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Urban Inequality and Segregation in Europe and China

Towards a New Dialogue

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Preface

The origins of this book lie in the 'Urban Transformations: Urban Development, Migration, Segregation and Inequality' research project, funded by the Chinese Academy of Social Sciences (CASS) and the Economic and Social Research Council (ESRC, Grant Reference: ES/N007603/1). One of the key goals of that project was to strengthen links between researchers in CASS and colleagues based at the universities of Glasgow and Sheffield, UK.

The project culminated in a research conference in the summer of 2017 at the University of Sheffield on 'Urban Segregation and Inequality in Europe and China', with an associated methods summer school for early career researchers and Ph.D. students. Speakers at the conference included Prof. Tiit Tammaru, Prof. Houkai Wei, Prof. Ya Ping Wang, Prof. Jingjing Shan, Prof. Guoqing Li, Dr Prof. Yiming Wang and Prof. Gwilym Pryce. The quality of the presentations, and the connections between them, led naturally to the idea of collecting the papers into an edited volume.

Meanwhile, another set of research connections were emerging between the Sheffield Methods Institute, University of Sheffield, and the Hebei Institute of Statistical Science (HISS), based in Hebei Province, China. HISS is responsible for overseeing the collection and analysis of census data for Hebei, which has a population and land mass of a similar size and scale as the UK. This collaboration led to a successful research bid to the ESRC Global Challenges Research Fund to investigate the 'Dynamics of Health and Environmental Inequalities in Hebei Province, China' (Grant Reference: ES/P003567/1). Led by Prof. Gwilym Pryce, the initiative brought together a research team comprised of Prof. Hui Song and Dr. Bifeng Wang from the HISS, and Prof. Gwilym Pryce, Dr. Yu Chen, Dr. Tim Birabi and Dr. Gwilym Owen from the University of Sheffield (plus additional collaborators from Beijing Normal University, Dr. Jing Ma, and the University of Liverpool, UK, Dr. Guanpeng Dong).

A key benefit of the Sheffield-HISS collaboration was that it opened up access to the Hebei Province Census data, which in turn led to detailed analysis of inequality and segregation in Hebei using cutting-edge statistical methods. This work was able to progress as a result of follow-on funding from of the ESRC Understanding Inequalities project (Grant Reference ES/P009301/1) of which Prof. Gwilym Pryce was

Co-Director. This expanded the research team to include Prof. David Manley, Dr. Meng Le Zhang, Dr. Dan Olner and Dr. Iva Křížková.

As these networks of research collaborations bourgeoned, so did the breadth and depth of the research, and the outcome is what we believe to be a substantial contribution to the field. From the outset, the goal of this collection of essays was that it would not only look back at how inequality and segregation have developed historically in Europe and China but also that it would look forward to how these phenomena should be researched and addressed in the coming decades. We hope this forward-looking theme will stimulate research and policy innovation and lead to substantial positive impacts on society.

Another central ethos in the creation of this book is that of communication, not only in terms of fostering a dialogue between European and Chinese researchers but also with respect to making the text as accessible as possible. A key element in achieving this goal has been the exemplary dedication of copy editor Phil Williams who has gone above and beyond the call of duty in helping us make the text clear and coherent. We are hugely indebted to him.

Our aim has also been for the text to become a resource that is freely available to researchers and policymakers across the globe. For this, we are grateful to funding from the ESRC that has enabled us to make the text fully 'Open Access'—that is, freely available to download for anyone with access to the internet.

We see this collection not as the last word on segregation and inequality, but as the start of a conversation. In that spirit, we welcome your feedback and your thoughts on how we can progress this important research agenda.

Sheffield, UK	Prof. Gwilym Pryce
Glasgow, UK	Prof. Ya Ping Wang
Sheffield, UK	Dr. Yu Chen
Beijing, China	Prof. Jingjing Shan
Beijing, China	Prof. Houkai Wei

In the original online edition of the book, cross-linking issues in chapter citations were corrected.

Contents

Chapter 1
Introduction: Urban Inequality and Segregation in Europe and China

Gwilym Pryce, Yu Chen, and Ya Ping Wang

Abstract In this chapter, we set out the rationale and key themes for the book. We briefly summarise the broad historical and institutional context, particularly the period of reform in China since 1978, and the background to the *hukou* household registration system, which has become a key source of segregation and inequality in modern China. We then provide an overview of the book including a synopsis of each chapter and the various links between them. We conclude with a call for further research and evidence-based policy innovation.

Keywords *Hukou* · Urban inequality · Residential segregation · Equilibrium sorting · Urbanisation · Shantytowns · Regional inequality · Urban villages · Social frontiers

1.1 Introduction

Issues of segregation and inequality have shifted to the forefront of political and academic debate in recent years. Piketty's (2014) magnum opus reinvigorated the literature on inequality, elevating the topic from the periphery to the central stage of economics and social science research. At the same time, public concern around issues of segregation and social integration has been heightened as a result of increased migration (Catney 2016; Fingleton et al. 2019; Phillimore 2020). In Europe, it is migration between countries which has been the main cause for concern. In

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China, internal migration, particularly from rural to urban areas, has generated both enormous economic growth and significant socio-economic inequalities (Liu 2005).

Unsurprisingly, there has been growing interest in the links between segregation and inequality in terms of both causes and consequences (Tammaru et al. 2016). While the literature on integration/segregation and inequality have traditionally been dominated by European and North American studies, there is burgeoning interest in these issues in the Chinese context. Economic liberalisation, rapid industrial restructuring, the unprecedented growth of cities and internal migration have reshaped the country profoundly. They have also led to increased socio-economic residential segregation and levels of income inequality that now surpass even the most neoliberal Western economies. Migration, segregation and inequality in Chinese cities have increasingly attracted academic attention over the last 20 years (Bian and Logan 1999; Wang 2004; Sicular et al. 2007; Cai et al. 2002; Liu et al. 2018). Nevertheless, the Chinese experience has remained under-represented in mainstream scholarly discussion.

Yet, the story of China's transition is truly remarkable and of global significance. Before 1978, China was known for its strict population movement control, welfare-oriented urban management and relative homogeneity in urban living conditions. After more than 40 years of economic reform, China has become a very different country (Wu et al. 2013). On the one hand, China has experienced spectacular success in urban development, which brought significant improvement for a large proportion of urban residents. The emerging middle classes in major cities own modern homes in well-designed new housing estates, many in gated communities. At the same time, however, millions of the urban poor and especially rural-to-urban migrants continue to live in shacks in suburban villages or in basements under glossy apartment buildings. The Chinese urban residential landscape, alongside the wider social, economic and political context, is becoming increasingly complex and polarised. Our understanding of Chinese cities and Chinese society is continually being challenged and reformed through these ongoing processes of change (Huang and Li 2014; Wang 2004; Wu 2004).

Chinese research efforts on these topics have clearly been overwhelmed by the enormity of the migration phenomenon and the complexity of the urbanisation process. Chinese approaches and methods are strongly influenced by the fast-changing social, economic and political environment. Within the hierarchical urban and rural administrative system, there is the distinctive feature of the population registration (*hukou*) structure, which affects migration patterns directly and the social and economic status of the migrants in destination cities and towns (Knight and Song 1999; Zhang and Tao 2012). Researchers from inside China often find it difficult to communicate these social and political restrictions to the global academic community, and researchers from outside find it difficult to understand the particular nuances of the Chinese social and political context.

The importance of *hukou* as a driver of segregation and inequality is a theme that permeates Parts II and III of the book so it is worth saying something here about its origins and nature. *Hukou* can be traced back to ancient Chinese systems of population registration and to 'techniques of social control … perfected in areas under Kuomintang and Japanese rule' in the early twentieth century (Cheng and Selden

1994, p. 645). However, *hukou* in its current form emerged during the 1950s when the communist government sought to introduce a comprehensive system of registration to control population movement and help demarcate eligibility for state-provided goods and services allocated under planned economy principles (Chan 2009).

The household registration system, *hukou*, emerged from these communist reforms as the,

> central institutional mechanism defining the city-countryside relationship and shaping important elements of state-society relations in the People's Republic. *Hukou* registration not only provided the principal basis for establishing identity, citizenship and proof of official status, it was essential for every aspect of daily life (Cheng and Selden 1994, p. 644).

For every individual, their registration status established their eligibility for employment, housing, clothing, food, education, health and social services. It also led to a bifurcated social system, where the provision of these services in urban areas was essentially 'owned and administered by the state' and urban citizens were 'the state's direct responsibility' (Banister 1987, p. 328). In contrast, the state assumed no such responsibility for these services in rural areas. Cheng and Selden (1994, pp. 644–645) explain that 'To the extent that any of these services have been available in the countryside, they have relied on the highly differentiated resources allocated by self-reliant rural communities (villages) or their collective sub-units (production teams)'. Migration, especially that from the countryside to cities, was strictly controlled by the state.

The effect of the *hukou* system was to create a geographical hierarchy where cities were favoured over rural communities in the allocation of services and economic development. There have been various reforms of the *hukou* system since the initiation of the economic reforms, partly to adapt to the unprecedented levels of rural-to-urban migration (Chan 2009). However, rural residents who moved to cities to find work, retain their rural *hukou* status. Without city *hukou* status, rural migrants had limited rights of access to health care, education, housing and social services. This binary system has become a key driver of urban inequality (Zhao and Howden-Chapman 2010), labour market stratification (Chen and Hoy 2008; Chan 2009) and residential segregation (Liu et al. 2018).

The focus of the present book is on the shared and contrasting experiences of segregation and inequality in Europe and China, and a desire to improve dialogue between scholars working in these related fields. Europe's varied cultural and economic history, including the rise and decline of communist planned economies, provides a rich backdrop for the study of segregation and inequality. What have we learned from the European experience of segregation, integration and inequality, and what insights can be gleaned to inform the bourgeoning interest in these issues in the Chinese context? How is China different, both in terms of the nature and consequences of segregation and inequality, and what are the implications for future research and policy? What forms do inequalities take in modern China? To what extent are they the natural outcome of an emerging meritocracy, and to what extent are they the byproduct of entrenched institutional inequities and bureaucratic failures? Has the process of reform and regeneration itself generated inequalities in housing, exposure

to pollution, and access to public services? These are the questions at the heart of this collected volume.

We believe this book offers a timely contribution to scholarship as China's significance increases globally and its policy focus shifts towards improving the quality of life rather than economic growth. To this end, we have drawn together leading researchers from Europe and China to reflect on the most relevant developments in research and policy, and to open up new avenues of scholarly conversation. The book also aims to provide guidance on future directions for policymakers and researchers in this increasingly important field.

1.2 Overview

The remainder of the book is organised into three parts:

- Part I: Lessons from Europe.
- Part II: Urban Inequality and Integration in China
- Part III: Future Directions for Research and Policy

We shall now summarise each of these sections in turn.

1.2.1 Part I: Lessons from Europe

In Part I, we review the European/Western experience in terms of the underlying social and economic drivers of segregation and inequality. The section begins with Chap. 2 by Aneta Piekut, which offers a review of European research on spatial segregation. Piekut highlights the key theoretical insights that explain why, in the absence of legally enforced apartheid, Western cities nevertheless become segregated along ethnic, religious and social divides. This is an interdisciplinary review spanning urban studies, sociology, psychology, spatial and human geography, providing a holistic understanding of the underlying mechanisms.

Chapter 3 by Tiit Tammaru and colleagues complements Piekut's survey of the literature by providing an empirical overview of trends in socio-economic residential segregation in European cities. They also investigate the specific hypothesis that income inequality is a major driver of residential segregation. Drawing on data for the cities of Amsterdam, Athens, Budapest, Helsinki, London, Madrid, Milan, Oslo, Prague, Riga, Tallinn, Stockholm and Vilnius, they find that changes in segregation levels tend to follow changes in inequality with a 10-year time lag. Although the analysis is preliminary, it nevertheless has important implications for the long-term trajectory of segregation for both European and Chinese cities if income inequality continues to rise.

1.2.2 Part II: Urban Inequality and Integration in China

Part II of the book starts with an overview by Yu Chen and Jie Chen of research on segregation in Chinese cities. Before the reforms in 1978, urban segregation had essentially been eradicated as a result of the socialist work-unit systems and the non-market allocation of housing. Since then, cities have become increasingly segregated as a result of a complex combination of institutional factors such as the *hukou* household registration system, massive rural–urban migration, economic and spatial restructuring, and market forces.

These themes, and China's recent policy responses, are explored in depth by Wei Houkai and Su Hongjian in Chap. 5. The authors document the processes and scale of urbanisation and rural-to-urban migration since the start of the reform era and the major shift in policy emphasis since 2014 towards quality improvement. This new agendum has led to growing recognition among policymakers that urban and rural poverty poses a major challenge to economic and social development, leading to a significant nationwide poverty reduction initiative. The authors offer a programme of reform that includes reform of the *hukou* system, urban–rural integration and coordinated poverty management.

One of the distinct features of China's urbanisation is the emergence of urban villages. As cities expanded, villages close to the urban periphery were absorbed and villagers converted their homes into rental properties to take advantage of the growing demand for accommodation from rural migrants. Many of these urban villages were redeveloped by city planners, and villagers were relocated to new housing. In Chap. 6, Ya Ping Wang uses a village in Beijing as a case study for this historical development, highlighting the associated benefits, challenges, and inequalities. A major theme once again is the persistent problem of the *hukou* system: 'the new property rights for the replacement flats confer no additional rights of citizenship for the relocated villagers who remain "second class" citizens within Chinese cities'.

In Chap. 7, Guoqing Li considers the related issue of shantytown renovation. The chapter provides a comparative study of four models of shantytown reconstruction, charting their emergence as new forms of urban community. Guoquing Li highlights the problems posed by shantytown renovation and the policy reforms needed to improve their integration into wider society.

In Chap. 8, Jingjing Shan and colleagues encourage us to step back from these specific examples of urban development to consider the wider system-driven disparities across the whole country. Inequalities have arisen as a result of China's rapid urban expansion and the persistant binary nature of the *hukou* registration system. The authors provide a detailed and comprehensive attempt to quantify inequalities in access to public services between the local urban population and migrant workers. The chapter considers inequalities between urban and rural areas, and also those within urban areas, and between regions. They find evidence of large inequalities at multiple geographical levels and argue for a programme of reforms to reduce inequalities in the geographical provision of education and medical health services, particularly in rural areas.

The final contribution in Part II is by Yeqiang Wang and Xin Dong (Chap. 9) which focuses on the problem of insecure and poor quality housing for migrant workers in China's cities. They provide a detailed account of the large discrepancies in levels of access to good quality accommodation between migrants from rural areas and the established urban population. These inequalities are exacerbated by inherited forms of residential registration that adversely affect rural migrants settling in towns and cities. The situation is worsened by land-use regulations that restrict the construction of collective dormitories for rural migrant workers. Policy responses over the past 20 years are evaluated, and recommendations for future policy development are proposed to improve housing conditions, including reform of land use regulations and improved property rights for migrants.

1.2.3 Part III: Future Directions

The third and final section of the book reflects on areas for future research and policy development with respect to urban segregation and inequality in China. Given the content and limitations of extant European research on integration and inequality, and the unique context of Chinese social and economic development, what should be the focus of future research and policy development in these fields? The final six chapters of the book suggest ways forward. They highlight elements of the Western literature that are most apposite to the Chinese context, and also the important differences in Chinese culture and society that need to be taken into account. Both aspects potentially open up new ways of thinking about segregation and inequality. There is a strong methodological theme to these chapters, drawing on cutting-edge ideas and methods to illuminate new avenues for inquiry.

The first of these chapters is Chap. 10 by David Manley, Gwilym Owen, Hui Song and Bifeng Wang. The authors draw on one of the most important innovations in segregation research in recent decades, the application of multi-level modelling techniques to the measurement of segregation. One of the limitations of traditional approaches is that they tend to be uni-dimensional. For example, they struggle to take into account the extent to which apparent segregation in one dimension (such as ethnicity) is in fact explained by segregation in another dimension (such as income). This is an important limitation as particular ethnic groups may have lower than average income. As a result, their geographic separation from other and wealthier ethnic groups may have nothing to do with a mutual aversion to living near people of different ethnicity, but simply due to the geographical concentration of affordable housing. The new generation of multilevel modelling approaches potentially overcomes this limitation, while also allowing researchers to distinguish between segregation occurring at different spatial scales. The authors of Chap. 10 explain the theoretical basis for this new approach and offer one of the first applications of the method to Chinese data. They use the model to estimate the segregation of different ethnic groups and of migrants versus non-migrants in Shijiazhuang, the capital city

of Hebei Province. The chapter concludes with suggestions for future research and policy development.

Residential segregation is a very important aspect of the separation of groups in society but is, by no means, the only form segregation takes. This is very clearly highlighted in Chap. 11, which considers segregation in social relations between care workers in Shanghai. The authors, Wenjing Zhang and Yiming Wang, use Social Network Analysis to conceptualise, visualise and explain friendships between workers in a care home. An important innovation is to complement the quantitative Social Network Analysis with qualitative interviews. Their approach not only reveals the extent of relationship segregation between migrant worker carers and those born locally but also shows how this new mixed-methods approach has the potential to transform and enrich future application network analysis in China and elsewhere.

Chapter 12 provides what is probably the first application in China of an 'equilibrium sorting model'. This sophisticated combination of economic theory and statistical analysis has become one of the most robust ways to model 'residential sorting'—the tendency for the housing market to group people by their characteristics, income and preferences. Such models have a wide range of applications including the estimation of people's willingness to pay for intangible amenities such as clean air, low crime, leisure facilities, green space, access to good schools and employment. The authors argue that being able to place a monetary value on these important drivers of human welfare will be essential for China to achieve its new priority goal of improving quality of life, as opposed to focusing exclusively on economic growth. One of the key methodological findings of this pioneering study is that it highlights the importance of incorporating mobility costs when using equilibrium sorting models to estimate the willingness to pay.

Further methodological developments are highlighted in Chap. 13 in the context of a particular form of residential segregation that arises from the way communities border. Authors Ivana Křížková, Meng Le Zhang, Dan Olner and Gwilym Pryce explore the concept of 'social frontiers' (Dean et al. 2019)—the existence of sharp spatial divisions in the residential make-up of adjacent communities that take on symbolic and territorial meaning. Whilst some social frontiers are marked by physical barriers, such as the 'peace walls'[1] in Belfast, many others are effectively invisible to researchers. Křížková and colleagues explain why these frontiers are considered an especially problematic form of residential segregation and demonstrate a practical empirical approach to their estimation. The authors use data on a post-socialist country, Czechia. This makes the study especially salient to the modern Chinese context with similar challenges associated with the deconstruction of historical institutions from the communist era, combined with new problems arising from market liberalisation.

Whilst most of the chapters in Part III focus on innovations in segregation research, in Chap. 14, Gwilym Owen and colleagues remind us of the need for methodological robustness and innovation with respect to the measurement of poverty and inequality. In order for China's poverty alleviation programme to be effective, it needs to find

[1] Security walls erected to keep rival communities apart.

reliable ways of quantifying and monitoring urban deprivation. Crucially, the burden of poverty is not just about lack of income, though this is often the key driver. Deprived households experience privations in a whole range of factors—including poor health, inadequate housing, limited access to public services, employment and education, and high levels of crime and environmental pollution. China's new public policy emphasis on improving quality of life leads, unsurprisingly, to the need to target resources effectively. To this end, Chinese researchers are finding ways to estimate Indices of Multiple Deprivation (IMDs) to highlight and address geographical inequalities. Originally developed in the UK, IMDs offer a powerful tool to capture multiple layers of disadvantage at the neighbourhood level. Unfortunately, data limitations pose real challenges for computing reliable IMDs in China. These problems have been made worse by methodological weaknesses in some of the recent Chinese applications. Gwilym Owen and colleagues 'seek to bring direction and conceptual rigour to this nascent literature by establishing a set of core principles for IMD estimation that are relevant and feasible in the Chinese context'. They demonstrate these principles with an empirical application to census data on Shijiazhuang, the capital city of Hebei province. Their four-step approach provides a template for provincial and city-region governments throughout China to monitor and address deprivation.

In the concluding chapter (Chap. 15), Gwilym Pryce attempts to synthesise the findings of the book, identify areas where more research is needed and highlight opportunities for innovation both in research methods and policy development. A key area for future research is the need to shift from a static understanding of segregation towards a dynamic one. This is especially important in the Chinese context where so much remains in flux and urban change continues at an astonishing pace in many cities. In line with this dynamic perspective, Pryce then considers the way in which inequality and segregation are related, drawing on the recent work of Galster and Sharkey (2017). The chapter goes on to highlight the relational and psychological impacts of inequality and segregation, which need to be included in the calculus of social and economic policy. The chapter concludes by reflecting on the implications of the Causal Revolution in social science research methods. These have the potential to transform the way urban policy in China is developed and evaluated when combined with these other proposed directions in future research.

1.3 Conclusion

Our goal in this collected volume is to bring important research on Chinese segregation and inequality to an international audience and further the dialogue between European and Chinese scholars in particular. We hope you be both intellectually stimulated by this collection of essays, and also inspired to find new and effective ways of alleviating the social and economic challenges facing the people of China.

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Part I
Lessons from Europe

Chapter 2
Re-Theorising Spatial Segregation: A European Perspective

Aneta Piekut

Abstract Research on segregation is traditionally associated with studies on residential segregation and the patterns of spatial clustering of minority ethnic groups or residents with immigrant backgrounds. This chapter examines European research on spatial segregation through various social science disciplines, including urban studies, sociology, psychology, spatial and human geography. It presents the range of theoretical approaches employed to explain why people who belong, or are perceived to belong, to dissimilar social categories or to hold different identities become spatially separated from each other, and ways in which this may change. Factors that influence segregation are interrelated. A holistic, interdisciplinary approach to spatial segregation is, therefore, essential to understand such mechanisms and then design policies to counter any negative impacts of segregation. Individual and group experiences are shaped by varied contexts, whether residential, work, leisure, transport and daily encounters. This chapter examines approaches to spatial segregation from a variety of disciplinary perspectives and indicates possible directions for future research.

Keywords Residential segregation · Non-residential segregation · Ethnic segregation · Domains of segregation · Measuring segregation

2.1 Introduction

Understanding the patterns of residential segregation and spatial clustering of minority ethnic groups or residents with immigrant backgrounds has been a key focus of research on segregation in the last century. More recently, however, there has been growing recognition in the scholarship on segregation that people's social lives are not constrained to one dominant space, such as where they live. Spatial segregation might happen in various types of spaces, in living places, work, leisure, means of transport and daily encounters. Many places of everyday social practices shape

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social relations, and more importantly, can impact individual and group behaviours and experiences (Van Kempen and Wissink 2014). We can only begin to grasp the full effects of spatial separation if we concurrently examine conditions both within and outside the residential space (Van Ham and Tammaru 2016). By looking at approaches from different disciplines, this chapter aims to identify the potential for further innovations in conceptualising and measuring spatial segregation.

Some scholars conceive spatial segregation as a neutral concept, which simply refers to 'the unequal distribution of a population group over a particular area (a city, for example)' (Bolt et al. 2010: 171). Seen from this perspective, segregation simply involves the over-representation of some groups and under-representation of others in relation to their overall share in a larger social space. Spatial segregation exists in all societies, and the perfect equal distribution of various groups across specific spaces is almost impossible to achieve. Other scholars, however, argue that spatial segregation reflects wider social inequalities and should not be seen as a neutral process. Spatial separation mirrors the way societies are organised, produce and distribute resources (Arbaci 2019). Researchers who specifically explore income inequalities and socioeconomic segregation notice that it is 'an involuntary concentration of a social group in a particular area due to their disadvantaged position within society.' Consequently, it is used as an intended and deliberate strategy by the more powerful and affluent for 'conscious socio-spatial distancing' (Sykora 2009: 432).

In this chapter, spatial segregation is approached in the first sense, in a demographic manner, as an unequal representation of some groups across various spaces. Yet, some forms or thresholds of segregation might originate from unequal access to social resources, and hence represent societal inequalities. The chapter will cite sources that demonstrate this to be the case.

The focus is on the lack of physical interaction between groups classified as dissimilar at different *levels*: individual contact, working in different locations, residing in different neighbourhoods. I draw predominantly on literature published in English, which analyses inter-ethnic relations. This means that sources are inevitably *selective* and chosen to show the variety of theoretical approaches in European scholarship on spatial segregation.

2.2 Traditional Approaches to Studying Segregation

Those studies that explore residential segregation for pre-defined administrative areas, and then quantify findings using segregation indices, belong to 'traditional' approaches to research of this kind. They developed from the pioneering studies of the Chicago School, which considered the spatial dispersion of population with more recent immigration experience as an indicator of their economic integration (Burgess 1923). This model has become known as the *spatial assimilation* or *spatial integration* model and was extensively tested in studies on segregation in the USA.

Later U.S.-based research questioned the dominant role of socio-economic factors, such as income and education, in areas with a high concentration of black

American and Hispanic residents. They demonstrated that even after the mitigation of such factors, ethnic segregation remains high among lower status groups (Massey 1979). The extremely high concentration of black Americans in cities after the Second World War was a result of a 'vicious circle' of racist attitudes, individual behaviour and institutionalised exclusion (Massey, Denton 1993).

Past American research perceived the lack of residential mobility among minority populations as an indicator of the lack of integration and inclusion, and consequently, segregation was cast as a negative phenomenon. Many subsequent studies in both the USA and Europe endorsed this approach, linking the spatial concentration of some vulnerable populations with their lack of cultural assimilation and integration in the labour market, low social mobility, and other negative consequences (for review, see Musterd 2003; Phillips 2007). As Sako Musterd reflected at the beginning of the present century:

> … many studies that were carried out on both sides of the Atlantic contained an underlying philosophy that mixed neighbourhoods offer the best opportunities for integration and full participation in society (Musterd 2003: 624).

The straightforward link between integration and residential segregation has since been widely questioned by European scholars, who recognised different factors in their own context than applied to white-black segregation in the USA (Arbaci, Malheiros 2010; Bolt et al. 2010; Musterd 2003). The 'classic' spatial assimilation model does not recognise that some groups might either have different preferences or there might be structural barriers limiting their spatial mobility. Spatial dispersion might not be the desired state for some groups, and they might prefer to remain in a neighbourhood where other members of their social networks live in order to support each other, have easier access to specific services and networks, or feel safer (Peach 1996).

Such an 'ethnic minority choice' approach overtly focuses on the one side of the choice—the minority group, whereas 'white segregation'—or segregation of any other majority group—is rarely seen as problematic (Phillips 2007). While self-selection into segregation, reflecting a preference for living in more homogenous areas, is usually connected with ethnic minority or immigrant communities, research shows that it is in fact more common among the majority group, usually white and/or indigenous (Harris and Johnston 2018). Studies in the UK and Sweden demonstrate that the main driving force behind segregation between ethnic minority and majority groups is 'white avoidance', that is the preference among the majority white population to settle in neighbourhoods, which are not ethnically diverse (Andersen 2017; Kaufmann and Harris 2015).

Spatial mixing does not directly translate into social integration for migrant communities. Integration in the spheres of the labour market, education and political participation of Turkish, Moroccan and Surinamese in Amsterdam in the 1990s was found not to correspond with their level of segregation (Musterd 2003). By contrast, a study exploring immigrant concentration in Southern European countries demonstrated that de-segregation processes were neither a result of more social inclusion of immigrants nor were they followed by integration understood in terms of parity in

quality of life and housing conditions (Arbaci and Malheiros 2010). In fact, policies that support the spatial dispersal of immigrant populations might worsen their living conditions, as there is often a lower quality of affordable and available accommodation in peripheral areas. However, in many European cities, it is the inner city that is the least affordable and dominated by affluent households (Brueckner et al. 1999), a pattern that is also becoming increasingly recognisable in cities in the UK and USA due to urban regeneration and the decentralisation of poverty (Zhang and Pryce 2019; Keebone and Berube 2013).

While social segregation is usually associated with spatial separation between people of dissimilar ethnicity, race or migrant status, it often overlaps with socioeconomic divisions. Income inequalities are the driving forces behind residential socioeconomic segregation, yet the concentration of migrant communities in more disadvantaged areas, as most initially lack resources to live elsewhere, fuels further spatial separation (Tammaru et al. 2019). Although income inequalities may reduce over time, ethnic segregation can persist and even be transmitted between generations. A U.K. study demonstrated that, even after accounting for differences in socioeconomic status and childhood neighbourhood characteristics, second-generation ethnic minorities, especially Pakistanis, Bangladeshi and Africans, were still less likely than White British to reside in areas of low segregation (Zuccotti 2019).

Growing income inequality might not always lead to increased residential segregation. In the post-socialist societies of Eastern Europe, the growth of inequality was actually accompanied by more social mixing as a result of gentrification, with wealthier groups moving to areas of lower social status (Sýkora 2009). But this finding might be contingent on the spatial scale at which segregation is measured; there may, for example, have been a rise in segregation at the more fine-grained local level. Similarly, Southern European cities have rather low or moderate levels of spatial segregation between native and foreign-born groups in comparison to Northern Europe. However, ethnic minority groups have become more marginalised over time, through exclusion from homeownership for instance (Arbaci 2019). Both studies point to the different nature of segregation in Eastern and Southern Europe, which manifests more as forms of 'mosaic' or micro-segregation, harder to capture with indices of segregation.

In summary, the process of spatial segregation is contextual and driven by varied factors across different societies (Arbaci 2019). A range of factors lie behind segregation, both at the micro and macro levels and extend beyond 'choice versus constraint' arguments, such as institutionalised discrimination and hostility from the majority group or inequality of access to power and resources, including housing, education or political representation (Peach 1996). Despite that, the 'minority choice argument' has often been accommodated in popular debates, and the voluntary 'self-segregation' of some minorities has become associated with issues of security and national unity, leading to the stigmatisation of some ethnic groups (Phillips 2007). The following sections of this chapter will examine research on spatial segregation across various levels and spaces, to challenge this simplistic perspective.

2.3 Relational Perspectives: The Scale and the Distance

Research into spatial segregation during the twentieth century drew predominantly on aggregated data for predefined spatial units, such as administrative or statistical regions. Over the last two decades, academics have increasingly recognised that such borders rarely overlap with people's local social lives or subjectively constructed boundaries between communities. It could be, for example, that a community composed of a minority ethnic group spreads across two or three administrative regions but only comprises a small fraction of their population. In these instances, commonly applied segregation measures will not capture their spatial clustering. This is symptomatic of a wider problem that has become known as the modifiable areal unit problem (MAUP). Point-based data on individual residential locations are typically aggregated to areal units. The difficulty posed by MAUP is that the results of a particular segregation measure will vary depending on the size and shape of the areal units (Nielsen and Hennerdal 2017). Arbitrarily redrawing areal unit boundaries, while keeping their size the same, can lead to significantly different segregation results from standard measures. This is also true of shifting to a larger or smaller geographic scale, though this may also be the result of genuine differences in the nature of segregation at different scales.

2.3.1 Multiple Scales

Segregation at different scales may be driven by different mechanisms and might have different consequences for minority groups and for inter-group relations (Andersson et al. 2018). By analysing levels of segregation at a smaller scale, such as walking distance, we can identify areas of everyday interactions between neighbours, and the implications for social cohesion, community attachment and belonging, local support and trust, volunteering and community initiatives (Catney 2018). Easton and Pryce (2019) also argue that xenophobia and processes of White Flight are likely to be more potent at the micro-neighbourhood level: 'social connections and interactions are more likely to occur in close proximity—residents' awareness of other households is likely to be greatest with respect to those who live closest. One might therefore expect the effect of incomers on the moving decisions of existing residents to decay with distance—the impact of changes in close neighbours will likely be much greater than changes a block or two away.' There is also evidence that homophily—the tendency for movers to be drawn to areas with a high proportion of people with the same ethnic/social characteristics as one's own—is more potent at the local scale (Bakens and Pryce 2019).

Meanwhile, degrees of segregation on a larger scale might represent processes at the level of an institutionalised community environment, such as local councils responsible for schools and services, or even larger government or regional zones

with their own public transport and budgeting (Reardon et al. 2008). In such cases, segregated groups have lower chances to meet each other and share activities.

Work on more spatially defined segregation measures has laid foundations for research by analysing it at multiple scales simultaneously. Using a spatial theory information index developed by Reardon and O'Sullivan (2004)—which computes spatially weighted and scale sensitive segregation measures—a study by Reardon and colleagues (2008) demonstrated how micro- and macro-level segregations behave differently, although they still might be interlinked. They computed micro/macro segregation ratios for 40 metropolitan areas in the USA, in the period 1980–2000, which revealed that micro-scale segregation was in some areas largely due to macro-scale segregation between white and black populations. They concluded that this relationship between levels of segregation is 'a distinct dimension of segregation patterns than that measured by the segregation level alone' (Reardon et al. 2008: 500).

However, as Harris (2017) explains, past research has not separated the higher-level segregation from divisions at lower levels, and the former is automatically included when calculating the degree of segregation at the finest levels. He advocated disaggregating the traditional segregation indices into a series of localised values using multilevel modelling. By employing this technique, a study in Leicester, UK, contradicted many previous findings by revealing greater levels of segregation among residents with Indian ethnicity at the largest rather than the smallest measured scale (Jones et al. 2018).

Multiscalar research provides various methods to measure degrees and levels of segregation and the interconnections between them. A study based on individual-level register data in the Netherlands treated the scale as a continuous variable, assuming that the closest areas—the immediate neighbourhoods—are 'the keystones that drive spatial patterns at both smaller and larger scales' (p. 1069). They generated bespoke neighbourhoods (see *egohoods* below) at 101 spatial scales and created profiles of ethnic exposure for each 100 m x 100 m cell (Petrović et al. 2018). This innovative approach showed how different scales of ethnic exposure are affected by the city's form and layout, affecting issues like the level of polycentricity and fragmentation. They also detected 'social cliffs' in the segregation continuum, with sudden changes in ethnic exposure between majority to non-Western minority populations. As such, this research has brought together the three concepts central to current research on segregation: multiple scales, the centre and the border. The latter two are discussed further below.

2.3.1.1 The Centre: Egohoods

Researchers studying community social relations and the social effects of neighbourhood attributes emphasise that people perceive themselves as centres of the neighbourhood. They coined the term *egohood* to describe a concentric area around someone's residential location. It is an individualised, egocentric neighbourhood (Andersson and Malmberg 2015). More importantly, they argued that individual

households do not belong to a single meaningful area, but to multiple egohoods serving numerous functions at the same time: school catchment areas, housing estates, shopping and leisure time areas, a political ward and larger municipal area (Hipp and Boessen 2013).

Egohoods have been defined in multiple ways:

(1) as a pre-defined radius, where an individual or address is taken as the central point (Reardon et al. 2008; Bakens and Pryce 2019);
(2) in relation to a density of population around a person/household, i.e. using the number of nearest neighbours—the k-nearest neighbour method (Malmberg et al. 2018);
(3) using specified travel time buffers to account for access to local services and resources (Petrović et al. 2018).

Still, the process of circling one-size-fits-all individualised neighbourhoods has limitations. In reality, they might be irregular in shape, vary in size and form for different groups and depend on activity patterns, neighbourhood attachment and social position (Van Gent et al. 2016).

Such a fine-grained statistical analysis of segregation is only possible if data are available at the individual or very small-scale level. Only then can data for specific points or tiny areas be flexibly aggregated into egocentric neighbourhoods. Researchers have usually computed segregation indices for egohoods of different sizes, thereby allowing for the analysis of segregation at multiple scales simultaneously.

Two separate studies in Sweden—based on register data for 1990, 1997, 2005 and 2012—demonstrated that segregation was both higher at the smaller-scale egohoods and had increased over time (Malmberg et al. 2018; Nielsen and Hennerdal 2017).[1] While segregation was on the decline according to the results computed with the dissimilarity indices, the analysis for smaller egohoods exposed emerging new clusters of non-European migrants in areas of previously lower segregation (Malmberg et al. 2018). Lower segregation at the larger scale areas might be the result of housing policies as shown by a comparative study in Belgium, Denmark, Netherlands and Sweden (Andersson et al. 2018). While, at the smallest scale areas, patterns of segregation were quite similar among the four countries, the Belgian results differed at the larger scale. Belgium was the only studied country that did not use housing dispersal policies to manage refugee settlement and this may account for the disparity.

[1] Nielsen and Hennerdal (2017) undertook a slightly different approach to measuring egocentric segregation: the share of immigrant population in the k-nearest area was compared to the share in the larger population K.

2.3.2 The Periphery: Borders

An important limitation of simple distance-based egohood approaches is that an individual may not, however, perceive themselves to be at the centre of a neighbourhood—they may recognise that they live at its periphery. The disciplines of criminology extend the pattern outwards by exploring the importance of liminal areas, the peripheries and boundaries of a community. These include both administrative borders and physical barriers, and studies can demonstrate how their existence can often translate into deviant or illicit behaviours. Borders between communities might be physical, such as streets, rivers, rail tracks, unoccupied land or walls, yet some might be 'merely' symbolic and subjective (Legewie 2018).

The presence of environmental barriers is often associated with different blends and representation of racial groups, resulting in a higher level of spatial segregation in a given area (Noonan 2005). Patterns of behaviour can be influenced by proximity to environmental barriers, as residents are less likely to interact with each other and less attached to neighbourhoods (Hipp et al. 2014). A study on how public space is used by Protestants and Catholics in Belfast also revealed how physical boundaries, including the Peace Walls, stimulated further self-segregation. They encouraged people to travel in ways that avoided contact with members of the other group (Abdelmonem and McWhinney 2015). Finally, inter-communal violence can cluster around such territorial boundaries, if they separate gangs and groups, which retain hostile relations with each other (Brantingham et al. 2012).

Studies have employed the 'aerial wobbling technique' (borrowed from ecology) to detect steep changes between neighbourhoods and identify areas of meaningful separation between social groups. As argued by Legewie (2018), past segregation research largely ignored areas of transition between relatively homogenous populations and spatial inequalities within neighbourhoods. Dean and colleagues named such boundaries 'social frontiers', as they 'represent cliff edges in the complex landscape of segregation' (Dean et al. 2019: 272). As residents who live in close proximity to a social frontier are likely to be located on the periphery of their community, they are not so strongly governed by the mechanisms of group social control. Such boundaries often do not overlap with any physical barriers but are rather perceived subjectively, reflecting sudden changes in population composition by ethnicity/race and socioeconomic status, or a combination of each.

It is possible to detect such boundaries in instances where low-level geocoded data have yet to be extensively applied. Using incident-level crime data, Legewie (2018) analysed the relationship between racial neighbourhood boundaries and violent crime in Chicago. In another study, Legewie and Schaeffer (2016) explored antisocial behaviour in so-called 'transition/contested zones' in New York using geocoded data from emergency calls. In Sheffield, UK, Dean et al. (2019) found higher levels for various crimes, such as violence, burglary, shoplifting and vehicle crime, in neighbourhoods adjacent to social frontiers than in neighbourhoods alongside administrative borders. Chapter 13 of this book describes further research on 'social frontiers'.

2.4 Beyond Residential Segregation

The focus on residential segregation can be attributed to the fact that individual life choices and social lives were once more dependent on longer term residence in particular neighbourhoods. A few decades ago, people were more likely to spend their entire lives in one or two areas rather than growing up in one neighbourhood and then move to another. The neighbourhood, although still important, is not the only area where people spend their time. For those who are less mobile, the neighbourhood might indeed be the main space that shapes their daily activities, providing social support and networks. For other people—especially those who spend less social and leisure time in their immediate locality—it could be a less important space. The pitfalls of focusing on residential segregation were explained by Ronald Van Kempen and Bart Wissink:

> People have multiple identifications and a varying part of these relate to the neighbourhood. (…) they receive stimuli from a lot of different people in numerous settings, of which the neighbourhood is only one. We should therefore not only study people as residents of neighbourhoods, but also as workers, visitors, long-distance travellers, shoppers, commuters, and so forth. These different roles potentially support new meetings and new identifications beyond the residential neighbourhood. At the same time, we should have special attention for variations between groups: some people might be "more" neighbours than others (Van Kempen and Wissink 2014: 103).

Van Ham and Tammaru (2016) urged social scientists to study multiple domains of segregation simultaneously, considering the linkages between them, and how they change over time. They identified five major domains for the study of ethnic segregation: home, leisure, work, school and travel. Such a multi-domain approach—they stressed—is vital to develop relevant policies to counter the negative effects of segregation as these might not be possible if we only concentrate on the residential settings. The recognition of a multiplicity of places where people develop social networks is not new in urban studies; however, such research could flourish given more availability of data beyond the place of residence (Van Kempen and Wissink 2014).

2.4.1 School Segregation

Schools—like neighbourhoods—are spaces of resources: physical facilities,[2] human capital from teachers and other staff, and social capital from other students. If the allocation of resources across schools is correlated with their racial composition, segregation will affect students' outcomes (Reardon and Owens 2014).

[2] School Segregation has received a lot of attention in past decades in the USA, where laws enforced separation between white and black pupils until 1954 (i.e. Supreme Court's *Brown v. Board of Education* decision).

We would expect that ethnic segregation at the *primary* school level[3] to be related to the composition of the school catchment area. Yet, various European studies demonstrated that this might not be the case. An analysis based on 2001 School Census and 2001 Population Census in the UK confirmed a high correlation between school and residential segregation (Burgess et al. 2005). It was, however, higher in the case of some minority groups, such as Indian, Pakistani and Bangladeshi. Interestingly, the deprivation level of the local education area was accompanied by segregation of Black Caribbean pupils only, but not by Indian.[4] However, another study found no relationship between school segregation and school deprivation (measured by the number of free school meals; Burgess, Wilson 2005).

Free school choice that permits self-selection by some groups into more desirable schools leads to higher school segregation. The introduction of an open enrolment system in Sweden has allowed more privileged and better-off parents to choose schools outside their area of residence. A shorter distance to school was more important for less wealthy families, single parents and minority households (Malmberg et al. 2014). A study in Amsterdam revealed that some parents even decided to move to less ethnically diverse school catchment areas (Boterman 2013). Similarly, a Danish study conducted in Copenhagen demonstrated that primary school segregation would be lower if students attended only schools in their catchment area (Rangvid 2007). The gap between ethnic segregation in residential areas and higher levels of school segregation was largely due to parental socioeconomic status. A more recent study in Copenhagen showed that despite an overall slight decrease in segregation across state-run schools, segregation increased across the private school sector (Skovgaard Nielsen and Andersen 2019). This pattern might not be universal and depends on the size of the minority group. In countries with lower immigration, like the Czech Republic, the concentration of pupils without Czech citizenship in schools in the period 2005–20013 was largely an outcome of higher regional concentration (Hasman et al. 2016).

Another common question raised in the school segregation literature is its effect on performance. Pupils with migrant backgrounds, such as Turks in Germany, fare worse in schools with high concentrations of students with similar origins. This could be due to their undertaking education in schools with less resources and levels of support (Söhn and Özcan 2006). In Sweden, in regions with high or medium levels of visibly non-European ethnic minorities, pupil performance substantially varied across schools (Andersson et al. 2010). This was partially explained by students' socioeconomic status, but many inter-school variations remained unexplained (Andersson et al. 2010). A U.K. study demonstrated that the school effect might be very different across migrants from different backgrounds. Indian pupils

[3] The particular structure of the educational system and institutional discrimination might be to blame for school segregation at higher levels. At varying transitional stages, minority students might be encouraged to select schools with specific profiles, e.g. of vocational not academic profile (Söhn and Özcan 2006).

[4] A Birmingham based study revealed that higher levels of school concentration among Black Caribbean pupils are partially explained by their preference of faith schools (Harris and Johnston 2017).

in Leicester achieved good test scores in all types of school, while Pakistanis in Bradford had higher scores only if they attended schools with lower segregation and more white students (Johnston et al. 2007).

When it comes to measuring levels of segregation, studies of this kind usually calculate an index of dissimilarity across educational areas using data for schools as smaller units (i.e. evenness of distribution of a minority group across schools within a given education area). An index of isolation is also used to explore the probabilities of meeting students with the same ethnicity or studies calculate percentages of ethnic minority groups within schools. Leckie and Goldstein (2015) used a multilevel random-coefficient model to study multigroup segregation among London secondary schools. They found that segregation levels between cohorts of White, Black, and Asian pupils remained stable over a decade, 2001–2010 (see multiscale segregation, Chap. 10).

2.4.2 Workplace Segregation

The workplace constitutes an important arena for social relations and inter-group contact outside the residential neighbourhood for adults active in the labour market (DiTomaso et al. 2007). Residential and work lives might be interconnected through different mechanisms:

(1) the proximity of both locations resulting in the similarity of co-workers, as people might prefer to work close to where they live;
(2) the network effect: when a neighbourhood support-base may facilitate finding employment through social networks (Granovetter 1995; Ioannides and Loury 2004);
(3) discrimination against immigrant/minority population living in stigmatised areas of high concentration, pushing them into jobs with a high proportion of migrant workers (Strömgren et al. 2014).

These three effects will vary across groups depending on their minority/majority status, gender and socioeconomic position. Some groups such as recent migrants may rely more heavily on local networks or prefer to work closer to home due to caring responsibilities.

One of the main questions in workplace segregation research, as in school-based studies, is the level of correlation with residential segregation. Do people living in ethnically segregated neighbourhoods also work in ethnically segregated workplace areas? A U.S. study has revealed that although workplace segregation is lower than residential segregation, both were in a strong, positive correlation (Ellis et al. 2004). The same was found in Sweden (Marcińczak et al. 2015), meaning that immigrants living in areas of higher segregation were also more likely to work in more segregated workplaces. This was more apparent for immigrant women, who might depend more on residential networks. Gender differences in workplace segregation did not exist for sectors requiring higher qualifications, like education (Tammaru et al. 2016).

Studies in Sweden and Germany have shown that workplace segregation between immigrant and non-migrant workers was common across all industries, but more pronounced in low-skill intensive sectors, such as agriculture, construction or small services (Åslund and Skans 2010; Glitz 2014).[5]

Status inequalities within the workforce will depend on, but also strengthen, existing structural relationships within society (DiTomaso et al. 2007). Segmentation of the labour market along ethnic lines is considered to be the driving force behind workplace segregation and 'is unlikely to be the result of a completely voluntary sorting process' (Åslund and Skans 2010: 489). An analysis based on linked employer–employee data in Sweden (1985–2002) demonstrated that the lower economic status of migrants was one of the most important factors explaining the high concentration of immigrants in some workplaces. A similar analysis for Germany (1975–2008) revealed that although ethnic workplace segregation declined with time spent in the labour market, it still remained high for some immigrant groups, such as those from Asian countries or Turkey, and very low for those from other European countries such as Austria (Glitz 2014).

2.4.3 Other Domains of Segregation

Spatial segregation is not limited to residential and institutional spaces, such as schools and employment. Not all people are employees: some are self-employed working off-site, some work at home taking care of the family, some are unable to work due to health conditions, unemployment or retirement, or are too young to work. For such groups, segregation in other activity domains, where they socialise and spend leisure time, might be more important. Such out-of-home and out-of-work segregation between Estonians and Russians was a topic of study in Tallinn, Estonia (Kamenik et al. 2015; Kukk et al. 2019). Based on the Estonian Time Use Survey for 2000 and 2010 and qualitative interviews, these studies demonstrated that although both groups were engaged in similar types of leisure activities, they practised them in different places and different times. Leisure time segregation was connected to residential segregation, as most participants claimed to have spent free time in the vicinity of their homes. Hence, although the study originated from the need to concentrate on issues other than the domestic and employment domains, it also demonstrated the significance of the neighbourhood as a site for inter-ethnic encounters, translating into segregation in leisure time spaces.

The level of ethnic segregation across voluntary organisations was indirectly a topic of Achbari (2015) study. It surveyed 400 participants in 37 organisations in

[5] Segregation was defined in terms of levels of separation between workplaces, i.e. minority or majority workers not working together in one registered unit (so the actual daily exposure was not tested). Glitz (2014) also computed a conditional segregation measure, which accounted for skills level of workers.

the Netherlands to explore whether homogenous Turkish or ethnically mixed organisations supported higher levels of political engagement. The study found that both attracted participants who were already more politically engaged. A comparative study of associations from Mannheim, Germany, Enschede, the Netherlands and Aberdeen in Scotland (van der Meer 2016) surveyed 3166 active participants in 645 organisations of different ethnic make-up. It revealed that more trusting and tolerant citizens participate in organisations with higher proportions of minority ethnic groups, which could be seen as a form of self-segregation.

In summary, compared with 'traditional' segregation research on residential areas, studies in these other domains have not developed innovative measures to assess spatial segregation. Instead, segregation has been conceptualised as the exposure to minority/majority group members and consequently systems to monitor more complex patterns of separation/contact—such as people working at different floors, coming to different meetings, etc.—have yet to be devised.

2.5 Segregation at the Micro-Ecological Scale

There is another level of segregation, which has not been considered by research based on multi-scalar and multi-domain perspectives: the individual. Psychological research on the so-called micro-ecological scale of segregation, or micro-segregation, has focused on 'the everyday, interpersonal interactions between people in informal settings' (Tredoux and Dixon 2009: 761). This research has argued that even in settings, which have low levels of segregation at home or work, people might still avoid contact with one another in shared everyday spaces. A great deal of micro-ecological research has been conducted not only in educational spaces, such as university dining halls, university stairs/sitting areas, university theatres or classrooms, but also in various urban public and leisure spaces, such as public transport, parks, squares and streets, beaches and nightclubs. Researchers have recorded and analysed the spatio-temporal position of individuals, such as sitting patterns, and the extent of interactions between individuals perceived to represent visibly different groups.

A micro-ecological approach to segregation arose from the rich research tradition on inter-group contact in psychology, starting with the influential work of Gordon Allport and his contact hypothesis (Allport 1954). This theory posits that prejudice can be challenged and reduced by positive face-to-face interaction if the status of involved members of different groups is equal and they have a common goal to pursue. Micro-segregation research in psychology has its origins in recognising the importance of space for daily human interactions, and that contact without a contextualised spatial layer would become a merely neutral act:

> … space is highly significant for human interaction; we interact rather differently in the "spaces" of funerals and weddings. Various kinds of space either enable or constrain particular kinds of action. Places have specific meanings for people; they resonate with symbolic and emotional significance. We all carry with us various senses of "place identity". Spaces

> are anything but mere inert backdrops, as we may immediately recognise in "home" and "away" sporting records. When space is allowed to disappear so too do two other features integral to the analysis of space: bodies and temporal sequences. When bodily processes, space and temporal sequencing are faded into the background, then "contact" just becomes an apparently neutral event, hollowed out from the very bodily practices which constitute it and which endow it with different meanings (Foster 2005: 498).

Psychologists argued that macro-level segregation, albeit important and driven by policies and other macro-level mechanisms, cannot explain how people interact with each other on a daily basis, and macro-scale research misses the 'boundary processes unfolding within the most intimate domains of everyday life' (Tredoux and Dixon 2009: 774).

A systematic review conducted by Bettencourt et al. (2019) neatly summarises different, yet inter-linked mechanisms explaining why people self-segregate at the micro-scale. First, the holding of negative attitudes and stereotypes underpins stronger in-group identification and higher perceived threats to the holders' own identity and values. Such individuals are more likely to feel anxious and uncomfortable when meeting dissimilar/other/minority group members (intergroup anxiety); and as a result, may wish to move only within so-called 'spatial comfort zones', which are ethnically or racially homogenous and provide them feelings of safety. This behaviour might finally lead to the development of exclusionist social norms promoting and strengthening micro-segregation patterns.

A micro-ecological perspective does not imply that prejudice operates just at the individual and every day, banal level, and that society is free from racism or other forms of structural inequalities. On the contrary, it recognises that 'space is heavily implicated in persisting forms of oppression such as racialisation' (Foster 2005: 496). Racial evaluation is an 'activity that people do together' (Durrheim, Dixon 2004: 632), and such repeated social behaviours of racial exclusion and micro-segregation represent broader norms and practices operating in a given society.

The main methods of measuring the micro-ecology of segregation involve the observation and mapping of locations. These are then often quantified with indices of segregation to enable researchers to compare how they change over the time involved in data recording. For example, Dixon and Durrheim (2003) plotted the distribution of white and black beachgoers by taking a series of aerial photos over a period of 10 days (two photos a day), then mapped the location of everyone present at the beach and marked whether they were white or black. For each observational time unit, they computed dissimilarity and interaction indices. In a similar fashion, a research team conducted a study on sitting patterns in a multi-ethnic cafeteria (Clack et al. 2005). They recorded specific sitting positions during different lunch times for white and Asian customers on a diagram divided into six sub-sections and then computed the level of segregation through spatio-temporal clustering patterns.

The work of South African psychologist John Dixon and Kevin Durrheim, and specifically their 2003 beach study, demonstrates how segregation in one type of space operates at multiple levels: (1) individual/micro (no contact between any white and black beach users), (2) groups occupying different parts of the beach (sectoral

segregation) and (3) white users responding to the influx of black users by withdrawing from the beach space altogether.[6] Because segregation was institutionalised across all spheres of life in apartheid South Africa (1948-1994), they coined the term 'informal segregation' to describe a form of segregation that operates despite the absence of legally enforced intergroup boundaries (Dixon and Durrheim 2003).

Research on the micro-ecology of segregation has spread to other countries and disciplines. In Chicago, USA, a study conducted on train seating patterns also revealed that segregation persists in everyday life despite the ending of enforced segregation in the 1960s (Swyngedouw 2013). Americans were more likely to sit close to and interact with passengers who were similar to themselves in terms of marks of class and race. A longitudinal study of classroom seating patterns among Protestant and Catholic pupils in three integrated secondary schools in Northern Ireland also demonstrated that segregation is persistent over time, even after formal barriers are removed (McKeown et al. 2016). When asked in a questionnaire, pupils also expressed their own group preferences for extracurricular activities, such as playing or eating. The study of cafeteria sitting patterns in a cafeteria affiliated to a metropolitan university located in a city in the north-west of England—a multi-ethnic and international setting, supporting intercultural mixing—also displayed patterns of micro-segregation between White and Asian students (Clack et al. 2005). Pre-existing social networks, own group preferences and language barriers might be contributing factors here.

2.6 Time-Space Geography of Segregation

While studying inhabitants of gated communities in London, England, Atkinson and Flint (2004) discovered that wealthy residents were not only isolated from other Londoners behind their gates and security technologies but they were also separated from others when travelling to places of work and leisure, using 'tunnel-like trajectories separating class and status categories' (p. 890). They dubbed this form of spatial separation 'space-time trajectories of segregation.' Years later, with the expansion of the 'new mobilities' paradigm—the shift from studying static aspects of social life into studying movement of people, objects and ideas (Sheller and Urry 2006)—geographers have turned attention to the dynamic side of segregation, which is in constant flux as people navigate their daily lives and move between locations (Shen 2019).

While the modifiable area unit problem (MAUP) has been the main concern for residential segregation scholars, temporal geographers face a related challenge known as the Uncertain Geographic Context Problem (UGCoP):

[6] Additionally, a potential contact was interpreted differently by white and black South Africans—by whites as an 'invasion' and 'being pushed out of space', while black people read this behaviour as an 'avoidance' and white people 'moving away' (Durrheim and Dixon 2004).

> This is the problem that findings about the effects of area-based attributes could be affected by how contextual units or neighborhoods are geographically delineated and the extent to which these areal units deviate from the "true causally relevant" geographic context (…) It arises because of the spatial uncertainty in the actual areas that exert contextual influences on the individuals being studied and the temporal uncertainty in the timing and duration in which individuals experienced these contextual influences. The UGCoP is a significant methodological problem because it means that analytical results can be different for different delineations of contextual units even if everything else is the same. It is perhaps a major reason why research findings concerning the effects of social and physical environments on health behaviors and outcomes are often inconsistent (Kwan 2013: 959).

The temporal and dynamic aspects of segregation are approached differently in recent studies. The main approaches involve: analysing segregation across an entire *activity space* of a person during a day/week or computing segregation measures for *different times* of a day/week for various spatial units. They are briefly discussed below.

2.6.1 Activity Space Segregation

As with micro-segregation research, an individual is the key unit of analysis in the activity space approach to segregation. However, exposure to other people is treated as a *person-based measure* not one of place (Kwan 2009). A person is followed across multiple spaces and may spend time in different neighbourhoods or even cities/regions, so their exposure to different populations varies over time.

Wong and Shaw (2011), using travel diary data, computed an exposure index for residents' activity space. In contrast to the traditional exposure index, a residential unit was not the base for calculations, but rather all locations visited by the subject, which were also weighted by time spent in each area visited. The limitation of the method, according to the authors, was reliance on census data for the areal units included in the activity space. It would provide more accurate results if the information on the actual exposure and interactions with other residents could be obtained. Mobile positioning data for city districts, along with data on mobile user age, gender and preferred language of communication, were employed to analyse segregation between Estonians and Russians in their overall activity space (Silm et al. 2018). Russian speakers were found to visit fewer locations, while the Estonians' spatial behaviour was more random. Older Estonians, however, were the most likely to visit more Russian-dominated districts, suggesting higher ethnic segregation among younger age groups.

Such an approach does not, however, overcome the Uncertain Geographic Context Problem. Whilst it does acknowledge that residents are exposed to different socio-demographic contexts as they move throughout the day, the contexts themselves are also dynamic and fluctuate over the daily or weekly cycle (Vallée 2018). Park and Kwan (2018) proposed a measure called the 'individual level spatiotemporal proximity index' (i-STP index) to capture the temporal variation in segregation levels. Like egohoods (see above) it uses the method of k-nearest neighbours to define a

person-specific neighbourhood and it is allowing for changes over time. The measure requires detailed geolocation of all or a sample of 'neighbours' (people met through the day).

2.6.2 Segregation Over Time

Researchers in transport and mobility studies have focused on how segregation changes over time. In another study in Tallin, Estonia, ethnic segregation was computed for different hours of a day, different weekdays and seasons on the basis of mobile phone data (Silm and Ahas 2014). It found that Estonian and Russian speaking residents were more likely to interact with each other during working times and days.

Studies in France and Sweden also revealed lower levels of segregation during daytime than at night. Using a detailed daily travel survey around Paris, Le Roux and team (2017) computed segregation indices for a 24-hour period across different educational and occupational groups. The probabilities for these groups to be present simultaneously were the lowest between low and high-status groups, but lower-middle and higher status groups were more likely to interact during the day than night. The mobility of upper-class members was the most fluid over 24 h, providing them more opportunities for interaction with groups outside their neighbourhood (Le Roux et al. 2017). In a study in Sweden, even smaller units of time were used to explore spatio-temporal segregation. Östh et al. (2018) analysed the trajectories of phone users and their exposure to residents from areas with dissimilar socio-economic status, over a period of 288 five-minute segments (24 h). Even though everyday mobility decreases spatial segregation, it remained quite high for residents from either very poor or very wealthy peripheral areas.

Other research conceptualised daily segregation as the separation between flows of people travelling to/from work. Farber and colleagues (2015) developed a measure called 'social interaction potential' based on the space–time prism framework. The study used origin–destination data between places of residence and work, for white, black and Hispanic populations in Detroit, USA. They identified locations with the highest 'interaction potential' for intra and inter-racial interactions during the day and the night. The study showed that a 'potential' for segregation depends on the time devoted to travel and that more population mixing happens when work commute time is longer. The 'interaction potential' model was further advanced in a British study in London on spatial segregation between occupational groups (Shen 2019).[7] It highlights that high segregation between large employers and casual workers during the day time is largely due to different commuting patterns.

[7] Commuting flows were conceptualised as networked systems; the 'flow-based spatial interaction potential' between two places measures the cumulative potential of the spatial interaction between the flow occurring between both places and its neighbouring flows happening between any two places (Shen 2019: 13).

In summary, these studies have placed more emphasis on how segregation might change over specific periods of time, such as a day or a week, or across various activity spaces in the city. The remaining limitation is that spatial proximity has been often equated with an interaction between people who are different in terms of ethnicity/race, age or socioeconomic status.

2.7 Geographies of Encounter and Breaking Down Segregation

Research on segregation and contact in human geography arose from criticism of the so-called 'cosmopolitan turn' in urban geography, which celebrated multicultural cities as sites for ethnic mixing, everyday civility and 'living with difference' (Valentine 2008). This research approach has further evolved into the analysis of different spaces of encounter and closer examination of conditions for so-called 'meaningful contact,' which transforms previously held prejudices and improves social relations between groups (Mayblin et al. 2016). While the micro-ecological research explores spatial patterns of distribution for all individuals present in given small-scale locations, in the spaces of encounter approach the emphasis is on the quality of contact which occurs between representatives of dissimilar social categories, and whether the benefits of such contact might be extended beyond this space (Matejskova, Leitner 2011).

Geographies of encounters research draw inspiration from symbolic interactionists, such as Erving Goffman or Lyn H. Lofland, and their micro-sociological analysis of everyday behaviours in public space (Swyngedouw 2013). Like psychologists working on the micro-ecology of segregation, geographers have also been influenced by the Allport's (1954) work on prejudice and inter-group contact. The 'encounter' has been conceptualised as a specific form of contact, 'where difference is somehow noteworthy' (Wilson 2017: 464). Although the word segregation is not often directly used in geographies of encounter literature, these studies de facto explore how segregation might be eliminated and more just societies created (Phillips 2015). They try to understand:

> '… the link between segregation, isolation and social mixing, and the value of interventions that commonly aim to build "communities of place" through a focus on neighbourhood-based encounters with difference (…) [They focus] on the productive intersection of strategies for re-distributional justice, in the face of inequality, the political recognition of unheard voices and the value of opportunities for social encounter between diverse groups for breaking down (unequal) social and spatial segregation' (Phillips 2015: 337, 340).

Spaces that have the potential to lower segregation and bring people together were termed 'contact zones.' Askins and Pain (2011)—drawing on the research of Mary Louise Pratt, a language and linguistics scholar—examined how friendships can be formed between children from the British majority and asylum seekers in the north of the UK. A participatory, art-based research project explored 'productive tensions,'

which could be then scaled up to a wider community level. A study in another northern city further developed the concept of the 'contact zone' by drawing on the work of sociologist Boaventura De Sousa Santos on intercultural communication (Mayblin et al. 2016). This study analysed activities within an interfaith project for Jewish and Muslim youth. It argued that a zone where meaningful contact takes place 'is not a single space of encounter that occurs once. It is a "zone" rather than a space of encounter precisely because contact must occur on multiple occasions, in multiple sites, and with a variety of intensities in order to become "meaningful"' (Mayblin et al. 2016: 216). Both studies concluded that de-segregation is not just about bringing dissimilar groups together via policies of ethnic mixing, but the effectiveness of the 'contact zone' depends on skilful facilitation of the encounter, so that communication and intercultural translations are possible (Askins, Pain 2011; Mayblin et al. 2016).

In contrast with methods of micro-ecology in segregation research, contact and spatial isolation are not quantified with indices of segregation and statistical methods are also rarely used. Many studies deploy ethnographic observations alongside individual in-depth and focus interviews. For example, in a study on encounters between immigrants and German residents in an estate in eastern Berlin, researchers participated in community life through volunteering and attending neighbourhood councils (Matejskova and Leitner 2011). Observations of the conduct and habits of passengers were used in a study of the everyday encounters on a public transport bus in Birmingham, UK (Wilson 2011). A British-Polish study by Piekut and Valentine (2017) based on survey data in Leeds and Warsaw explored the relationship between contact in different types of spaces and attitudes towards minority ethnic groups. The study showed that contact does work differently not only in varied spaces but also in the two national settings. In Leeds, encounters in social spaces (such as community and sports clubs, volunteer organisations, etc.) correlated more closely with tolerance, whereas encounters in eating spaces (i.e. cafes and restaurants) were more strongly linked with positive attitudes in Warsaw.

2.8 Conclusions and Future Directions

Spatial segregation has been studied in social sciences from two different, but equally important, perspectives—*place-based* and *person-based*. While the first can provide a better understanding of spatial separation *within* specific types of spaces, the latter complements the ecological approach with insights into individual-level segregation and how it varies across time and space. It might be possible that whilst some people live and work in unsegregated areas, yet they continue to move in 'space-time trajectories' of segregation (Atkinson and Flint 2004). As such, segregation is not solely an attribute of places or spaces, but it also a characteristic of individual activities.

In summary, we could divide the approaches into four groups, as depicted in Table 2.1:

Table 2.1 Summary of conceptual approaches to spatial segregation

Measure	Conceptualisation of segregation	
	Place-based	Person-based
Static	Residential, workplace, school and other domains of segregation	Egohoods Social frontiers Spaces of encounter
Time-variant	Temporal and flow-based segregation	Micro-ecology of segregation Activity space segregation

Source own elaboration on the basis of literature

(1) *Place-based segregation using static measures of segregation*—studies exploring residential segregation, which were followed by studies employing the same spatial segregation indices for other spaces, such as school or workplaces.
(2) *Person-based segregation using static measures of segregation*—studies that approach segregation by considering the position of an individual in a given space.
(3) *Place-based segregation using temporal measures of segregation*—studies recognising that segregation is not static across any space and varies over the period of a day, week or a year.
(4) *Person-based segregation using temporal measures of segregation*—studies exploring segregation from a perspective of an individual and how its temporal dynamic operates.

The increasing availability of geocoded data at the individual level, coupled with new, rich sources of (big) data, could bring further methodological and conceptual innovations for the joint study of place- and people-based segregation. Cross-disciplinary knowledge exchange has been the bedrock for many methodological or conceptual innovations in social sciences. I conclude this chapter by highlighting potential creative connections between the above approaches and indicate possible directions for future research.

Residential segregation no longer plays such a dominant role in segregation studies and isolation patterns in other types of spaces are increasingly explored. However, the relationship between residential segregation and separation in other domains remains an important topic for enquiry. Some studies demonstrate its conditional effect on segregation within schools, workplace and other domains, whilst others point to different factors and mechanisms that shape non-residential segregation. Socioeconomic deprivation and the lower status of minority groups are recurring causes of segregation, coupled with exclusionary policies, structural racism and individual prejudices among majority or more privileged groups. Studies comparing segregation across more than two types of spaces do not yet exist as far as I am aware, due to the lack of suitable data, which would need to provide information on segregation at the domestic, work and leisure patterns for the same individuals. It would be interesting to see in future studies not only how segregations in various domains interlink

and correlate but also whether the implications of segregation in one space resonate elsewhere, i.e. impact behaviours or inter-group relations.

The complex methodologies developed in studies of residential segregation patterns, such as the focus on multiple scales, the centre (conceptualised as *egohoods*) and the periphery of neighbourhoods (the role of physical barriers and symbolic borders), have yet to be applied to the study of segregation in other domains. In an employment study, for example, most research would either compute segregation indices for workplaces or examine levels of exposure to minority or immigrant workers. As within neighbourhoods, there might be multiple scales of segregation within workplaces: cubicles, offices, floors, buildings and locations, etc. Smaller scale and work activity space segregation within employment could be more easily studied with qualitative methods, such as observation, or by employing some smartphone-based tracking technology, if such was permitted by a large enough sample of individuals. Multiple scales of segregation across other life domains is yet another topic for social scientists.

Micro-ecology, activity space and human geography studies have concentrated on the segregation between individuals during everyday interactions. However, they often rely on a small number of observations. Meanwhile, temporal geography, transport and mobility studies use large datasets, tracking daily routes of residents, and these disciplines have developed complex measures of segregation that acknowledge its dynamic, not static nature. But there has not been enough attention to the quality of such interactions in individual activity spaces. Studies of human geography recognise that some daily, fleeting interactions might have little meaning and may not even have been noticed; such contact might be limited to an exchange of civilities. The visualisation method of socio-spatial isolation as presented by Lee and Kwan (2011), which integrates data on spatial movements with information on the quality of encounters, is a promising perspective. It may yet prove difficult to apply without asking participants to assess their daily interactions. Mobile surveys that use dedicated survey apps, collect geolocations and ask questions about daily experiences might offer another inspiration for this area of study.

Finally, studies on segregation across various domains have determined that a choice of the majority group to avoid spaces perceived to have a too high representation from minority groups is often a driving force of spatial separation. Public and political anxieties about 'self-segregating' minorities, which view the high segregation of some groups as undesirable and a failure of local policies aiming to de-segregate them (Phillips 2007), are often not substantiated (see, for example, U.K. evidence discussed in Catney 2018). A more comprehensive discussion on the dynamics of ethnic segregation across various types of spaces and times could help reduce such bias in public debates. The interdisciplinary literature review in this chapter supports such efforts.

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Chapter 3
Income Inequality and Residential Segregation in European Cities

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Abstract Based on extensive research with distinguished scholars within the book project 'Socioeconomic Segregation in European Capital Cities', this chapter summarizes the key trends in income inequality and socioeconomic segregation in Europe. We draw our data from the two last census rounds, and we focus on the most common indicators of income inequality (Gini Index) and residential segregation (Dissimilarity Index). We find that levels of residential segregation grew between the two last censuses in most of the cities included in our study. Changes in residential segregation follow changes in income inequality with a time lag, and it tends to happen in both directions. Low levels of income inequality relate to low levels of segregation after 10 years, and high levels of inequality relate to high levels of segregation after 10 years.

Keywords Income inequality · Residential segregation · Comparative urban studies · Europe

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3.1 Introduction

Income inequality has long been a feature of most societies and segregation has long been a feature of cities (Nightingale 2012; Tammaru et al. 2020). Very high levels of income inequality and high levels of residential segregation are also important policy concerns since they may bring negative consequences for cities and people, ranging from a lack of opportunities, constraints on social mobility, poverty, the intergenerational transmission of disadvantage and even social unrest (Galster et al. 2015; van Ham et al. 2018). Vulnerable population groups, such as low-income households and ethnic minorities, tend to concentrate in the poorest neighbourhoods in the case of modest public interventions, for example through various interventions that stem from social policy and housing policy (Scarpa 2016). The higher the level of income inequality, the more difficult it is for people with low incomes and their children to fully realise their abilities and skills, and to undertake upward social mobility (Krueger 2012) and upward residential mobility (Nieuwenhuis et al. 2020).

Although the exact mechanisms that link inequality and segregation may be complex (Fujita and Maloutas 2016; Tammaru et al. 2020; Musterd 2020); there seems to be a regularity that societies with high levels of inequality may become less dynamic with petrified class structures as the fortunes of children depend heavily on the fortunes of their parents (Arundel 2017; Hochstenbach and Boterman 2017; Nieuwenhuis et al. 2020). Low income and spatial clustering of vulnerable population groups may lead to the vicious circle of segregation, also across generations, as social and spatial disadvantage is passed from parents to children (van Ham et al. 2018). High levels of residential segregation between socioeconomic groups tend to be related to liberal societies (Tammaru et al. 2016a, b).

The vicious circle of segregation may evolve, operating as follows. Money buys choice on the housing market and it tends to sort people with different incomes to different neighbourhoods (Hulchansky 2010). Living in certain neighbourhoods may limit job opportunities, as claimed by the spatial mismatch hypothesis (Kain 1968). According to neighbourhood effects research, living in certain neighbourhoods affects many other individual outcomes, ranging from the labour market to health (Johnston et al. 2005; Wilson 1987). Neighbourhood effects may run also across generations (Hedman and van Ham 2021). For example, when schools are neighbourhood based, sorting of parents into certain houses and neighbourhoods shapes the sorting of children into schools (Boterman et al. 2019). Schools are places where children get both academic and non-academic knowledge, where values form and friends are made. Evidence shows that schools located in high-income neighbourhoods tend to have better academic achievements than in those of low-income neighbourhoods (Owens and Candipan 2019). The differences that evolve at schools tend to lead to differences in labour market outcomes that, in turn, shape housing choice.

High levels of inequality may cause social problems. However, aiming to eliminate inequality may also be detrimental to individual lives. Post-World War II experiments in centrally planned European countries did lead to high levels of equality as well as

to low levels of segregation (Tammaru et al. 2016a, b). These experiments revealed the disadvantages of socially flat and residentially mixed societies. For example, cities became less dynamic, less diverse and dull places to live in (Szelenyi 1996). Hence, widespread public interventions in all domains of society can reduce income inequality and residential segregation but can also result in low levels of motivation to achieve. Consequently, the economy can lack dynamism, leading to sluggish growth and low productivity (Kornai 1992). Hence, it seems that both extreme levels of inequality and extreme levels of equality may have negative consequences on individuals, cities and societies.

The current chapter aims to provide an overview of trends in socio-economic residential segregation in European cities and to investigate the extent to which these trends are related to different levels of income inequality. The chapter draws on earlier work by Tammaru et al. (2016a, b) based on the cities of Amsterdam, Athens, Budapest, Helsinki, London, Madrid, Milan, Oslo, Prague, Riga, Tallinn, Stockholm and Vilnius. We have also included Helsinki in our analysis.

The chapter is structured as follows. The first section reviews the literature on the interplay between income inequality and segregation. This is followed by a section on data and methods. The study employs data on income inequality from the years 1990, 2000 and 2010, and data on residential segregation from 2000 and 2010 in order to account for possible lagged effects between changes in the two variables. We then present the main findings. We start our analysis with a discussion of income inequality based on the Gini Index. We then proceed with the analysis of segregation in form of the Dissimilarity Index by measuring the difference in the distribution of top and bottom socioeconomic groups across urban neighbourhoods. The chapter ends with an analysis that explores the link between income inequality and segregation by lagging the Gini Index 10 years (being measured in 1990, 2000) compared to the Dissimilarity Index (measured in 2000 and 2010). We do not focus on the potential reverse relationship: i.e. the potential for segregation to cause income inequality to increase (Cutler and Glaeser 1997).

3.1.1 Link Between Income Inequality and Residential Segregation

The focus of this chapter is on the link between income inequality and residential segregation between the top and bottom socioeconomic groups. There are several mechanisms that connect income inequality and residential segregation (Tammaru et al. 2020):

(1) changes in household numbers that affect the distribution of top and bottom socioeconomic groups over neighbourhoods (population shrinkage or growth, natural change, immigration);

(2) the geography of housing and its differentiation, attracting, forcing or constraining the residential mobility of households earning different incomes, and
(3) residential mobility of top and bottom socioeconomic groups within urban regions (people change residential neighbourhoods because their incomes increase or decrease).

Changes in the Distribution of High- and Low-Income Occupations

Since the seminal work by Sassen (1991), debates on changing labour markets, and how they are affected by globalisation and migration, revolve around issues of social polarisation and professionalization (Hamnett 2020; van Ham et al. 2020). According to Sassen (1991), globalisation is the driving force for social polarisation. Highly skilled professionals, especially in advanced business services and in the technology sector, are able to sell their labour globally to large multi-national companies. Countries, cities and companies compete for talent, pushing up their wages. Knowledge-intensive systems and technological advancements have become complementary tools for performing tasks for highly skilled professionals, contributing to an increase in their productivity (Autor et al. 2001; Cirillo 2017). Low skilled workers in developed countries compete with workers in developing countries, which limits their wage growth. Professionalisation implies that, over time, a trend for strong upward mobility across the available workforce can take place alongside an overall improvement of education in each subsequent generation (Hamnett 1994). Hence, even if some polarization takes place, it is a secondary process, while professionalization or overall upward occupational and income mobility is the main trend (Hamnett 2020; van Ham et al. 2020).

The Geography of Housing

Residential segregation is structured by the availability of different types of housing in different parts of a city. When different types of housing (by tenure and price) are located in particular types of neighbourhood, the result will be residential segregation by income (Tammaru et al. 2016a, b; Musterd et al. 2017). School segregation is strongly related to residential segregation, for a recent overview, see Boterman et al. (2019). Labour market segregation is related to skills and education and so, over time, an inter-generational vicious circle of segregation may start to operate, leading to an overlap between social and spatial disadvantage (van Ham et al. 2018). Housing forms one of the key elements in this spiral of segregation since housing is often the most expensive 'good' that people buy in their lifetime. Money buys choice on the housing market, but housing choice also determines location, schooling and opportunities. As young people increasingly rely on their parents for help in entering the housing market, there is an inter-generational dimension not only in educational and labour market disadvantage but also in housing market disadvantage (Hochstenbach and Musterd 2018).

Residential Mobility of High- and Low-Income Families

Residential sorting hinges also on residential preferences that may both contribute to higher levels of residential segregation, or to temporarily lower levels of segregation. Two spatial mega-trends seem to have started within European cities: one related to the gentrification of the rich and the other to the suburbanisation of the poor (Hochstenbach and Musterd 2018; van Ham et al. 2020). As a consequence of these trends, we generally see growing levels of segregation between the rich and poor both in European cities (Tammaru et al. 2016a, b) as well as elsewhere in the world (van Ham et al. 2020; Musterd 2020). House values have risen quickly in attractive inner-city neighbourhoods so that such housing in these areas is beyond the reach of most urban residents. However, the relationship between inequality and socio-economic segregation is characterised by a time lag (Marcińczak et al. 2016). Likewise resorting to high- and low-income households across neighbourhoods—e.g. at times of gentrification—can cause temporary mixing of income groups, lowering rather than increasing levels of segregation (Musterd and van Gent 2016; Tammaru et al. 2016a, b). As a result of time lags and mixing, it may take even several decades before a rise in income inequality starts to contribute to the rise of residential segregation (Wessel 2016).

3.2 Data and Methods

The data sample for this chapter derives from the edited book project 'Socio-Economic Segregation in European Cities: East Meets West' (Tammaru et al. 2016a, b). We are very grateful to all the researchers that participated in this book project, and the help we received in solving the various challenges of achieving a comparative dataset. First, we had two different variables for measuring socio-economic status, occupation and income. Where census data were available, we had to rely on occupation (Athens, Budapest, Madrid, Milan, London, Prague, Riga). In countries that use register data, we relied on income (Amsterdam, Oslo, Helsinki and Stockholm) and we compare people who belong to the first- and fifth-income quintile in calculating the Dissimilarity Index. In all other cities, census data on occupations are used. We used the International Standard Classification of Occupations (ISCO) to define the main occupational groups. These are managers, senior officials and legislators; professionals; technicians and associate professionals; clerks; service and sales workers; craft and related trades workers; plant and machine operators, and assemblers; and elementary occupations. We compare managers and elementary occupations in calculating the Dissimilarity Index. Occupation and income are obviously not the same concepts but they are related and, as a rule of thumb, the higher the job in the occupational ladder the higher the income (Tammaru et al. 2016a, b).

The study is based on data from the 2000 and 2010 census rounds. Cities are defined as a common housing market with a continuous built-up area. We calculated the Dissimilarity Index between the top and bottom occupational/income groups at

both census dates. We then contrasted the values of the Dissimilarity Index with the national level Gini Index since Gini Index values are not available for us at the city level. As a rule of thumb, inequalities in large cities tend to be higher than national averages, which implies that in using country-level estimates, we underestimate levels of inequality of the cities in our study.

Our main interest lies in the relationship between changes in the Gini Index and changes in the Dissimilarity Index. We measured the Gini Index 10 years earlier than the Dissimilarity Index since transmission of changes in income inequality to changes in residential segregation are likely to take some time (Tammaru et al. 2020). We explored the relationship between city-level Dissimilarity Index values in 2000 and Gini Index levels in 1990, and the relationship between city-level Dissimilarity Index values in 2010 and Gini Index levels in 2000. As Eurostat does not provide historical Gini Index estimates, we relied on harmonised Gini Index values produced by Tóth (2013). We should be aware of the different starting positions for cities in Eastern Europe and across the rest of Europe. The year 1990 is especially relevant in this respect as it is statistically less than 1 year before or after regime changes in various Eastern European countries. Processes of inequality change had already been operating across the rest of Europe for some time before this. We should also bear in mind that the changes that took place in the built environment and segregation were significantly slower than those which took place within economic structures and income inequality in Eastern Europe in the 1990s (Marcińczak et al. 2015). We consequently assume that levels of residential segregation in Eastern Europe were still low in 2000, reflecting the patterns inherited from the period of central planning. However, due to the growth of inequality in the 1990s in Eastern Europe, we expected to see a significant increase in levels of residential segregation by 2010. In other words, we expected to find a similarly strong relationship between levels of lagged income inequality measured in 2000 and levels of residential segregation measured in 2010.

3.3 Findings: Income Inequality and Residential Segregation in Europe

3.3.1 Changes in the Level of Income Inequality

The value of the Gini Index measuring income inequality is higher than 35 in most world countries. Within Europe, however, Gini Index values tend to be lower than 35. In 1990, there was a clear geographic pattern in Gini Index values, with the lowest values in Northern and Eastern Europe, and the highest in Southern and Western Europe (Fig. 3.1). We can also observe that income inequalities grew across Europe in the 1990s or immediately after the Fall of the Berlin Wall and the demise of the Soviet Union (Vihalemm et al. 2017). However, the growth in inequality varies considerably from country to country, and it is important to distinguish between

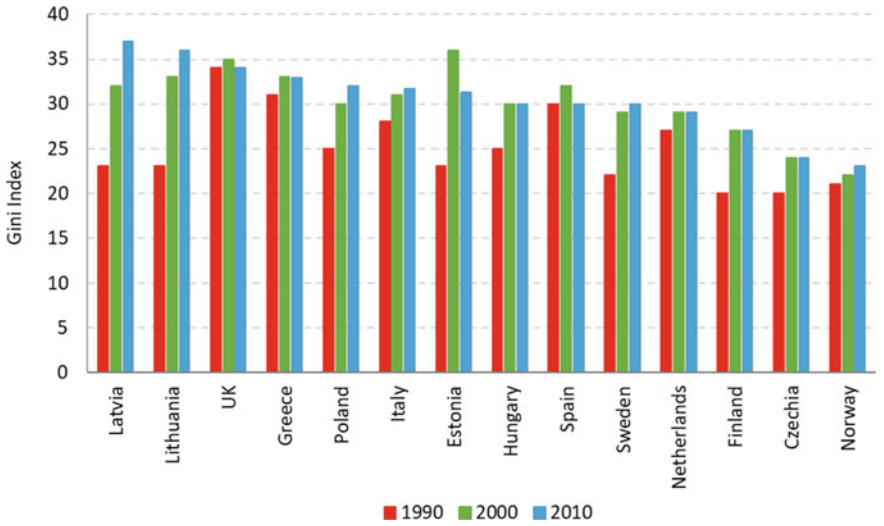

Fig. 3.1 Change in income inequality in selected European countries (Reproduced from Tóth 2013)

levels and *changes* in Gini Index in understanding the link between income and segregation. In some countries, most notably in the UK and in Greece, levels of income inequality are high with very little change over the observed period. By contrast, levels of income inequality are low and with very little change in Norway and the Czech Republic. Other countries show different trajectories of change in income inequality, with some shifting from low inequality categories to the group of high inequality countries. The most notable examples occur across the formerly centrally planned countries of Eastern Europe.

Eastern European countries underwent political, social and economic transformations in the 1990s, and this brought about major changes in income distribution. Nevertheless, there were important differences between these countries. Across the former Soviet Baltic states of Estonia, Latvia and Lithuania, the Gini Index increased more than it did in the Visegrad countries, such as Hungary and the Czech Republic, which are included in this study. The very modest increase in income inequality was in the Czech Republic, which had the highest GDP per capita in the East before the political transformations, and the smallest decrease in GDP per capita in the 1990s (Tammaru et al. 2017) is especially notable. Interestingly, despite very complex reforms that included a transformation from central planning to a market economy within a democratic system, the Gini Index values initially increased moderately in Eastern Europe.

Under the influence of the newly introduced market system in Eastern Europe, the ideological value of blue-collar workers jobs and compressed wage structures under central planning was replaced by increased poverty and by increased returns to education in the 1990s (Brainerd 1998; Ladanyi and Szelenyi 2000; Stephens et al. 2015). Blue-collar workers lost their previous high social status, while young people

born in the 1960s, and entering the labour market were among those who gained the most from the transitions, alongside members of the old elite (Helemäe et al. 2000; Węcławowicz 1998). Those who occupied better quality housing under central planning systems received the immediate rewards of housing privatisation that took place in the 1990s (Stephens et al. 2015). With time, these initial structures of housing inequality changes as those who benefitted more from economic restructuring and new opportunities on the labour market started to shape also the dynamics of the housing market, leading also to new forms of residential segregation (Kovács 2020; Tammaru et al. 2016; van Ham et al. 2018).

To conclude, three important messages arise from the analysis of the changes in income inequality in Europe since 1990s: (a) there has been a growth in income inequality; (b) the increase was especially rapid during the 1990s and (c) the formerly clear differences between the East and West became increasingly blurred. In this context, we are especially interested in how the levels of income inequality and changes in inequality correspond to levels and changes in socioeconomic residential segregation. Following the recent study by Tammaru et al. (2020), our guiding hypothesis for the analysis is as follows: we expect to find that levels of residential segregation correspond with levels of income inequality 10 years earlier. Since we have to rely on census data, we use a 10-year time lag in our analysis.

3.3.2 Levels and Changes in Residential Segregation

We start our analysis of residential segregation by plotting the values of the Dissimilarity Index between the top and bottom socioeconomic groups in 2001 and 2011 or at the time of the two last censuses in Fig. 3.2. To put the values in perspective, Marcińczak et al. (2015) suggest that the values of the Dissimilarity Index between socioeconomic groups can be interpreted as follows: values that are smaller than 20 can be interpreted as being low, and values that are 40 and higher can be considered being high. In this perspective, our first finding is that all the cities studied were characterised by medium levels of segregation in 2000. The only exception is Milan with a Dissimilarity Index above 40. The other most segregated cities in 2000 were London and Amsterdam. Our second finding relates to the geography of segregation in European cities in 2000 that corresponds to the level of income inequality in 1990. Eastern and Northern European cities are the least segregated, and Southern and Western European cities are the most segregated. More specifically, in our panel of cities, Oslo and Riga are the least segregated, and Amsterdam, Madrid and London are the most segregated.

Our third finding is that levels of segregation between top and bottom socioeconomic groups grew between the 2000 and 2011 census rounds, with Amsterdam as the only exception. As a consequence, the Dissimilarity Index reached the value of 40 and higher in five cities, Stockholm, London, Milan, Tallinn and Madrid, all belonging to different European macro-regions. In other words, while Milan and London already had high levels of segregation in 2000 and, hence changes in the

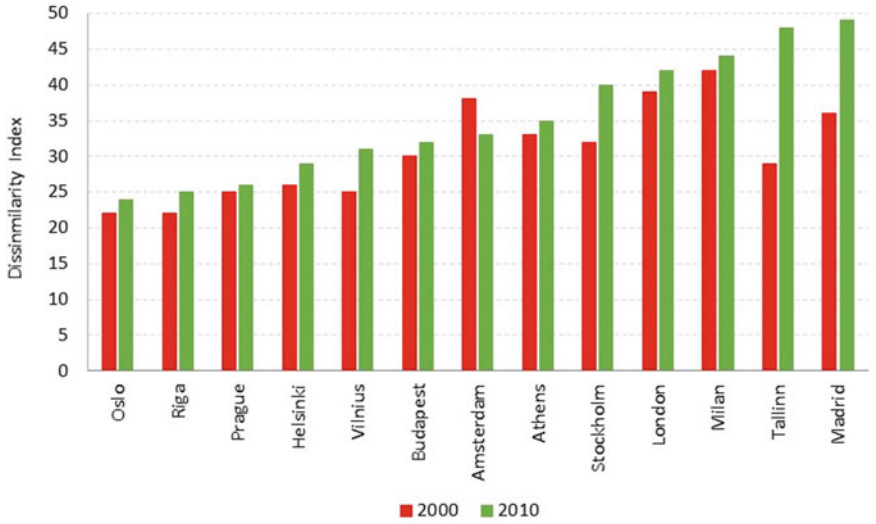

Fig. 3.2 Levels of residential segregation between the top and bottom socioeconomic groups in the panel of European cities, 2000 and 2010 (Tammaru et al. 2016a, b)

level of segregation between 2001 and 2011 were small, the rise of segregation was especially high in Stockholm, Tallinn and Madrid. Although different, the three cities with the most rapid increase in residential segregation in the 2000s shared a strong new housing construction boom in the 2000s before the housing sector collapsed in the 2008/2009 recession. New housing construction for the affluent tends to elevate levels of segregation. There are other more city-specific factors contributing to rising levels of segregation. Both in Stockholm and Tallinn, big and compact clusters of modernist blocks of high-rise housing can be found. As higher income groups move into newer and/or better housing, low-income groups are constrained to the areas where housing is most affordable. Immigrants and ethnic minorities are over-represented in Stockholm and Tallin respectively. The arrival of large numbers of immigrants and refugees earning lower incomes has led to the strong overlap between ethnic and social segregation (Andersson and Kährik 2016).

The question, of why expectedly similar cities—e.g. the Baltic cities of Riga, Tallinn and Vilnius or the Nordic cities of Helsinki, Oslo and Stockholm—have shown different trajectories of change, is intriguing. Tallinn shows much higher levels of segregation in 2010 than Riga, yet these cities are very similar when it comes to history, economic structure, patterns of urban development and population composition (Krišjāne et al. 2016; Valatka et al. 2016). Both Tallinn and Riga belonged to the Soviet Union, underwent radical political, economic and social transformations in the 1990s that culminated in European Union membership in 2004, and both have sizeable Russian-speaking minority populations. Tammaru (Tammaru et al. 2017) explains the differences in the speed of economic recovery from the economic crises of the 1990s. Recovery was far more rapid in Tallinn compared to both Riga and

Vilnius. There was also a strong overlap between ethnic and income inequality in Estonia. One effect of more rapid economic recovery was a private house building boom in Tallinn where homeownership increases alongside weak housing policy and high levels of income inequality, new housing construction tends to quickly elevate levels of segregation. In a market dominated context, new housing is accessible only for higher-earning households.

Differences in the growth of segregation levels between Nordic cities also warrant some attention. Oslo is the least segregated city with very modest growth in levels of segregation despite the fact that its housing sector has been market-dominated for decades. In Norway, the growth in income inequality has been low and the effects on segregation have been small and with a significant time lag. The oil-rich country has abundant resources for effective income redistribution policies (Wessel 2016). Helsinki and Stockholm are interesting comparison cities with moderate segregation levels in Helsinki and with only a small increase over time. Segregation in Stockholm is much higher after a strong increase between 2000 and 2010. The two cities differ from each other in important ways. First, Stockholm is bigger and more globally connected than Helsinki. Previous research shows that there are higher levels of segregation as a result of globalisation (Musterd et al. 2017). Second, and partly related to the first factor, Stockholm has been longer exposed to immigration. There is a growing overlap between social, ethnic and residential patterns in Stockholm, with low income and minority households over-represented in large housing estates that provide the most affordable housing (Andersson and Bråmå 2018).

Third, market principles have been introduced to Stockholm's housing market at a much quicker pace compared to Helsinki that still pursues active housing mix policies (Andersson and Kährik 2016; Dhalmann and Vilkama 2009; Eskelä 2018).

Amsterdam is also an interesting case, as this is the only city that experienced a drop in segregation levels. According to Musterd and van Gent (2016), the underlying mechanisms affecting residential sorting are very similar in Amsterdam to all other cities studied. The two main trends within residential mobility in the city are the gentrification of high-income households and suburbanisation of low-income households (Hochstenbach and Musterd 2018). The opposite direction of the change in income inequality and residential segregation has been explained by the segregation paradox; when the residential preferences of high-income households shift towards previously low-income neighbourhoods—as is characteristic of the gentrification process—a temporary mixing of income groups will follow (van Ham et al. 2020). This may reduce rather than increase the level of segregation, resulting in neighbourhoods where people with different incomes live together. However, over time, levels of segregation may start to rise and lower-income households begin to move from gentrifying neighbourhoods as house prices rise and wealthier people move in (Musterd and van Gent 2016).

In our earlier study, we found only a weak correlation between levels of income inequality and levels of residential segregation (Musterd et al. 2017; Tammaru et al. 2016a, b). In this paper, we introduce a time-lag between the two processes by contrasting graphically levels of the Dissimilarity Index with levels of the Gini Index 10 years earlier. A previous analysis by Tammaru (Tammaru et al. 2020) across

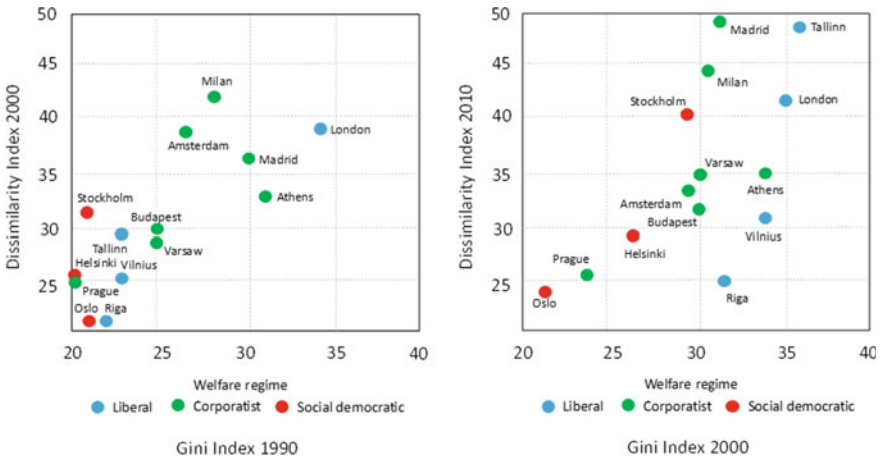

Fig. 3.3 Relationship between levels of income inequality (lagged 10 years) and residential segregation in European cities

Northern and Southern European countries showed that by lagging the two variables, their correlation becomes much stronger. Both the increase and decrease in income inequality relate to the increase and decrease in residential segregation 10 years later. The same holds true across our sample of 13 European cities at the two time-points used in our data analysis.

A positive correlation emerges from contrasting the Gini Index in 1990 with the Dissimilarity Index in 2000 (Fig. 3.3). In Prague, Oslo and Riga, income inequality was low in 1990 and residential segregation was low in 2000. In fact, Eastern European cities, shortly after the fall of the Berlin Wall in 1989, did not show any correlation between inequality and segregation. This holds equally for Baltic cities that later were labelled 'liberal', as it does for cities which at that time were still firmly social-democratic. In London, income inequality was highest in 1990 and residential segregation was highest in 2000. Other cities fall in-between. Stockholm deviates the most from this pattern. Levels of segregation in 2000 were somewhat higher than levels of income inequality would predict in 1990. Clearer positive correlations emerge when we contrast the Gini Index in 2000 with the Dissimilarity Index in 2010.

The spread in the upper end of the graph has increased somewhat, but when we consider the relation between lagged inequality and segregation for each of the three welfare regime types separately, we see three positive relations. The so-called liberal cities that reached relatively high levels of income inequality in 2000 show only moderately higher increases of levels of segregation—yet these are still increasing. Riga shows the most significant deviation where the level of residential segregation in 2010 is much lower than the 2000 level of income inequality would predict. Riga is an interesting case in this regard as in the 2000s, after joining the European Union, it has witnessed the highest level of emigration in our selection of cities. Migration

in and out of a city, especially when on a massive scale, may intervene with the process of residential segregation (Bailey et al. 2017) At the other extreme, levels of residential segregation are higher in Madrid than one would predict from the level of income inequality in 2000. One of the reasons for this may relate to the extreme housing boom in Spain in the 2000s, partly supported by tourism and second-home buyers from across the world, which could distort the relationship.

3.4 Conclusions and Future Research Avenues

In this chapter, we reviewed the relationship between income inequality and socio-economic segregation. We find that, in general, changes in segregation levels follow changes in inequality with a time lag. Change in levels of inequality leads to a change in levels of segregation 10 years later. Low levels of income inequality relate to low levels of segregation after 10 years, and high levels of inequality relate to high levels of segregation after 10 years. However, these findings need further research to address a number of limitations in our analysis.

First, our data do not allow for a more nuanced analysis of the length of the time lag. We use a 10-year time interval since this is determined by census interval and our ability to use only two census years. For example, the study by Wessel (2016) that used a longer time horizon for Oslo shows that the time needed for changes in inequality to changes in segregation maybe even longer, perhaps two decades or more. It may also be that changes evolve quickly in some cities. This happened in Tallinn at a time of rapid transformation from a centrally planned society to a market-based one (Tammaru et al. 2016a, b).

Second, comparative analysis over time and space always raises concerns regarding data comparability. The Gini Index may be calculated in different ways that yield very different outcomes, due to differences in how the tax redistribution is considered, for example (Hellebrandt and Mauro 2015). Moreover, the calculation of Dissimilarity Index is sensitive to the spatial units used. Therefore, further comparative studies are needed that focus on segregation at different spatial scales and spatial configurations and how it varies from city-to-city. Furthermore, the Dissimilarity Index is spatially blind and, hence, may hide more than it reveals. For example, stability of the Dissimilarity Index over decades may mask dramatic changes in the geography of segregation as low- and high-income group sort over houses and neighbourhoods (van Ham et al. 2020). In the course of residential sorting, as a result of gentrification of inner-city neighbourhoods, for example, various forms of mixing and separation may occur at different spatial scales, with the outcome that city-wide measures of segregation such as Dissimilarity Index hardly change.

Third, the finding that a change in inequality leads to a change in segregation is not necessarily causal. It may be that other factors drive levels of segregation that are correlated with inequality. Most importantly, in Europe, immigration is an important intervening factor. Immigrants are more likely to work in lower-income occupations. Hence, the arrival of large numbers of migrants may increase both income inequality

and residential segregation. Large, economically dynamic urban areas are particularly likely to attract migrants, leading to both increased inequality and increased segregation (Glaeser 2008). Other mechanisms may be related to inequality and segregation in a co-evolutionary way. Segregation exacerbates inequality via spatial opportunity structures (Galster and Sharkey 2017) and through the importance of housing in the overall degree of social stratification (Tammaru et al. 2017). For example, living in certain neighbourhoods affects opportunities to find a job and as well as access to school for children. As a result, the neighbourhood of residence is not only affected by inequality but is also an inherent part of inequality in modern urban societies, with residential advantage and disadvantage being passed from parents to children.

To conclude, our study found a strong correlation between residential socioeconomic segregation and levels of income inequality observed 10 years earlier. Future studies are needed to shed light on the causal and co-evolutionary characteristics of this relationship, and the inter-generational connection between inequality and segregation.

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Part II
Urban Inequality and Segregation in China

Chapter 4
Research on Residential Segregation in Chinese Cities

Yu Chen and Jie Chen

Abstract This chapter provides an overview of research on the evolution of residential segregation in Chinese cities since the establishment of the People's Republic of China. There were almost no discernible patterns of segregation during the central planning period, largely due to the socialist work-unit systems and the decommodification of land and housing. Since the initiation of economic reforms in 1978, Chinese cities have witnessed significant spatial divisions across socioeconomic groups, driven by forces such as rapid economic and spatial restructuring, market-oriented housing and land reforms, and massive rural-to-urban migration. Residents of similar socio-economic status tend to cluster in the same neighbourhoods, with the elite moving to expensive gated communities and the urban poor to dilapidated residential areas. The impacts of segregation on residents' social contacts and labour market outcomes are profound and long-lasting. While social segregation is regarded as a widespread urban phenomenon worldwide, the causes and consequences of segregation in Chinese cities should be interpreted within the country's specific historical, social, cultural and institutional contexts.

Keywords Residential segregation · Urban transformation · China · Cities · Transitional society

4.1 Introduction

In common with other transitional societies, China has experienced significant transformations of urban landscapes during the shift from a centrally planned economy to a market one. Before 1978, most urban residents were employed in work units and

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lived in houses allocated by these units in relatively stable and homogenous neighbourhoods close to workplaces (Wang and Murie 1999). Cities were characterised by mixed neighbourhoods without discernible patterns of segregation (Bray 2005; Lo 1994). The subsequent economic reforms have resulted in significant socio-economic stratification and spatial divisions (Li and Wu 2008). Housing reforms privatised most work-unit housing and facilitated the development of a booming real estate market, which provided options for wealthy people to purchase commercial properties of high quality, leading to income-based spatial sorting (see Chap. 12 on residential sorting and Chap. 9 on housing market reform). Land reforms resulted in unprecedented urban sprawl, creating new industrial zones and residential compounds in suburban areas. Urban renewal projects have tended to gentrify the city centre leading to the relocation of millions of residents to suburban areas either voluntarily or against their will. Meanwhile, a large number of migrants have moved to cities to seek job opportunities and a better life. Most of them are concentrated in low-skilled jobs and live in poorer areas or migrant enclaves. Urban neighbourhoods have shifted from being 'work-based' to 'residence-based' and from mixed communities to those of residents of similar socio-economic status (Wang 2000).

Numerous studies have examined the causes, processes, extent and consequences of urban segregation in China (Li and Wu 2008; Wu et al. 2014; Liu et al. 2019; Shen and Xiao 2019). This chapter aims to provide an overview of research on residential segregation in Chinese cities, with the focus on both the driving forces behind it as well as its profound impacts on society. Segregation refers to 'the processes of social differentiation and the resulting unequal distribution of population groups across space' (Madrazo and van Kempen 2012, p. 159; see also further discussion of segregation concepts in Chaps. 2 and 10). As the geographic distribution of resources and opportunities is unevenly distributed, segregation is likely to influence people's access to resources, and subsequently their contact with other social groups, social networks and labour market opportunities. An overview of existing knowledge on the driving forces, extent and consequences of segregation in Chinese cities can provide rich insights into the life experiences of urban dwellers during the transitional process. It is also useful to predict the future trends of urban transformations in China to inform policy development.

Levels of urban segregation have been researched in various countries and are generally agreed to be a widespread global phenomenon. The extent and nature of such segregation vary according to the particular groups affected, the way it is measured and the historical, cultural and institutional contexts. In this chapter, we first provide background information by discussing neighbourhood arrangements in China's central planning period (1949–1978). Then we proceed to discuss the driving forces of neighbourhood changes and segregation during the reform era (post-1978). This is followed by a review of the extent and measurement of segregation in Chinese cities. Finally, we explore the consequences of urban segregation in terms of social contact and labour market outcomes in the specific context of Chinese transitional cities.

4.2 Urban Segregation During the Central Planning Period

During the central planning period, the government's egalitarian policies tried to reduce socio-economic inequalities and to create a 'classless' urban society (Wu and Li 2005). The majority of urban workers was employed in work units, which were social organisations established under state socialism to provide employees not only with lifetime jobs but also a comprehensive package of social benefits and services including nursery, medical care and pension (Bray 2005). The metaphorical term 'iron rice bowl' was coined to indicate the continuity and stability of state employment. Income differences were minimal. Cities were characterised by a high degree of social homogeneity, a work-unit-based cellular structure, and mixed neighbourhoods without noticeable patterns of spatial segregation (Lo 1994). There was no private land or housing market. All urban land belonged to the state and was allocated to various land users according to the central planning system. Housing was regarded as a form of social welfare. The de-commodification of housing and land, an embodiment of a centrally planned economy, is said to be shaped by both ideological considerations and development strategies (Chen and Han 2014).

In the early 1950s, many private houses were transferred to local governments as part of the nationalised wealth redistribution process. The majority of urban residents lived in houses allocated by their work units, which were responsible for constructing, allocating and maintaining accommodation. Work-unit housing accounted for about 60% of the total urban housing stock in 1978, a figure much higher than that in former socialist countries such as Hungary (Kirkby 1985). The municipal housing bureaux provided housing to those few who did not have a work unit. Only 20–25% of the urban housing stock was owner-occupied (Huang 2004). Most work-unit housing was constructed near workplaces, forming cellular neighbourhoods. They became self-contained spatial units with mixed land use for workplace, residential areas and social services such as nursery and medical centres. Jobs and housing were, therefore, linked together, enabling workers to minimise their journey to work. Housing costs formed part of the total costs of the work unit who then bargained with their supervisory government agents for investment to develop and manage housing.

Work-unit compounds provided the basic urban structure of a socialist city. Their spatial distribution relied on urban land use under the central planning system. Within each work-unit compound, housing allocation was based on non-pecuniary criteria such as seniority, rank and family needs (Wang and Murie 1999). Managers and workers, regardless of their occupation and social status, lived in the same residential areas close to their workplace. As a consequence, people's residential locations depended on proximity to the workplace rather than personal characteristics such as income (Logan et al. 2009). It is claimed that 'social areas in the pre-reform era were mainly built upon different land uses rather than social stratification' (Li and Wu 2008, p. 406).

Despite the socialist ideology, there were inequalities among work units, which differed according to their economic and political strength. Those producing strategic products for the state (e.g. large steel companies) or those with higher administrative

ranking (e.g. provincial-level state-owned enterprises) had more bargaining powers when they negotiated with supervisory government agents for resources and investments. They, therefore, had a greater capacity for investment in housing within their work-unit compounds. Powerful work units provided better facilities and residential environments for their employees, while others, such as smaller units or those with performance problems, might experience housing shortage and deterioration. It is apparent that during the central planning period, housing inequalities between work units exceeded those within work units (Wang 2000). Despite this, workers in the same work unit lived in the same residential area and were spatially mixed—that is, workers of different rank were not segregated by their residential location. Spatial segregation was limited though it is hard to say whether there were other forms of segregation as described in Chap. 2, such as friendship stratification by social status.

4.3 Socio-Spatial Differentiation and the Driving Forces After 1978

Chinese cities experienced dramatic transformation and socio-spatial differentiation since the initiation of the economic reforms in 1978. This has significantly changed the socialist egalitarian allocation of urban space, with emerging segregation among different social groups. Economic reforms have increased income disparity (Bian and Zhang 2002). Whilst the middle class and the elite have been on the rise, a significant group of urban poor has emerged. Jobs were no longer allocated by the government. Millions of workers were laid off from state-owned enterprises as a result of economic restructuring. Rural migrants who moved to cities to work in low-skilled jobs also swelled the ranks of the urban poor (Wu et al. 2013). Accordingly, a new social-spatial structure has emerged with the elite concentrated in expensive gated communities and the urban poor in run-down neighbourhoods such as old work-unit compounds, residential areas awaiting regeneration and urban villages (Huang 2004; see also Chap. 6). It is widely acknowledged that socioeconomic status, housing market discrimination and economic restructuring are the main drivers of segregation in Western cities (Madrazo and Van Kempen 2012). In the Chinese context, the role of institutional factors has been highlighted as one of the major drivers in shaping socio-spatial segregation. Scholars agree that segregation results from the joint efforts of market forces and institutions (Li and Wu 2008; He 2010). Such institutional factors include housing reforms, the land system and the household registration (*hukou*) system, all of which significantly influence individuals' access to social services, resources and opportunities.

China's housing system has experienced significant changes as a result of pro-market housing reforms, which promote homeownership and stratify the socio-economic structure (Wang and Murie 1999; Huang 2004). Housing reforms initiated in the early 1980s aimed to establish a functional housing market by privatising existing work unit housing stock and developing a real estate market. Through a

process of trial and error in selected cities, housing privatisation was gradually rolled out across the country where existing work unit housing was sold to occupants at a heavily discounted price. The construction and allocation of work-unit housing coexisted with commercial properties until 1998 when the welfare distribution of housing was abolished. Since then, most people who were not allocated a house through their work unit have had to purchase housing via the market. However, some large and powerful work units, such as government and public institutions, continue building or providing subsidised housing to their key workers, resulting in persistent patterns of residential stratification. The housing privatisation process led to enormous housing inequality. People who enjoyed better-allocated housing before 1998, including those with higher political ranks in work units, gained more benefits by purchasing their property at a low price (Wang 2000). A subsequent booming housing market has further exacerbated housing differentiation and inequality (Logan et al. 2009). The market provides more housing choices, including high-quality commercial properties with access to improved facilities and infrastructure. People with high income then move away from their previous work-unit compounds or run-down areas to high-quality housing, leaving those who were unable to move in poorer residential areas. Rising house prices in many cities has led to serious housing affordability problems. In contrast with the rapid development of a real estate market (Chap. 9), the subsidised housing sector targeting low- and moderate-income households has lagged behind. The government has introduced mitigating schemes, such as the Economic and Comfortable Housing and the Affordable Rental Housing programmes (Huang 2012). However, both governments and real estate developers are reluctant to construct subsidised housing due to its low profitability and its great drain on public finance. Many subsidised housing units are located in suburban areas without sufficient public facilities and services. They become less desirable residential areas. The housing reforms have resulted in clusters of residents with similar socio-economic status becoming concentrated in certain neighbourhoods.

Along with the housing reforms, an urban land market has gradually evolved, as the government separates the ownership and use rights of urban land. This enables entrepreneurial urban governments to take control of land under their jurisdiction and to lease land use rights to finance local urban development. Many cities have experienced rapid urban sprawl, with new industrial zones and residential housing in suburban areas, to take advantage of cheaper land there. Urban sprawl in China differs from the pattern in the USA where residential sorting results in a decayed city centre surrounded by affluent suburbs. In the Chinese context, local urban governments play an important role in promoting urban land sprawl in order to develop the local economy. However, in many cases, they fail to synchronise the development of high-quality facilities and services such as hospitals and schools, which remain located in the city centre (Chen and Yeh 2019). Suburban living is associated with low service accessibility, especially for people without cars.

In the meantime, neighbourhoods in the inner city have witnessed enormous physical and socio-economic changes. A large number of new buildings have been constructed since the mid-1980s, and now form the majority of the current urban housing stock (Li and Huang 2006). Massive urban renewal projects demolished

many work-unit compounds and neighbourhoods of pre-1949 origin and replaced them with glossy offices and luxurious apartments. For example, 280,000 homes in inner city Beijing were torn down in the 1990s, and 605,000 more were demolished in the 2000s (Liu and Wong 2015). Numerous residents lost their original homes and had to be accommodated elsewhere. Those who could not afford commercial properties in their original location were forced to move to resettlement housing in the city fringe with poor amenities (Fang 2006). Many urban renewal projects have gentrified the city centre and significantly changed the socio-economic composition of residents in those neighbourhoods (He 2010).

Since 1978, hundreds of millions of migrants have moved from their places of origin into the cities to seek jobs and a better life. Three quarters of them originate from the countryside. As they lack local household registration (*hukou*) status, they face many barriers and constraints. The *hukou* system, implemented in 1958, is a social control measure that requires all Chinese citizens to register with either agricultural or non-agricultural *hukou* status in a particular place inherited from their parents. Holders of *hukou* registration in different places are entitled to different social benefits and services. Those with local urban *hukou* status have access to better public services than migrants, and residents in larger cities are entitled to even better services (e.g. high-quality health and education) than those in smaller cities (Chan 2009). Despite the gradual relaxation of migration control and years of reforms of the *hukou* system, most migrants are unable to get local *hukou* status after they have moved to live and work in the city. Without local urban *hukou* status, migrants are denied access to many local social benefits and services, such as subsidised housing, unemployment insurance and even schooling for their children in local authority schools in some cities (Wu 2002).

There is a huge heterogeneity among migrants in terms of their educational qualifications, skills and career prospects. Many migrants, especially those originating from the countryside, are concentrated in low-skilled jobs in manufacturing factories, construction and service sectors. They live in poor urban neighbourhoods, particularly urban villages, which provide low-cost housing and gradually become enclaves where migrants develop social networks and create job opportunities. Informal structures and ambiguities arise around land property rights due to illegal building extensions, lax land management and development control, overcrowding, and informal and insufficient service provision (Wu et al. 2013). An urban village represents an example of segregated urban space, which we shall discuss in more detail in the next section and in Chap. 6.

4.4 The Measurement of Segregation in Chinese Cities

In contrast with segregation studies in Western countries which often focus on race and ethnicity, segregation in Chinese cities is based on socio-economic status. This is partly because non-Han ethnic minorities account for a small proportion of the Chinese population (8.5% in 2015) and most of them are concentrated in western and

northern regions (NSB 2016). Most studies on urban China are conducted in coastal or large cities where the number of non-Han ethnic minorities is extremely small when compared with the Han majority. A good range of methods have been employed to measure segregation in terms of socio-economic status in urban China, including index-based measurements (e.g. dissimilarity index), profiles of clusters, multi-scale analysis, activity space analysis and spatial-social network analysis. Studies use different spatial scales, such as predefined administrative spatial units, i.e. residential committee (*juweihui* in Chinese), sub-district (*jiedao*) and district (*qu*), as well as residential blocks. Moreover, individual survey data are used in activity space analysis and spatial-social network analysis, as we shall discuss later in this section (see Part III of the book for proposed new methods in Chinese segregation research). There is a consensus across existing studies that the level of segregation in Chinese cities has increased dramatically since the initiation of the economic reforms.

As segregation is usually regarded as a spatial issue, index-based measurements are widely used in segregation studies to measure the concentration of a particular group in given spatial units using census data (e.g., Duncan and Duncan 1955; see methods review in Chap. 2). For example, Zhao (2013) uses the census data in Beijing for 1990, 2000 and 2005 to calculate the indices of social segregation and finds that residential segregation increased significantly over these years. Wu et al. (2014) use the 2000 census data at the residential committee level in Nanjing and develop profiles of residential clusters. Their findings reveal clear patterns of segregation between affluent and poor social groups. Li and Wu (2008) agree that segregation of social groups emerged in Chinese cities, though the extent was much lower than that in the USA or UK. Using 2000 census data in Shanghai, the authors examine the dissimilarity index in terms of housing tenure, educational attainment, *hukou* status and location (centre versus suburb). They find that the most significant residential segregation was based on housing tenure. This finding is supported by Sun et al. (2017) who reported significant residential differentiation among different housing tenure types in the coastal city of Xiamen. Similar conclusions are reached in studies based on the Western contexts which maintain that housing tenure is significantly associated with segregation because the supply and location of different housing types influence people's housing choices and so lead to the spatial concentration of specific social groups (van Kempen and van Weesep 1998). However, as Li and Wu (2008) rightly point out, tenure-based segregation in China in the late 1990s and early 2000 mainly resulted from pre-existing institutional privileges rather than households' housing preferences. A subsequent study by Shen and Xiao (2019) examined the changes in residential segregation in Shanghai using census data from 2000 and 2010 at the residential committee level. They found the city had become more divided in terms of socio-economic status over the decade, and significant segregation existed in terms of educational attainment and *hukou* status, besides the division between central and suburban locations. The extent of segregation in terms of educational attainment exceeded that based on *hukou* status. While the authors acknowledge the impact of institutional factors on urban segregation, they argue for the growing importance of the role of human capital and market forces in shaping socio-economic segregation.

Using the 2010 census data at an individual level in Shanghai, Liu et al. (2019) find the spatial unevenness of the migrant residential distribution is much more evident in smaller geographic units such as residential committee levels than larger geographic units: where the top 10% of migrant-concentrated neighbourhoods had a migrant share higher than 75% and the bottom 10% were at 12% or below. Liu et al. (2019) also show significant differential patterns of segregation among people with different *hukou* status; in particular, rural migrants tend to cluster rather more than local residents and urban migrants, with most of them concentrated in the outskirts of the city. The significant differences in residential segregation between migrants and local residents are also found in the cities of Guangzhou (Liu et al. 2015), Wuhan (Huang and Yi 2009) and Shenzhen (Hao 2015). Many migrants live in urban villages, dilapidated neighbourhoods and factory dormitories, away from local residents.

Besides considering the census data, some studies have examined the spatial distribution of residents of different socio-economic status using more finely-grained block-level data. Liu et al. (2018b) provide such an example, by using the 2005 and 2010 Beijing Travel Survey, which recorded 24-h travel diaries from 210,000 individuals in 2005 and 116,000 in 2010. The authors studied the socio-spatial changes in central Beijing at the scale of Traffic Analysis Zones (TAZs), which are derived according to the road networks by the Beijing Municipal Commission of Transport. The spatial scale is similar to the size of a block, much finer than that of a residential committee. By employing latent class analysis and GIS visualisation, the authors show that 90% of the blocks in the study had over 10% change in the social stratification index of their residents. It is generally agreed that the extent of segregation at a lower spatial scale tends to be larger than that at a higher one (Duncan and Duncan, 1955; Sun et al. 2017), though recent research has challenged this (Manley et al. 2019).

Segregation may occur in people's activity space outside home, including the workplace, shopping and leisure, which are regarded as other anchor points for daily activities (see Chap. 2). The analysis of segregation based on activity space represents an alternative method of examining segregation through a people-based approach rather than the conventional place-based method. The rationale is that activity space may influence individuals' use of urban space and facilities as well as their social contact. Studies have used surveys, travel diaries or participant observation to examine individuals' activity space in daily life. For example, Lin and Gaubatz (2017) employ an ethnographic method to record migrants' daily social and spatial interactions with urban spaces, including work, shopping, leisure activities and social contacts in the city of Wenzhou. They find that migrants are constrained in their activity space as they have limited interaction with local people and little access to urban amenities beyond their residential area, which is close to their manufacturing factories. The study echoes findings of various significant patterns of segregation between migrants and local residents from research work using index-based segregation measurements such as RCQ (residential concentration quotient) (e.g. Liu et al. 2019).

Wang et al. (2012) used a travel survey of over l,000 residents in 10 different neighbourhoods in Beijing to examine people's actual use of space in their daily life for

residents living both inside and outside privileged gated communities. Their results show socio-spatial differentiation beyond residential spaces in terms of employment, consumption patterns, leisure and social relations. A similar conclusion was reached by Zhou et al. (2015), which examined the out-of-home activities of residents in Guangzhou and found a significantly different activity space between higher and lower income groups. Similar patterns have been observed in terms of ethnic segregation. Despite the low dissimilation index indicating residential mixing between the ethnic minorities and the Han majorities in administrative spatial units, Tan et al. (2017) revealed significantly different space–time patterns within daily activities between the Han majority and the Hui minority in the city of Xining in western China. The authors explain the differences in terms of the particular religious activities of the Hui minority and Hui women's limited participation in out-of-home activities. The results show that the dissimilarity index is likely to underestimate the actual degree of social segregation.

Similarly, Zhao and Wang (2018) reported different everyday activities between migrants and local residents in an urban village in Guangzhou, despite the fact that the two groups lived in exactly the same residential area. Using socio-spatial network analysis, the authors found that local residents socialise more with other locals, visit pubs and send their children to publicly funded kindergartens, while migrants have more contact within their own group, visit roadside food stalls and small chemist shops and send their children to migrant kindergartens. There was only a modest interaction between the two groups, suggesting levels of segregation that are not captured by index-based segregation measurements.

Various residential enclaves are discernible in Chinese cities. Two of the most noticeable are urban villages and gated communities comprising commercial properties. Urban villages are rural settlements that were engulfed by rapid urban expansion (see Chap. 6). As the compensation of expropriating residential land is much higher than that of agricultural land, local urban governments expropriated agricultural land for development and left residential land in the village. Due to their convenient location and the rising job opportunities that accompany urban sprawl, many migrants flooded into urban villages for affordable housing. Local villagers took the opportunity to extend their houses and rent them to incoming migrants to supplement their income after the loss of their agricultural land. In most urban villages, migrants outnumber local residents. Urban villages are characterised by substandard housing, overcrowding, lack of sanitary facilities and public services. They do, however, provide low-cost housing and an entry point for many migrants who develop livelihoods and social networks in the city. A range of institutional factors create significant levels of differentiation between local residents and migrants. Local residents are entitled to local social benefits and services, as well as extra benefits provided by their collective assets, while migrants are treated as 'outsiders' as they do not have local *hukou* status (Du et al. 2018). Urban villages as migrant enclaves strongly reflect residential segregation. However, some villages, such as those in Shenzhen, are located near the city centre thereby providing opportunities for migrants to access amenities (Hao 2015). If segregation is measured at a larger

spatial scale, urban villages will actually reduce the level of segregation by providing low-cost housing for migrants in central areas.

As another typical enclave in Chinese cities, gated communities provide quality residential space for people who can afford them. The physical barriers such as gates, and the higher socio-economic status of residents both contribute to social segregation. It is important to note, however, that gated commercial properties vary hugely in terms of the quality of the residential environment and the extent of exclusiveness in Chinese cities. The impacts of gated communities on social contact are contingent on local context, as we shall discuss in detail in the next section.

4.5 The Consequences of Segregation in Chinese Cities

Segregation is likely to have important consequences for individuals' life chances and opportunities because it affects their access to resources, amenities and the benefits of wider social networks (Granovetter's 1983 'strength of weak ties' argument; see also Chaps. 11 and 15). While there are positive consequences of spatial concentration for people of the same social group, such as the ability to network effectively, many studies based on Western contexts document the negative effects of segregation (van Kempen and Murie 2009). For example, living in a neighbourhood with large numbers of ethnic groups tends to be associated with poverty and unemployment. Segregation is likely to reduce contact between ethnic minorities and the majority, leading to social exclusion. This might be detrimental to the integration of ethnic minorities into mainstream society. However, as Kaplan and Holloway (2001, p. 62) rightly point out, 'people may be victimised by space or they may utilise space, and this can change with time. Specific accounts must negotiate the tension between the marginalising and empowering impacts of segregation'. The impacts of segregation on people's life are contingent on local contexts and personal characteristics. We discuss the consequences of segregation in Chinese cities through the perspectives of social contact and labour market outcomes.

4.5.1 The Impacts on Social Contact

An important mechanism under which segregation influences life chances is through social contact. Living in a migrant enclave might reduce social contact between migrants and local residents. There are studies showing different activity space and limited interaction between migrants and local residents in an urban village (Zhao and Wang 2018). Residential segregation may also influence peoples' perception about different social groups. Using data from a survey in Shanghai in 2012, Liu et al. (2018a) examine migrants' and local residents' perceptions of social integration and find that migrants living in neighbourhoods with a larger migrant population size are more likely to think that they are excluded by local residents. Based on a large national

micro-level data extracted from the 2014 China Migrant Dynamic Survey, Zou et al. (2020) find neighbourhood types correlate with migrants' socio-economic integration but there is broad heterogeneity in the correlations across different migrant groups. In particular, migrants living in urban villages show significantly lower levels of overall socio-economic integration than those living in formal urban neighbourhoods such as work-unit compounds and commercial properties. Through interviews with migrants living in urban villages, Du et al. (2018) reported that many migrants agreed that they were treated as 'outsiders' in the locality, because they were excluded from many local benefits and services, which are only reserved for those with local *hukou* status.

However, Wang et al. (2016) argue that urban villages per se do not prevent migrants from interacting with local residents. Using a survey of 1370 questionnaires from Nanjing, the authors examined the impacts of *hukou* status and residential characteristics on neighbourhood interaction between different social groups. They found that migrants are more likely to interact with other migrant neighbours than longer term local residents. Open spaces, particularly in deprived neighbourhoods and urban villages, facilitate residents' interaction with their immediate neighbours. These neighbourhoods have a higher level of intergroup social contact than commercial housing estates. The finding is supported by Forrest and Yip (2007) who reported that social contact is more frequent in old neighbourhoods or work-unit compounds than in commercial property estates where privacy is most valued. According to another study based on a 1420 questionnaire survey in Shanghai in 2013, Wang et al. (2017) found that the concentration of migrants in a neighbourhood does not reduce neighbourhood cohesion, which is measured by social solidarity, common values, social networks, a sense of belonging and informal social control. These findings support the conclusion that urban villages do not prevent migrants from interacting with local neighbours. However, it is unknown whether the experience of living in an enclave influences migrants' social interaction with local residents residing outside urban villages, especially those living in formal urban neighbourhoods such as commercial properties.

Gated commercial estates represent another of enclave within Chinese cities. Most studies of gated communities in the Western context focus on their negative impacts on social contact between different social groups, such as the exclusion of underprivileged people and limits on social contact (Atkinson and Flint 2004). In the Chinese context, gates and walls have always been features of the urban landscape (Wu 2005). Traditional Chinese cities were walled and gated. Within the residential areas, courtyard houses were characterised by walls and collective living space. During the period of state socialism, Maoist cities were replete with walls and gates that defined the boundaries of self-contained work-unit compounds, which accommodated both managers and ordinary workers. After the economic reforms, newly constructed commercial properties often have gates to separate themselves from busy streets and other public spaces. In recent years, there is a push for closed community management in terms of neighbourhood governance in certain cities. Any interpretation of gated community within Chinese cities should, therefore, take this tradition into account.

The impacts of a gated community on social contact and life opportunities are contingent on local social and cultural contexts. There are studies that do report the negative impacts of gated commercial estates. For example, drawing on data from a retrospective questionnaire survey in three gated estates in Chongqing, Deng (2017) found that many homeowners' contact with other people decreased after they moved from work-unit compounds to gated communities. However, Douglass et al. (2012) argued that residential enclaves do not necessarily prevent contact across different social groups for three reasons. First, gates do not necessarily prevent people from accessing the neighbourhood. Second, amenities in gated communities are not provided exclusively for residents, as people living outside can also use the facilities or services. Finally, people in China are more accustomed to the use of gates to separate living and business environments. This is supported by Breitung (2012), a study that examines residents' attitudes towards gated living environments, using interviews from residents living inside and outside three gated communities in Guangzhou. Those living inside the gates valued security and a good residential environment, whilst those living outside showed great acceptance or approval of using gates and walls. It seems that gating is not seen as a problem or a cause for social tensions in Chinese cities in contrast with Western contexts.

4.5.2 The Impacts on Job Opportunities and Wages

The literature has long suggested that migrants in Chinese cities have fewer employment opportunities and lower income than otherwise comparable natives. For example, migrants are not eligible to apply for certain jobs in the public sector and state-owned enterprises. Such labour market discrimination against migrants is especially pronounced for rural-to-urban migrants (Meng and Zhang 2001). However, the urban literature also suggests that residents living in enclaves may experience both spatial constraints and network spill-over effects in terms of job opportunities. Empirical studies have discussed spatial mismatch effects for ethnic minorities living in enclaves, i.e. mismatch between the locations of job opportunities and enclaves, as residents may have poor access to low-skilled jobs located beyond enclaves (Houston 2005). The spatial mismatch effects may lead to longer commutes and reduce labour market success. On the other hand, ethnic minorities concentrated in enclaves may develop strong social networks and share information about job opportunities. This might facilitate their job search and improve their job prospects.

Most studies on enclaves and labour market outcomes in Chinese cities focus on urban villages. Drawing on data from the 2009 survey in 12 cities in four regions in China, Zhu et al. (2017) examined job accessibility and commuting behaviour for rural migrants living in urban villages and formal urban neighbourhoods such as work-unit compounds, public housing and commercial property estates. They found that migrants living in urban villages had shorter commuting times and distances and better job accessibility. This can be partly explained by the network effects, i.e. migrants originating from the same province or county tend to concentrate in

the same urban village and share information about job opportunities. The migrant community is also capable of creating jobs, though many of these are informal. The other explanation is that many urban villages are located near industrial zones and factories as the result of urban expansion. Their convenient location helps migrants to secure job opportunities nearby.

Zhu (2016) further examined employment opportunities and wages for rural migrants living in urban villages and formal urban neighbourhoods using the same dataset. The author found that rural migrant workers living in urban villages had better employment prospects and higher wages, facilitated by their social networks. This is supported by other studies on urban villages demonstrating that social networks and a vibrant informal economy help migrants adapt to urban life and develop careers in the city. In one example, based on the individual-level data of the 2010 census in Shanghai, Liu et al. (2019) found that migrant enclave residence is positively associated with employment outcomes for rural migrants. The effect is particularly evident among female migrant workers and those who live in locations with relatively low job densities. However, such a positive social network effect is not shared by urban migrants or urban natives. The authors explain that rural migrants, lacking higher levels of educational attainment, are more likely to rely on social networks to secure jobs.

Studies also indicated that migrants originating from Zhejiang province developed successful clothes businesses in urban villages in suburban Beijing (e.g. Ma and Xiang 1998). A recent study in Guangzhou discusses the entrepreneurial activities of migrants originating from Hebei Province and their thriving garment business in an urban village (Liu et al. 2015). Migrant entrepreneurs actively use urban space to create job opportunities and achieve economic advancement and social mobility. New migrants from the same place of origin obtain help from their fellow migrants and find jobs in the same garment industry. It is noted that most of these jobs are informal in nature. The authors do acknowledge that not all migrant enclaves can promote migrant-owned business and facilitate migrants' career development. In addition to tightly knit social networks in the enclaves, resources linked with native places and externally oriented economic activities are crucial for the emergence of migrant entrepreneurs.

4.6 Conclusions and Discussions

During the centrally planned period initiated by Chairman Mao in 1949, Chinese cities were characterised by mixed neighbourhoods comprised of socially homogenous work units with no discernible patterns of segregation. Since the initiation of the economic reforms in 1978, cities have experienced enormous transformation and spatial divisions between different socioeconomic groups, driven by market-oriented housing, land reforms, rapid economic and spatial restructuring and massive rural-to-urban migration. While the elite can afford to live in affluent gated communities, the urban poor are clustered in dilapidated neighbourhoods and urban villages. With

the deepening of the economic reforms and the continued process of urban transformation, the patterns of segregation in Chinese cities are likely to change rather than being static.

Various methods have been employed to measure the extent of segregation in Chinese cities. All studies agree that urban segregation based on socio-economic status has increased significantly since the start of the economic reforms. Chinese cities are beginning to resemble Western cities in that people of similar socio-economic status tend to concentrate in certain residential areas. However, it is difficult to compare the extent of segregation in Chinese cities with that of North American or European cities by using index-based measurements. This is because the spatial scales used in European studies are typically quite different to those in Chinese ones and we know that, even in the same city, segregation indices can give very different results for different spatial scales. Index-based measures of residential segregation are also likely to underestimate the true extent because social segregation may also occur in leisure and activity contexts as well as places of residence (see Chap. 2). Segregation may influence residents' ability to access resources and opportunities. The impact of urban segregation on social contact and labour market outcomes are mixed in Chinese cities. While there is evidence of some negative consequences, evidence also exists to demonstrate that by living in enclaves migrants can actively develop social networks and achieve economic advancement and social mobility.

Residential segregation can be observed in cities across the world, of course, but there are particular features within a Chinese urban context. These features should be understood and interpreted within the particular Chinese historical, social, cultural and institutional background. Gated communities are an example of how a particular form of segregation can have a very different meaning and impact in China compared with American and European counterparts. This is because the gated communities in China have a communal historical precedent popularised during the Maoist era and so do not necessarily have the connotations of exclusivity and xenophobia associated with gated communities in the West. Moreover, some of the political and economic processes that lead to segregation are unique to China such as the impact of land reforms and the ongoing importance of rural migration, increased city-to-city population mobility and the *hukou* system in driving socioeconomic inequality and residential segregation. In this chapter, we have, therefore, attempted to highlight the role of cultural and institutional factors that have shaped the socio-spatial structures in Chinese cities. These factors are likely to continue influencing segregation in China, together with the increasingly important impact of market forces. The characteristics of continuing urban segregation in China mirror various social-spatial structural transformations within the country and warrant extensive investigation. It provides an important area for future research.

In the next five chapters, these drivers of change and their implications for inequality are discussed in more detail, particularly with respect to urbanisation, migration and the anti-poverty programme (Chap. 5), the development and redevelopment of urban villages (Chap. 6) and Shanty towns (Chap. 7), inequalities in public services (Chap. 8) and the housing issues facing rural migrants (Chap. 9).

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Chapter 5
Urbanisation, Migration and the Anti-Poverty Programme in China

Houkai Wei and Hongjian Su

Abstract From 1979 to 2018, China underwent rapid urbanisation and large-scale population migration. As a result, the permanent urban population increased by about 659 million, and the numbers of rural poor decreased by 754 million. However, as migration from rural to urban areas has increased, rural poverty has reduced while urban poverty is gradually increasing. The co-existence of both rural and urban poverty poses new challenges to development. In this chapter, we analyse the characteristics of China's internal migration and urbanisation process. We draw on relevant data to describe in detail the changes that have occurred since China's Reform and Opening-up, as well as China's programme in reducing rural poverty and current trends in urban poverty. As the rate of urbanisation in China enters a new phase, there is a growing imperative to improve and promote an integrated approach to both urban and rural development. We also discuss the new raft of anti-poverty and poverty-management measures.

Keywords Urbanisation · Migration · Anti-poverty programme · China

5.1 Introduction

Since China's 'reform and opening-up', urbanisation has increased rapidly. At present, the rate of urbanisation (the proportion of people living in urban areas) in China has reached 59.6% (State Statistical Bureau 2019), and this is well above the world's overall level. Although the speed of this process is slowing down, it is still happening at a comparatively high rate. With urbanisation and large-scale population movement has come urban poverty. As a result, there has been a growing

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imperative to monitor and improve the quality of urbanisation. Chinese urbanisation in China has recently entered a new stage steered by moves towards significant quality improvement (Wei 2014, 2015).

In this chapter, we chart the various stages of China's internal migration and urbanisation process over the past four decades and the implications for urban poverty. The chapter consists of four parts. Section 5.2 describes the slowdown of urbanisation in China and the new stage of development oriented towards improving the quality or urban life. In Sect. 5.3, we investigate achievements in poverty reduction in rural China since the 'reform and opening-up'. In Sect. 5.4, we discuss urban poverty in the process of Chinese urbanisation, calculate the size of the population of urban poor using various methods, and analyse the multi-dimensional aspects of poverty within this population. Section 5.5 concludes with a brief overview and discussion.

5.2 China's Urbanisation and New Stage of Development

China's urbanisation rate has reached two major points of development in recent years (see Fig. 5.1). While internal migration from rural to urban areas has slowed, the rate of growth continues. The Chinese urbanisation rate increased from 17.92% in 1978 to 58.52% in 2017, with an average annual increase of 1.04 percentage points. In the same period, the world's overall urbanisation rate increased from 38.48–54.82%, with an average annual increase of 0.42 percentage points. From 2010 to 2011, China's urbanisation rate rose beyond 50%, so that the country became a predominantly urban society (Wei 2013). The following year, China's urbanisation rate reached 52.6% to

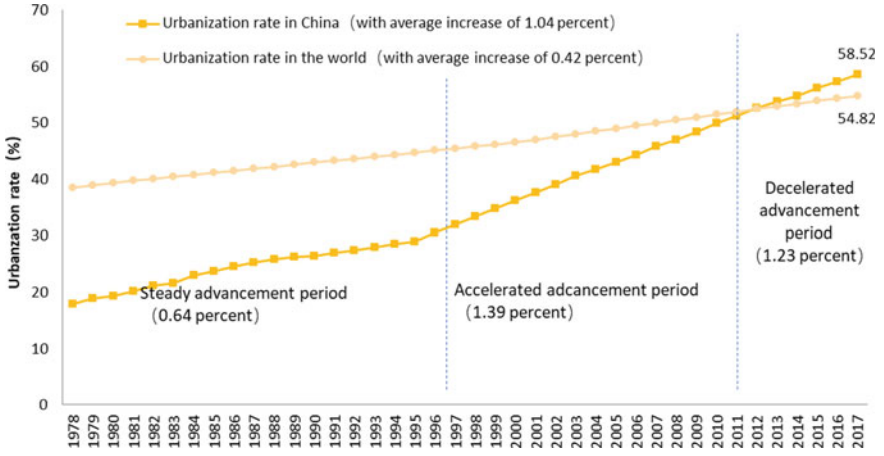

Fig. 5.1 Urbanisation rate in China and the world (1978–2017). *Data sources* Data on urbanisation rate in China is derived from China Statistical Yearbook (2018); data on the global rate of urbanisation is derived from data published by the World Bank: https://data.worldbank.org/indicator/sp.urb.totl.in.zs

exceed the global urbanisation rate of 52.5% and continued to advance faster than the world average.

According to Northam (1979), China's urbanisation rate was less than 30% at the initial stage of development, growing from 30–70% during the middle period of rapid development. The acceleration stage occurred from 30 to 50%, with deceleration occurring between 50–70%. Anything beyond 70% occurs at the later stage of stable development (Wei 2014). China's urbanisation rate reached a turning point of 30% and 50% in 1996 (30.48%) and 2010 (49.95%), respectively. From 1978 to 1996, it progressed steadily at a speed of 0.64 percentage points. From 1997 to 2010, it accelerated at a speed of 1.39 percentage points. The average speed slowed down during 2011 and 2017, with an average annual increase of 1.23 percentage points. If we project the S-shaped curve alongside other forms of predictive research (Wei 2014), the Chinese urbanisation rate will reach 70% by around 2030. The rate of urbanisation is expected to advance rapidly until reaching that point.

The rate of slowdown conforms to Northam's (1979) S-shaped curve of urbanisation. An eventual deceleration derives from a slowdown in migration and a reduced willingness among migrant workers to enter and settle in cities. Under the new steady-state of China's economy, the rate of increase in urban employment has also declined. The migration rate from rural areas has decreased with the downturn in economic growth and the substitution of capital to labour caused by the rapid rise in wages. According to annual monitoring and survey reports on migrant workers released by the National Bureau of Statistics since 2009, the rate of migration from rural areas has declined sharply since 2012 (see Fig. 5.2). In 2015 and 2016, the increase was only 630,000 and 500,000, respectively. It should be noted that in 2017, the number of rural migrant workers increased by 2.51 million. However, these new

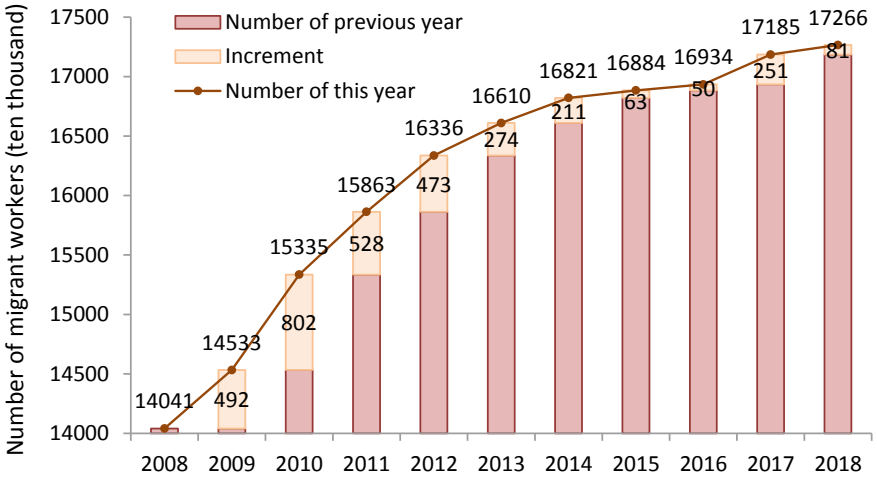

Fig. 5.2 Growth of migrant workers from rural areas of China in recent years. *Data sources* National Bureau of Statistics, annual monitoring and survey reports on migrant workers

migrant workers mainly flowed from their villages to urban areas within their home provinces, which accounted for 96.4% of the increase of migrant workers from rural areas.

The annual increase revived during 2018, rising to 810,000. Due to a combination of government intervention and market forces, urban capital, technology, and talent have increasingly flowed into the countryside in recent years. This process is especially pronounced in the developed coastal areas such as the Delta of the Pearl and Yangtse Rivers where rural residents enjoy many benefits like homestead and collective dividends. Some urban residents are now trying to find ways to obtain rural *hukou*–household registration status that confers rights of access to local public services and welfare support (see Chaps. 1, 4 and 12)—through various channels. In the longer term, the trend will be towards a two-way free migration of urban and rural populations.

5.2.1 Settlement Rates of Rural Migrants

At the same time, the willingness of migrant workers to settle in cities varies across different regions. Factors that affect the willingness of rural migrants to settle in cities include a narrowing income gap between urban and rural residents, a continual increase in levels of urban-rural integration, and increasingly preferential rural policies. At present, in some megacities, where stricter *hukou* systems and settlement standards are implemented, rural migrant workers show a strong willingness to settle permanently. Other small and medium-sized cities have liberalised their *hukou* system and actively encourage rural workers to settle. Nevertheless, the overall willingness of rural workers to settle down has declined.

According to statistical surveys (see Table 5.1) conducted in 2014, the proportion of agricultural migrants prepared to settle longer-term in cities was relatively low, between 30 and 50% except in Changzhou and Zhengzhou. The proportion of migrant workers willing to settle in cities and towns was only 41.5% in Zhongshan, 40.8% in Harbin, 41.1% in Yantai, 34.5% in Fuling, 51.6% in Ordos, 45.6% in Guang'an, and 46.2% in Shaanxi (see Table 5.1). The Survey on Dynamic Monitoring of Migrant Population in 2016 reveals that the willingness to settle as residents in the cities of immigration among the rural registered floating population was 58%, while the willingness to settle down (including *hukou* registration in the cities of immigration) was only 30%. These figures were much lower in small and medium cities (National Health Commission of the People's Republic of China 2018). This decline in rural workers' willingness to enter and settle in cities will slow the urbanisation rate and impact the urbanisation pattern (Wei 2019).

Table 5.1 Results of survey on migrant workers' willingness to settle in cities (2014)

Survey subject	City	Sample number	Willingness to settle in cities (%)
Zhongshan Survey Team of the National Bureau of Statistics	Zhongshan	82	41.5
Changzhou Survey Team of the National Bureau of Statistics	Changzhou	152	82.9
Harbin Survey Team of the National Bureau of Statistics	Harbin	341	40.8
Yantai Survey Team of the National Bureau of Statistics	Yantai	90	41.1
Zhengzhou Survey Team of the National Bureau of Statistics	Zhengzhou	120	75.0
Fuling Survey Team of the National Bureau of Statistics	Fuling	84	34.5
Ordos Survey Team of the National Bureau of Statistics	Ordos	186	51.6
Shaanxi Statistics Bureau	Various districts and counties	1100	46.2
Urban–rural Survey team of Guang'an Bureau of Statistics	Guang'an	500	45.6

Data sources Collated according to relevant data released by the statistical departments

5.2.2 New Type of Urbanisation: A Period Marked by Quality Improvement

With the slowdown in the urbanisation process, strategic planning has begun to emphasise quality improvement issues. At the end of 2013, the Central Work Conference on Urbanisation clearly pointed out the necessity to 'advance people-centred urbanisation.' Further clarity was provided by the Chinese State Council and the Central Committee of the Communist Party of China in 2014. A plan for the period 2014–2020 made an explicit commitment to quality improvement and a more 'people-centred' approach taking complete account of Chinese characteristics. The aim was to implement a more holistic approach by improving the spatial layout and addressing ecological and cultural heritage in any new developments.

The State Council also issued the *Comprehensive Pilot Programme for National New-type Urbanisation* at the end of 2014, further emphasising the need for a people-centred approach. Pilot work considered various aspects, including the citizenisation of agricultural migrants, investment and financing mechanisms, reform of the rural homestead system, innovations and reforms in administrative management and institutional mechanisms, so as to identify models that can be up-scaled or replicated. The practical issues of development and the change at a strategic level show that China has entered a period of comprehensive improvement in the quality of urbanisation. It is imperative to advocate a shift from rapid urbanisation to a more quality-oriented process. Recent measures to improve the quality of the urbanisation process address three important aspects.

Firstly, active promotion of reforms of *hukou* and related systems, and the integration of rural migrants more effectively within the process of urbanisation. In recent years, in response to the issue of 'urbanisation of people,' the State has introduced a number of reform measures for the *hukou* system to encourage greater integration of agricultural migrants. The State Council, for example, issued the *Opinions on Further Promoting the Reform of the Hukou System* in 2014. Since 2016, the *Interim Regulations on Residence Permit* has come into force. In 2016, the General Office of the State Council issued the *Proposal to Promote the Settlement of 100 Million Non-Resident Population in Cities.* As a result, various departments have issued a series of supporting policies and measures in a concerted effort to solve the practical issues of education, employment, medical and old-age care, and housing security for rural migrants, as well as the practical issues of withdrawal of 'three rights'[1] in rural areas for those workers who settled in cities. The provinces and central cities have also introduced corresponding plans to implement the reform of *hukou* systems. Through such reform, the urbanisation rate of the *hukou* registered population reached 43.37% in 2018, and the urbanisation rate of the permanent resident population was synchronously increased. By November 2018, more than 75 million residence permits were issued throughout the country. The six basic public services and seven facilities stipulated in the *Interim Regulations on Residence Permits* have been implemented in various places, and efforts have been made to expand the scope of basic public services and improve service standards. With deeper and wider reforms of *hukou* and related systems, the goal of 'Three hundred million people'[2] has been gradually implemented.

The second measure concerns the steady promotion of land systems reform so as to improve efficiency and create co-ordinated development of the process of urbanisation affecting both land use and people. Urban population growth and urban sprawl

[1] This refers to rural workers who have settled in cities and voluntarily relinquished rural land contracting rights, homestead use rights, and collective income distribution rights with compensation according to regulations.

[2] In March 2014, the 'Government Work Report' reviewed and approved by the 12th National People's Congress pointed out that in the coming period, we should focus on 'Three hundred million people', that is, to promote about 100 million agricultural migrant population settled in towns, renovate urban shanty towns and urban villages where about 100 million people live, and guide about 100 million people to urbanise in the central and western regions.

are the main manifestations of urbanisation. In recent years, the State has issued a number of policies to promote land systems reform so as to achieve 'people-land linkage' in the process of urbanisation. In 2014 the General Office of the Communist Party of China Central Committee and the General Office of the State Council issued the *Opinions on the Pilot Work of Rural Land Acquisition, the Market Entry of Collective Business Construction Land, and the Reform of Homestead Land System.* The aim was to actively explore the entry of collective construction land and rental property in rural areas into the open market. In 2017, the Ministry of Land and Resources and the Ministry of Housing and Urban-Rural Development jointly issued the *Pilot Programme for Building Leased Housing by Collective Construction Land*. In 2018, the Communist Party of China Central Committee and the State Council issued the *Opinions on Implementing the Rural Vitalization Strategy*, clearly specifying the policy of 'improving the idle homestead and idle farm houses,' and exploring the 'Separation of ownership, qualification and use rights of the homestead.' This has set the direction for the reform of rural land systems. On this basis, the Ministry of Land and Resources issued the *Notice on Actively Supporting Poverty Alleviation and Development and Relocation of Ex-situ Pro-poverty by Making Good and Flexible Use of Increase and Decrease Linking Policy* in 2016. The General Office of the State Council printed and distributed the *Measures for the State's Overall Management of Supplementary Arable Land Across Provinces and Regions* and the *Measures for the Adjustment Management of Balanced Indicators of Increase and Decrease Linking for Land Used for Urban–rural Construction Projects Across Provinces and Regions* in 2018. This could expand the transaction scope of balanced indicators of land used for urban–rural construction projects. It was conducive to improving land-use efficiency and achieving a co-ordinated development of urban population growth and urban sprawl.

The third measure comprises the co-ordinated adoption of new strategies for urbanisation and rural development that accelerate the process of integration. Since the 19th National Congress of the Chinese Communist Party in October 2017, there has been a more pronounced two-way flow between urban and rural initiatives. The characteristics of intergenerational migration[3] in both urban and rural areas have become more apparent, indicating that the process of urbanisation has entered a transitional period of greater integration. The report of the 19th National Congress of the Communist Party of China put forward the Implementation of Rural Vitalization Strategy for the first time, highlighting the need for greater integration of urban-rural development. The Strategy also recognised the need to modernise agricultural industries and improve the quality of life of rural communities. The *Opinions of the Central Committee of the Communist Party of China and the State Council on the Implementation of Rural Vitalization Strategy* further clarified the significance, objectives, and priorities of implementing new strategies for rural development. Subsequently, the Central Committee of the Communist Party of China and the

[3] Since many migrant workers have not obtained urban registration, they will return to their hometowns when they reach a certain age and revert to their previous status as rural workers once more.

State Council jointly issued the *Opinions on Establishing and Improving the System, Mechanism and Policy System for the Integration of Urban-rural Development* in April 2019. As a result, all regions began to implement in-depth rural vitalisation strategies and establish and improve institutional mechanism and policy systems in order to integrate urban–rural development more comprehensively.

5.3 Impact of Urbanisation on Rural Poverty Reduction

With the rapid advancement of urbanisation and large-scale rural-urban migration, China's economy has continued to grow rapidly. The income of urban and rural residents has increased sharply, and the most chronic rural poverty level has decreased drastically. The decrease in rural poverty has contributed more than 70% to global poverty reduction (Wei and Huang 2019).

5.3.1 Poverty Reduction in Rural Areas

The Chinese government attaches great importance to poverty reduction in rural areas. It has invested a great deal of manpower, material and financial resources to help accelerate rural development and achieve prosperity. As a result, levels of rural poverty have decreased significantly across the country. According to the 2010 rural poverty standard (2,300 yuan per person per year), in constant prices, the rural poor population dropped from 770.39 million in 1978 to 16.6 million in 2018, and the poverty incidence decreased from 97.5% to 1.7% (see Fig. 5.3). During this period, the rural poor population decreased by 754 million, with an average annual

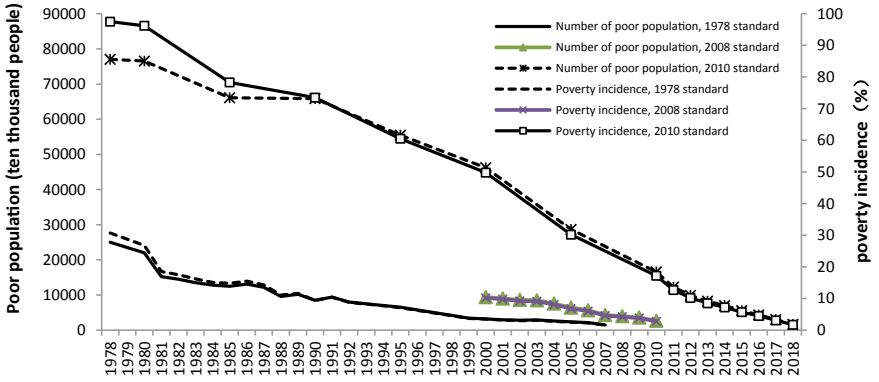

Fig. 5.3 Changes in rural poor population and poverty incidence in China (1978–2018). *Data sources* Calculated according to China Statistical Yearbook (2018) and the Statistical Communique on the 2018 National Economic and Social Development of the People's Republic of China

reduction of 18.84 million. The incidence of poverty decreased by 95.8 percent, with an average annual decline of 2.40 percent. This is the only example of a 40-year process of sustained poverty reduction in the world. The consistent reduction in levels of poverty can be attributed to three general effects:

- Sustained and rapid economic growth, crucial for rural poverty alleviation.
- Sustained and rapid internal migration to urban areas resulting in increased prosperity.
- The government's application of active measures to reduce rural poverty tailored to address specifically Chinese factors and characteristics. According to the standard of Purchasing Power Parity (PPP) of US$1.9 per day in 2011, China has contributed 71.82% of the reduction in the world's 1.10 billion poverty-stricken population from 1981 to 2012 (Li and Wei 2016).

The fastest rate of poverty reduction has taken place in the east of the country, while the western region has seen poverty reduce by the largest scale. From 2010 to 2018, China's rural poor population fell by 90%, with the highest reduction of some 94.3% in the eastern region, and only about 89% in the central and western regions (see Table 5.2). During this period, the numbers of rural poor decreased by

Table 5.2 China's rural poor population and its distribution from 2010 to 2018

	Poor population (ten thousand)				Distribution of poor population (%)			
	Nationwide	Eastern China	Central China	Western China	Nationwide	Eastern China	Central China	Western China
2010	16,567	2587	5551	8430	100	15.6	33.5	50.9
2011	12,238	1655	4238	6345	100	13.5	34.6	51.9
2012	9899	1367	3446	5086	100	13.8	34.8	51.4
2013	8249	1171	2869	4209	100	14.2	34.8	51.0
2014	7017	956	2461	3600	100	13.6	35.1	51.3
2015	5575	653	2008	2914	100	11.7	36.0	52.3
2016	4335	490	1594	2251	100	11.3	36.8	51.9
2017	3046	300	1112	1634	100	9.9	36.5	53.6
2018	1660	147	597	916	100	8.9	35.9	55.2
Change	−14,907	−2440	−4954	−7514		−6.7[a]	2.4[a]	4.3[a]
Growth (%)	−90.0	−94.3	−89.2	−89.1				

a means a percentage point

Note Unit a is a percentage point. Eastern China includes Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan; Central China includes Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, and Hunan; Western China includes Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang

Data sources Calculated according to the annual *China Statistical Yearbook* and *China Statistical Summary,* and Wei and Huang (2019)

149.07 million, by some 50.4% in the western region, 33.2% in the central region, and only 16.4% in the eastern region. Because of the rapidity of poverty reduction in the eastern region, the proportion of the rural poor in that region has gradually declined in recent years, while the proportion across the central and western regions has been rising. Since 2017, over 90% of China's rural poor have been concentrated in the central and western regions. In 2018 the western region accounted for 55.2% of the total, with a poverty incidence of 3.2%. The central region accounted for 35.9%, with a poverty incidence of 1.8%; and the eastern region accounted for only 8.9%, with a poverty incidence of 0.4%. From the perspective of provincial administrative regions, the poverty incidence in all provinces generally fell below 6% in 2018. Incidence of poverty in Guizhou, Tibet, Gansu and Xinjiang was over 5%, while in Shanxi, Henan, Guangxi, Yunnan, Shaanxi, Qinghai and Ningxia it lay between 2 and 5%. The poverty incidence in Beijing, Tianjin, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, and Guangdong has dropped to less than 0.5% (Wei and Huang 2019).

5.3.2 The Role of Urbanisation in Poverty Reduction in Rural Areas

Urbanisation has played an active role in rural poverty reduction, mainly through promoting economic and social development and labour transfer in poverty-stricken areas. The process has raised the income level of rural residents, increased the non-agricultural income of rural dwellers, and gradually narrowed the income gap between urban and rural areas. The means by which urbanisation reduces rural poverty can be divided into three aspects.

- First, the attraction of urban centres as places of employment and increased integration of urban and rural development drives economic and social development in rural areas and increases income levels. Shen and Jiang (2007) use China's provincial panel data and analyse the positive impact of urbanisation on economic growth, which increases income levels and reduces poverty. Chen et al. (2010) proved the positive correlation between urbanisation and economic development at a provincial level.
- Secondly, an increase in non-agricultural income will increase wages or transfer income from family members employed in sectors other than agriculture. Ahluwalia (2008) argues that by primarily increasing income levels, urbanisation is an important condition for poverty reduction.
- Thirdly, urbanisation involves large-scale internal migration from rural areas leading a reduction in the population of the rural poor. This can also lead to the problem of urban poverty which will be discussed in the next section. This process can be called the *transfer effect* of urbanisation on poverty reduction. Wang (2008) considers that this transfer effect is achieved by means of 'urbanisation—transfer of rural labour –poverty alleviation.' Calì and Menon (2016)

believe that urbanisation reduces rural poverty mainly through the transfer of rural poor population to urban areas, which reduces both the rural poor population and the total rural population. Wan et al. (2017) argue that urbanisation can not only effectively reduce the poverty of rural and migrant workers, but also help to narrow the urban–rural income and consumption gaps. Some scholars suggest that whether urbanisation can reduce poverty is related to the particular stage of urbanisation involved. The early stage of the urbanisation process is conducive to poverty reduction, while later stages have less impact on reducing levels of poverty (Panudulkitti 2007; Cui and He 2018).

As Chinese reforms gathered pace from the 1980s, rural workers followed a pattern of temporary migration—'departing farming without leaving native land.' By the beginning of the 1990s the scale of trans-provincial flow of labour gradually increased. After 2000 the rural surplus labour force began to migrate on a large scale and to settle in cities more permanently. The process of 'rural workers moving into cities' has both greatly improved their income and living standards and narrowed the income gap between urban and rural residents, while providing a sufficient labour force for economic development. The per capita wage income of rural households and its proportion of workers' per capita net income have both increased rapidly, from 152 yuan or 21.4% in 1991 to 772 yuan or 32.6% in 2001, and then to 3448 yuan or 43.6% in 2012 (see Fig. 5.4), making a significant contribution to the increase of per capita income of rural households. By contrast, the proportion of household operating income fell from 73.9% in 1991 to 44.6% in 2012. Since 2013, the National

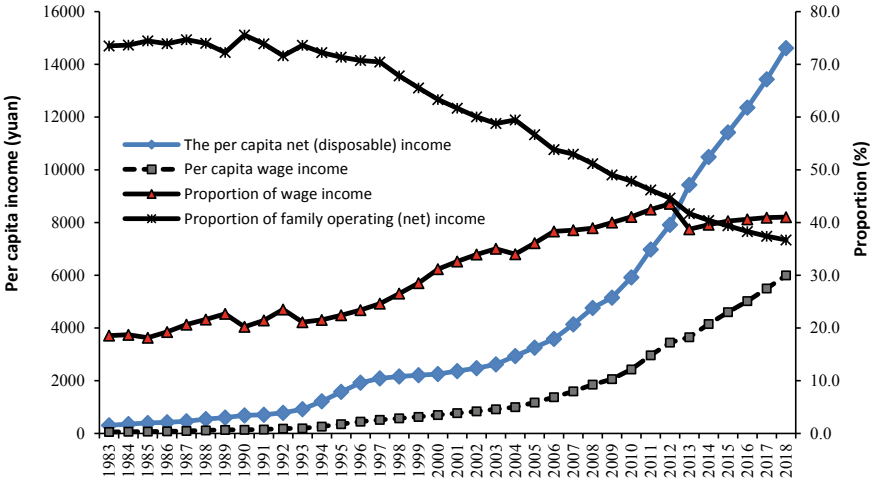

Fig. 5.4 Changes in per capita income of rural households in China (1978–2018). *Note* Due to the adjustment of statistical calibrations, the data before 2013 refers to the per capita net income of rural households, and the data since 2013 refers to per capita disposable income of rural households. *Data sources* Calculated and collated by the authors according to the *China Statistical Yearbook (corresponding years)* and *China Statistical Summary* (2019)

Bureau of Statistics has surveyed integrated household income, expenditure and living conditions in urban and rural areas, and revised the statistical calibration of farmers' income, principally adjusting farmers' per capita net income to the per capita disposable income of rural residents. From 2013 to 2018, the proportion of wage income within rural households' per capita disposable income increased from 38.7 to 41%. The proportion of net transfer income increased from 17.5 to 20%, while the proportion of net income from household operations decreased from 41.7 to 36.7%. The income earned by farmers leaving agriculture and rural areas to work in cities forms a significant proportion of this increase. It follows that the rapid growth of farmers' main income in recent years comes from the growth of wages and net transfer income from urban migration. During 2014 and 2018, nearly 70% of the increase of rural residents' per capita disposable income came from wage income and net transfer income, of which the contribution of wage income to the increase of farmers' income was 45.2%, and that of net transfer income was 24.5%.

With urbanisation and population migration, the income gap between urban and rural residents has fluctuated and expanded continuously. It has gradually stabilised and narrowed from 2003 (see Fig. 5.5). In the early stages of reform and the implementation of the rural household contract responsibility system, farmers' income increased rapidly, and the urban–rural income gap narrowed. However, since the focus of economic reform shifted in 1985 from rural to urban areas, the urban–rural income gap began to expand sharply. From 1984 to 2003, the ratio of per capita disposable income for both urban and rural residents expanded rapidly from 1.84 to 3.12. From 2004 to 2019, the Communist Party of China's Central Committee

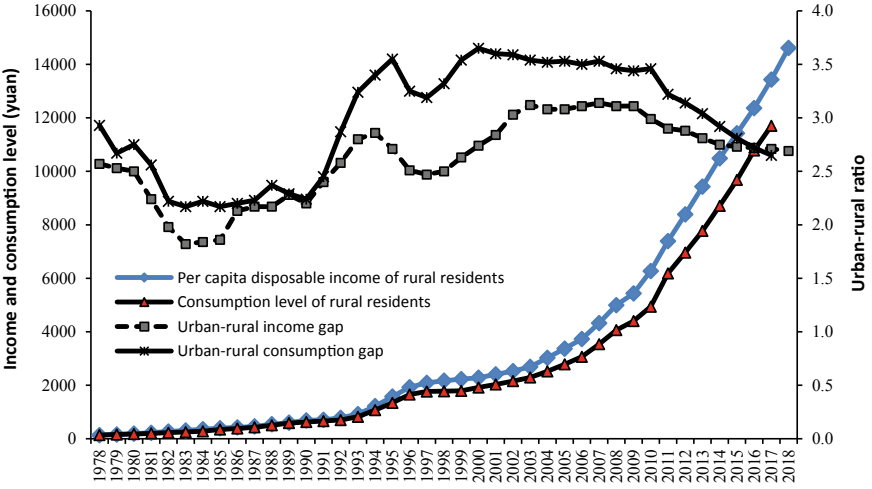

Fig. 5.5 Changes in the income of urban and rural residents in China (1978–2018). *Data sources* Drawn according to *China Statistical Yearbook* (2018), *China Rural Statistical Yearbook* (2018), *China Statistical Summary* (2018) and the *Statistical Communique of National Economic and Social Development of 2018*

successively issued 16 No.1 Documents to support the development of 'agriculture, rural areas and rural residents' and introduced a series of policies to support agriculture and benefit farmers. With the support of central policies, the income of rural residents continued to increase rapidly, and the gap between urban and rural residents' income and consumption levels continued to shrink. In terms of per capita disposable income, the income ratio of urban and rural residents in China dropped from the peak value of 3.14 in 2007 to 2.69 in 2018, while the consumption ratio for urban and rural residents also declined from the peak value of 3.65 in 2000 to 2.65 in 2017. This shows that China has entered a new period in which the gap between urban and rural areas continues to close.

However, it should be noted that the current urban–rural income gap in China remains large. In 2018, the ratio of per capita disposable income of urban and rural residents was still 48% higher than in 1983. In particular, since an integrated land market has not yet formed, the channels for rural resources to change into capital and wealth are not smooth, and the wealth gap between urban and rural residents is very wide. In 2018, the ratio of per capita net income from capital and wealth of urban to rural residents reached up to 11.8.

The process of urbanisation correlates both with increases in rural residents' income and anti-poverty measures. Figures 5.6 and 5.7 show the basic correlation between the rate of urbanisation, poverty incidence and the size of the provincial poor population in 2017. It indicates that the higher the urbanisation rate, the lower the incidence of rural poverty and the smaller rural poor population. It can be seen that, in 2017, eastern provinces and cities experienced the highest rates of urbanisation. The rural poverty rate for Beijing, Tianjin, Shanghai, Jiangsu, Zhejiang, Fujian, and Guangdong (at the lower right corner of Figs. 5.6 and 5.7) was 0, and their urbanisation rates were 86.5%, 82.9%, 87.7%, 68.8%, 68.0%, 64.8% and 69.9%, respectively.

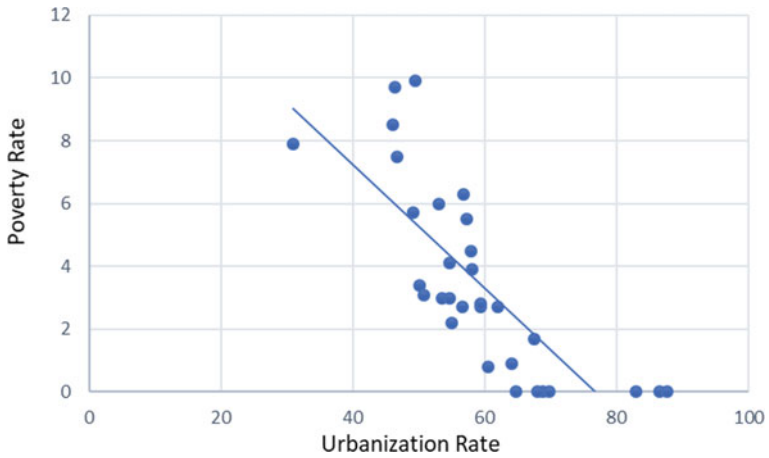

Fig. 5.6 Correlation between urbanisation rate and poverty incidence in rural areas in various regions in 2017. *Data sources* Drawn according to *China Statistical Summary of 2018*

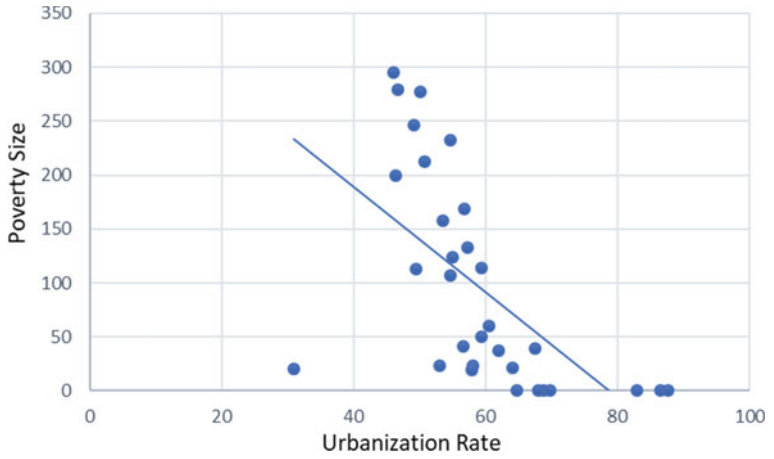

Fig. 5.7 Correlation between urbanisation rate and size of rural poor population in various regions in 2017. *Data sources* Drawn according to China Statistical Summary 2018

In comparison, the urbanisation rate of the western provinces (autonomous regions) such as Tibet, Gansu, Xinjiang, Guizhou, Yunnan, Guangxi and Qinghai (at the upper left corner of Figs. 5.6 and 5.7) was low, and the poverty incidence in rural areas was high.

This study further uses the panel data of urbanisation rates, the incidence of rural poverty and size of the poor population from 2010 to 2017 to examine the correlation between urbanisation and rural poverty. The result is shown in Table 5.3. In Models 1–6, we use panel data to analyse the correlation between the urbanisation rate, the incidence of rural poverty and size of the poor population, showing a significant

Table 5.3 Correlation among urbanisation rate, poverty incidence in rural areas and size of poor population

	Poverty incidence			Size of poor population		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant term	38.0224[a] (22.42)	60.0987[a] (8.32)	105.9304[a] (24.71)	973.3356[a] (15.13)	2170.217[a] (5.89)	3163.952[a] (24.88)
Urbanisation rate	−0.5145[a] (−17.18)	−0.9158[a] (−6.27)	−1.7491[a] (−22.47)	−12.7994[a] (−11.27)	−34.5598[a] (−5.22)	−52.6268[a] (−22.79)
F	295.27		504.91	127.10		519.48
R^2	0.5455	0.5455	0.5455	0.3407	0.3407	0.3407
Sample	31 × 8	31 × 8	31 × 8	31 × 8	31 × 8	31 × 8
Remark	Mixed effect	Random effect	Fixed effect	Mixed effect	Random effect	Fixed effect

Note The numbers in the parentheses refer to t-value or z-value
[a]indicates significance at 1% level

negative correlation. That means, the higher the urbanisation rate, the lower the poverty incidence in rural areas, and the smaller the size of the poor population. Considering that the urbanisation rate is the only explanatory variable, in models 3 and 6 we adopt a fixed-effect model to control for time-invariant omitted variables. As such, the coefficients of Model 3 and Model 6 are the preferred models for interpretation. The coefficients reported in Table 5.3 show that for every 1 percentage point increase in the urbanisation rate, the poverty incidence in rural areas reduces by about 1.75% (Model 3), and the size of the rural poor population reduces by about 526,300 (Model 6).

5.4 Urban Poverty in the Process of Migration and Urbanisation

The active role played by urbanisation in rural poverty reduction can be partly attributed to the migration of population from rural to urban areas, that is, the *migration effect* of urbanisation in poverty reduction. Nevertheless, migrants who settle in cities often face a variety of barriers that can lead them into urban poverty. During the process of rapid urbanisation and large-scale demographic migration, the national poverty reduction strategy develops from an early countryside-oriented strategy to one that lays equal stress on urban and rural areas. It will then change emphasis to become a city-oriented poverty reduction strategy (see Fig. 5.8), along with a shift in rural poverty and urban poverty. Current anti-poverty measures in China have entered a new stage of co-ordinated urban-rural management. It should be emphasised that,

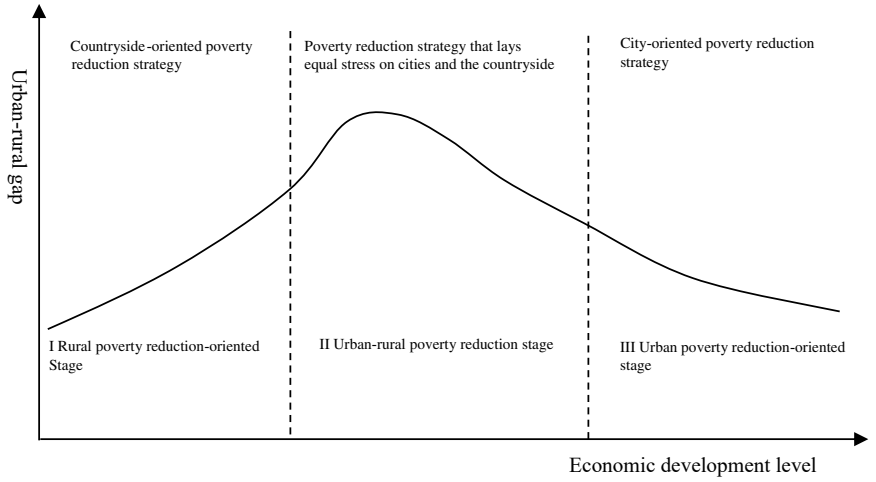

Fig. 5.8 Economic development and poverty reduction strategy. *Source* Wei (2018)

although some rural–urban migrants live in poverty, Chinese cities have not experienced the emergence of 'slums' like other countries in the process of large-scale rapid urbanisation. This can be attributed to continuous strengthening of the policy support for 'going into the city' and the policy guarantee of 'returning home'[4] for rural–urban migrants in China. The policies enable Chinese farmers to realise urbanisation in an orderly manner and a two-way flow process of 'moving into the city and returning home smoothly'.

At present, official statistics for the size of the urban poor population mainly cover the lower-income urban registered population. Estimates for transient or migrant populations are often based on sample surveys. In general, the lower-income population with local urban hukou has been decreasing, and poverty levels among the urban floating population have increased. Growth in floating populations with presumed high levels of poverty and the problems of relative and multidimensional poverty are more significant. Further studies on the size, structure and distribution of poverty among permanent urban residents are needed in order to gain a clearer picture.

5.4.1 Estimation of Poverty Rates Among the Urban Hukou Registered Population

Currently, China lacks a unified standard for measuring levels of urban poverty. Consequently, any estimation of the size of the urban poor population will vary according to the different standards used. To all intents and purposes, a measure based on urban minimum living standards (only covering the *hukou* registered population) acts as yardstick for levels of urban poverty. This standard is generally the first to be applied, with other measures added according to circumstances. In order to properly assess and resolve issues around living standards among the urban poor, the State Council issued *the Notice on Establishing the Minimum Living Security System for Urban Residents Across the Country* on September 2, 1997. Since then, all levels of government have gradually established and improved their policies for dealing with minimum living standards in urban areas.

It can be seen from Fig. 5.9 that the number of *hukou* registered population guaranteed by the minimum standard of living increased gradually from the time the new system was introduced. By 2002, numbers had stabilised to around 20 million. Since 2009, the trend has decreased, falling to the level of 2002 in 2013 and continuing to decrease. By 2018, the number of urban dwellers living at the minimum standard had fallen to 10.08 million.

[4] On the one hand, it supports their return to hometown for employment and entrepreneurship and promotes urbanisation locally; on the other hand, it supports basic public services for them to enjoy equalisation in cities. At the same time, it maintains land contracting rights, homestead use rights, and collective income distribution rights for the rural migrant workers who become urban residents, and promotes an orderly process of citizenisation.

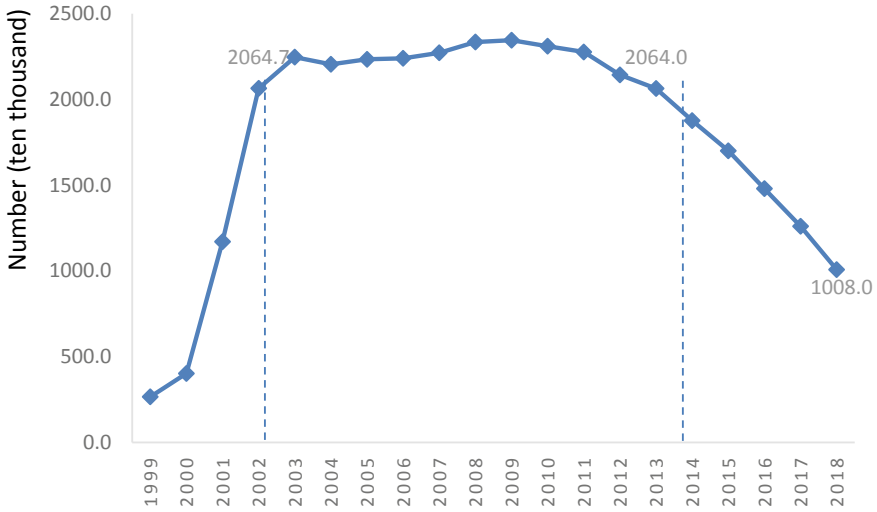

Fig. 5.9 Urban poverty: Chinese urban population living at the minimum living standard (1999–2018). *Data sources* Collated according to relevant data from *China Statistical Yearbook*

5.4.2 Estimating the Scale of Urban Poverty Including Migrant Populations

According to the early studies of the World Bank (1993), the numbers of urban poor in China ranged from 500,000 to 3.9 million between 1981 and 1990, with an average poverty incidence rate of 0.5%. Since there is currently no unified standard for measuring urban poverty, Chinese analysts and scholars use different methods to estimate urban poverty, and results vary greatly (Wei et al. 2016).

Comparing these results, we find that:

- The size of the poor population calculated for individual years is much larger than that obtained according to the urban minimum living security standard.
- The size of the poor population calculated according to consumption and expenditure is much larger than that calculated according to the income standard.
- Thirdly, due to limited data, the large number of people who make up the 'floating population' in cities are missing from the calculations. The number of poor rural migrants in cities cannot be counted accurately. Consequently, the scale of urban poverty has been underestimated to a certain extent. At present, estimates on the size of the floating population are mostly conducted by sampling methods across individual regions; therefore limited knowledge is available concerning the size and distribution of the floating population at the national level.

According to the existing studies, the poverty rate among the floating population is higher than that across the original urban residents. Estimates of the incidence of urban poverty will increase and the estimated size of the population of urban poor

will significantly increase when the floating population is taken into consideration. For example, the study by Du (2007) shows that the poverty rate of the floating population is slightly higher than that of urban local residents, at 10.3% and 8.7%, respectively. Research by Li (2002) shows that the national average poverty rate among the floating population is 15.2%. The study also finds that its proportion in some cities is even higher than 20%. The average poverty rate among the floating population is about 50% higher than that of the urban registered population. Based on a review of the actual situation and general living expenses standards, Ma (2005) used the national per capita living expenses indicator to classify the urban poor population. If rural migration into cities were to be taken into consideration, the poverty incidence rate would be estimated at 11% in 2003 and the urban poor population at 60 million.

(1) **Estimation based on the existing results**

We use existing studies to estimate the current scale of urban poverty. According to the survey by Du (2007), the poverty incidence of the floating population is slightly higher than that of urban residents, but the two are roughly the same. This is mainly due to the mobility of the floating population between urban and rural areas, and consequently, urban poverty is a result of the choice of living location. When their urban living standard is low, rural migrants choose to return to their hometowns. The research by Wang (2011) also shows that the income of the floating population is at times even higher than that of local residents. This is mainly because they work long hours and intensively, but the income per unit time may be lower than that of local residents. In addition, the urban poverty rate, even estimated according to the US$2 a day international poverty standard, remains at more than 8.5%.[5]

Using this criterion, we make a conservative estimate of a poverty rate of 8–10% based on income. In 2014, China's urban population was 749 million, with a poor population of between about 60 million and 75 million, comprising about 18 million 'registered' citizens and a floating 'unregistered' population of between about 42 million and 57 million.

(2) **Estimation based on a sample survey**

In order to investigate poverty levels among the urban floating population and estimate the numbers of poor migrant workers, we designed a questionnaire based on the experience of previous studies. We modified and improved the questionnaire design during pre-survey tests, and conducted a sample survey among migrant workers in Beijing, Shenzhen and Huizhou. We distributed a total of 1800 formal survey questionnaires and received a total of 1305 valid questionnaires in response, excluding invalid returns and responses from residents staying in cities for less than half a year.

We estimated the size of the poor population in the survey results. The floating population was not covered by the urban minimum living security standard at the time of the survey, nor were they completely covered by urban public services. Their poverty can therefore be described as 'multidimensional

[5] In October 2015, the World Bank adjusted the international poverty standard from US$1.25 and $2 to US$1.9 and $3.1, respectively.

poverty' or relative poverty compared to urban residents. The scale of the relatively poor population is larger than that of the absolute poor population. The poverty rate calculated according to the relative poverty standard is correspondingly higher than the indicator value obtained according to the absolute poverty standard.

Based on the previous research experience, we adopted a standard of 50% of local residents' per capita consumption expenditure in that year to measure levels of poverty. A total of 263 poverty samples were identified, with an overall incidence of poverty at around 20.15%. Based on this, according to the 20% poverty incidence of migrant workers, we estimated that the total number of migrant workers in China was about 274 million in 2014, and the number of migrant workers in poverty was about 55 million. The estimated results are in the range of 8–10% of urban residents living in poverty which accords to the most credible estimates.

Thus, it can be seen that the size of the 'registered' population of urban poor has decreased in recent years, while that of poor migrant workers has increased. In 2015, the population of urban 'registered' poor was about 17 million, and poor migrant workers around 55 million, accounting for around 75% of the total of urban poor. Without effective measures to alleviate poverty among migrant workers and accelerate the process of citizenship, it is likely that the problem of rural poverty will shift to cities.

5.4.3 Other Dimensions of Poverty Among Urban Migrant Workers

Sen (1981) argues that poverty means low levels of wealth and the loss of the ability to acquire more due to inequalities in economic status. Based on existing studies, combined with the results of our questionnaire survey, we recognise that the quality of life of urban migrant workers needs to be improved in terms of the nature of work, family income and expenditure, living conditions, social security and children's education (Wei et al. 2016; see also Chap. 14). The first dimension, the nature of work, comprises low wages, long working hours and low skills. First of all, wage levels are low. Restricted by educational levels, lack of personal skills and information acquisition, poor migrant workers still greatly rely on their relatives and friends to get jobs, and usually have to sell their labour cheaply. Long working hours are also an issue. The survey found that 21.1% of the poor population worked more than eight hours per day, and nearly 10% worked more than 10 h per day. A third point is their low level of job skills. Nearly half of all poor migrant workers have not participated in any form of vocational training, and most of them are engaged in jobs with low technical requirements, such as nannies, waiters, or in industries with relatively difficult and dangerous conditions, such as construction, transportation, handling and loading.

The second dimension involves issues like small living spaces with relatively backward facilities. According to the survey, the living area per capita housing for urban poor migrant workers was only 11.73 m^2, less than half of the national average for urban residents (32.91m^2). More than 20% of urban poor migrant workers lived in simple housing, basements or semi-basements, and nearly 70% lived in dormitories or one-bedroom apartments, with narrow living space and a tough living environment. The housing quality indicator for poor migrant workers was only 0.47, measured by the average ownership rate of various housing facilities (televisions, the internet, toilets, bathing facilities, refrigerators, air conditioners, etc.). That is lower than the sample average value of 0.58.

Thirdly, the proportion of rural migrants claiming social security is lower than that of urban residents, which exacerbates their poverty. According to the survey, only 27.80% of urban poor migrant workers have actively participated in unemployment insurance schemes, and 48.65% of them have taken out work-related injury insurance. 17.76% of them have not participated in any form of medical insurance, and 16.99% have no form of pension insurance. Poor migrant workers have a strong requirement for social security assistance, and 40–50% of respondents considered that the level claiming social security needs to increase.

A fourth element is the proportion of children who do not receive any form of education where their parents or carers work. According to the survey, 57.4% of urban poor migrant workers are compelled to leave their children in their hometowns to receive education because of their exclusion from *hukou* or higher tuition fees where their parents work. Currently, a high proportion of children living with their migrant worker parents are either too young for school, have dropped out of education or else reached the legal working age. Many children of migrant workers have to return to their registered permanent residence for schooling. The survey results also show that the demand among married migrants for their children's education (50.77%) is higher than that of the total samples (43.37%).

At the same time, poverty seriously impedes the willingness of poor migrant workers to stay in cities. Urban poor migrant workers show a low level of willingness to settle in cities (24.69%), mainly due to high living costs (71.67%) and issues around *hukou* problems (38.20%). Consequently, poorer people give less consideration to factors affecting where their children live. Among the respondents, 50.75% have not considered this issue, which is directly related to their lower willingness to stay in cities.

For further discussion on the multidimensional nature of deprivation, see Chap. 14 which sets out the theoretical basis for indices of multiple deprivation and offers practical guidelines for estimating them in a Chinese context.

5.5 Conclusion

Since China's Reform and Opening-up, the country's rapid urbanisation and large-scale internal migration have greatly contributed to social developments and the promotion of well-being. From 1978 to 2017, China's permanent urban population increased from 172 to 813 million, with an increase of 641 million in the overall population. This accounted for 26% of the world's new urban population in the same period. At the same time, in the context of China's rapid economic and social growth, benefiting from both income and transfer effects in the process of urbanisation, China's rural poor population has decreased by 754 million over the past 40 years. This marks a contribution of more than 70% to the reduction of global poverty, an unprecedented and almost miraculous decrease in levels of human poverty.

In recent years, levels of poverty within urban *hukou* populations in China has continuously decreased. In contrast, levels of chronic poverty among migrant workers has continued to grow, accounting for about 75% of the total population of urban poor. The urban poor population has been increasing in proportion with total urban numbers, and the multidimensional characteristics of their poverty are significant (see Chaps. 14 and 15).

As a result, measures to tackle issues of urban/rural inequalities and challenges around population flows from rural to urban areas and back, have entered a new stage of higher quality development. In the future, China needs to prioritise these new challenges, increasing levels of 'citizenship', urban-rural integration, and co-ordinated poverty management, so as to achieve high-quality development and interventions.

Firstly, to address the problem of 'incomplete urbanisation', China will have to accelerate the pace of increasing levels of citizenship and reforming the *hukou* system. China suffers from significant structural contradictions in the process of increasing citizenship. There are higher barriers for permanent settlement in megacities, while rural migrants are less willing to settle in small and medium-sized cities. To improve the reform of institutional mechanisms, such as *hukou*, land and public services, China should continue to steadily promote the reform of relevant systems, accelerate the process of citizenship for rural migrants. The aim must be to narrow the gap between the urbanisation rate among *hukou* registered and permanent populations and migrant workers. Allied to the provision of more adequate and equal public services and social security, these measures need to focus on comprehensively improving the well-being of various groups.

Secondly, to address the imbalance between urban and rural development, China will need a coordinated policy response. This will entail improving the level of urban-rural integration and development through the implementation of innovative programmes to revitalise both rural and urban areas. This will help improve the quantity and quality of capital resources, and encourage labour to flow back into the countryside. Both rural and urban land need to be utilised more effectively and comprehensively to facilitate greater interaction and equality between urban and rural areas. China should also gradually introduce measures to coordinate poverty management and achieve common prosperity across rural and urban areas.

Since 1978, China has made great strides to tackle rural poverty, but the problems of urban poverty, especially among migrant workers, have become increasingly prominent. In future, based on the great achievements in the reduction of rural poverty, China should accelerate the development of systems to address poverty comprehensively across urban, rural and migrant poor populations. Issues around urban poverty need to be integrated into the scope of appropriate organisations dedicated to the alleviation of poverty. The focus of policy in China seems to be shifting towards the need to address relative and multidimensional poverty and to adopt a comprehensive approach to resolving urban-rural poverty. This will help lay a solid foundation for achieving common prosperity across both urban and rural areas.

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Chapter 6
Urban Villages, Their Redevelopment and Implications for Inequality and Integration

Ya Ping Wang

Abstract Urban villages are a unique product of China's rapid urban expansion. They provide a new way of life sustained by property rental income for local villagers. More importantly, urban villages provide cheap accommodation for millions of rural migrant workers in most large cities. Recently, with the increasing demand for land by commercial developers and public projects, urban villages have become the targets for redevelopment. This chapter uses a case study village in Beijing as an example to assess the social and economic impacts of urban village redevelopment on both the original local inhabitants and migrants in rented accommodation. The case study village went through a very long and complicated redevelopment process from 2004 to 2017 involving different stages of demolition and relocation. It provided a rare opportunity to evaluate the effects on the local population, both pre- and post-redevelopment. The study involved several field visits, observation and interviews with village residents. It shows that urban village redevelopment offered no positive benefits for migrant workers who often lost their homes to demolition. For local villagers, redevelopment and relocation into new flats may improve their living conditions. However, most suffer from the loss of long-term economic and income generation opportunities. Moreover, the new property rights for the replacement flats confer no additional rights of citizenship for the relocated villagers who remain 'second-class citizens' within Chinese cities.

Keywords Urbanisation · Urban villages · Land · Village redevelopment · Migrants

6.1 Introduction

Urbanisation, industrialisation and globalisation have rapidly transformed China from a traditional agricultural-based society into a global economic powerhouse over a period of just 30 years. China's urban population grew from 20% in 1980

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to 60.6% in 2019 (State Statistical Bureau 2020). However, the country's rapid economic development and urban growth remain unbalanced across different regions and social groups. China boasts some of the most impressive modern urban landscape globally, and some Chinese cities are among the most expensive places to live. Simultaneously, social divisions, income inequality, environmental pollution, traffic congestion and ecological degradation all pose serious problems to urban residents and policymakers. Many of these problems and challenges are clearly manifested in the so-called urban villages (城中村).

In pre-Communist China, major coastal cities developed under Western influence and took on very different forms to traditional inland cities and towns (Murphey 1980). This colonial versus Chinese division was replaced by urban/rural divergence supported by the *hukou* (residence registration) during the early years of the Communist period from 1949 to 1976. Towns and cities housed the non-agricultural population and functioned as bases for industrial development and administration, while people living in villages remained peasant food producers. China's rapid entry into the global economic system since the 1980s has created new social and spatial divisions (Wang and Murie 1999; Wang et al. 2009). Traditional rural villages alongside the fast-growing suburban areas of major cities were either partially urbanised or entirely overrun by rapid urban sprawl. These villages have been physically absorbed into towns or cities, but they retain many traditional characteristics in the composition of their buildings and populations. This distinctive phenomenon within Chinese urbanisation has changed the simple dichotomy between the rural and the urban, to create a third category of residential space: the 'urban village.' Their populations comprise large numbers of rural migrants (the 'floating population'). Modern business and commercial districts, occupied by 'official' residents and linked closely with the global economic system, form a sharp contrast with informal and poor residential areas represented by urban villages.

The most publicised early urban village in the 1990s was probably Zhejiangcun (浙江村) in Beijing. Located in the south of the city, the Zhejiangcun district comprised 24 administrative villages with around 100,000 migrant workers in 1995 (Liu and Liang 1997). Since 2000, almost all villages located within commuting distances from a city have been turned into urban villages in the prosperous Pearl River Delta and Yangtze River Delta regions. Traditional family houses have either been extended or demolished and replaced with narrow high-rise buildings to provide rental accommodation to migrant workers. Shenzhen and Dongguan near to Hong Kong, where the migrant population outnumbers local residents many times, are two extreme cases. When the Shenzhen Special Economic Zone (SEZ) was set up in 1980, the government initially took a piecemeal approach to land acquisition from local villages for development. As urban development intensified and more land was taken out of agricultural production, all traditional villages became urban villages in some form.

Traditional Chinese villages were all integrated holistically with agriculture. The layout of the village settlement was also simple. Each family often occupied a small courtyard, which contained one or several simple one- or two-storey houses built of bricks and timber. The courtyards were normally arranged in rows with streets

running between them. Larger and richer families occupied more buildings and more yards. As cities grew and the demand for rental housing increased, unplanned and unauthorised building activities multiplied out of control in many suburban villages. New houses were constructed with modern materials such as steel and concrete. In Shenzhen for example, 80% of post-1990 buildings constructed in urban villages by individual families were between 6 and 9 storeys high. Another 5% were over 10 storeys, and some even reached 20 storeys (Shenzhen City Urban Village Redevelopment Planning Working Group 2004). In order to maximise floor space, only very narrow gaps were left between buildings. This practice resulted in extremely high density and the so-called 'kissing buildings.' It was said that people in different buildings could kiss each other through their windows. A Shenzhen government report showed that urban villages in 2004 occupied a total land area of 9,204 hectares. There were altogether 307,000 privately owned dwellings, of which 44% were constructed after 1999. The average size of construction floor space per building was 343 square metres (Shenzhen City Urban Village Redevelopment Planning Working Group 2004). In Futian District alone, there were 15 urban villages; together, they occupied 390 hectares of land and housed 572,100 migrants and 19,300 local villagers (China Academy of Urban Planning and Design, Shenzhen Branch 2004).

In other cities, the scale of urban village development was not as large. Nevertheless, in the inland city of Xi'an, for example, among the 624 administrative villages located inside the six urban districts and four development zones, 286 were officially classified as urban villages in 2010. These urban villages housed 370,000 rural residents. The inner-city areas contained 72 urban villages. These villages had 25,000 households and 89,800 people, most of them rural *hukou* holders. Xi'an also includes three suburban districts and counties, where another 40 villages with a combined population of 90,000 were classified as urban villages (Xi'an Municipal Urban Village Redevelopment Office, 2010). All these population figures only include the original village inhabitants. If migrants were included, the total population would be at least several times larger.

There is an increasing volume of literature on urban villages in China (Yeh 2005; Lin 2006). Papers produced outside the country are more concerned about the rights of local residents and migrants, working class living conditions, poverty and the politics of land and property rights, etc. (Fan 1996, 2001; Ma and Xiang 1998; Knight and Song 1999; Solinger 1999; Wang 2004 and 2019). Researchers often link China's migrant experiences to the international experience and some compare Chinese urban villages with slums in other developing countries (Wang et al. 2009). Inside China, urban villages have been a controversial issue for many years. Mainstream academic and policy researchers have focused on the negative aspects of unplanned and overcrowded developments, crime and poor safety records, serious health, environmental and sanitary problems. To them, urban villages are the 'tumours' of cities and must be redeveloped. These arguments are often based mainly on the city's overall economic, infrastructural and environmental considerations. Urban village redevelopment rarely considers the interests and needs of a large number of migrant residents.

More recently, particularly since the implementation of its 12th Five Year Plan (2010–2015), the Chinese government has begun to address these serious urban inequality problems through an integrative and transformative strategy—effectively introducing a new style of urbanisation. The strategy aims to integrate economic, political, social, cultural and ecological development. Transformative development policies shifted from urban and rural division toward urban-rural integration and equality; from economic and industrial development toward social development; from environmental degradation toward environmental improvement. These policies have important socio-economic, political, physical, and environmental implications for cities, and especially urban villages. To build a harmonious urban society, residents living in urban villages must be integrated into the local urban communities. Long-term migrants must also receive the same citizenship rights as others to enable them to settle in the city and access the social and economic rights they are entitled to. Urban inequality, segregation and integration have also become hot research topics. However, such policy changes and newer research emphases have not changed the overall direction of planning policy, which still inclines toward the elimination and redevelopment of urban villages, especially in districts with high land values. Policies focus mainly on physical changes rather than social and economic upgrading of the poor communities living in the urban villages.

This chapter will focus on the urban village redevelopment processes and its implications for inequality and integration. I shall do this by looking closely at the changes of a case study of urban villages—SC Village, located in the northwest suburbs of Beijing. SC Village is interesting because it has been undergoing redevelopment since 2000. Unlike the redevelopment of other villages that are normally completed in a couple of years, the relocation and redevelopment process in SC Village happened sporadically for over 15 years. The authorities only achieved complete demolition and relocation in 2017. The prolonged process highlights many issues and problems associated with the urban village redevelopment programme. I will discuss the background context, the long and messy process of redevelopment, the gains and losses of the original villagers and other stakeholders involved, and the impacts on migrants who rented accommodation there. I will question the extent to which urban village redevelopment leads to social integration and as well as the reduction of inequality. The findings are based on continuous monitoring and observation of the redevelopment process over a number of years. I visited the original village and replaced housing estates between 2009 and 2018 and conducted interviews with residents before and after relocation.

6.2 Urban Village and Land Ownership

> Access to land is a central issue because it is a crucial asset for food production and a key factor for shelter and community development. How issues related to rights of access are addressed in development projects and programmes has a direct impact on the livelihood and security of people not only in rural areas, but in urban and peri-urban settings as well.

> Failure to address the land tenure interests of all stakeholders in land development or land reform can cause problems and inequalities. These problems can unintentionally fall on the most vulnerable and disadvantaged members of society. (FAO 2002, p.1)

This statement from the Food and Agricultural Organisation's tenure studies provides a guiding principle for dealing with land issues in fast urbanising regions. It also offers a good theoretical perspective for discussion and analysis about land development in China. Before we look at our case study for urban village redevelopment, it is important to have some understanding of the Chinese rural and urban land management system.

Chinese land reforms in the 1950s created two different types of land ownership for urban and rural areas. In urban areas (including the officially defined suburban areas), land was nationalised and municipal governments became the legal owner of land on behalf of the state. In rural regions, inherited and unequal private family land holdings were firstly redistributed across the villages to give poor families their share. After several collectivisation movements in the 1950s, rural land ownership was centralised to the village level. Land owned by individual families was pooled for farming and all villagers became members of collective teams. Before the Communist era, individual families occupied residential land. After the reforms, collective team members worked together on the main agricultural land with a small proportion divided between families as private plots. From 1978, agricultural land was redistributed to individual families under the so-called 'responsibility system' in order to stimulate farming activities and increase grain production. Farmers were promised the right to hold onto the land for at least 15 years, later extended to 30 years, for production. Land ownership remained collective and individual families could not sell or change the land to other uses (Wu 1999; Cartier 2001; Zhu 2004 and 2005; Ho and Lin 2003, 2004; Ding 2003, 2004; Deng and Huang 2004; Yeh 2005).

Under this system of dual land ownership, there was a policy provision for municipal governments to take over collectively owned land for development. In the 1980s, when the land was taken over by municipal governments or other new users, mainly from the public sector under the socialist planned economy, they had to pay compensation to farmers. Simultaneously, new users and municipal governments had to arrange jobs for working-age farmers affected by the land transfer. As urban-based employment provided an alternative and more secure way of life to peasant farmers, the process did not cause much concern. Farmers also welcomed the practice because it provided them an opportunity to have a new life in cities or towns. As the urbanisation process intensified and the planned economic system was replaced by a market system from the early 1990s, municipal authorities and new land users, no longer all from the public sector, struggled to find suitable jobs for all those farmers affected. As a result, compensation changed from job assignments to alternatives such as cash payments and housing resettlement. Large-scale urban development coupled with the change of land transfer process created a serious problem of landless farmers and urban villages around all Chinese cities and towns.

The way that Chinese suburban villages are redeveloped is determined by the unique urban and rural land ownerships and the channels through which rural land

is transferred into urban ownership. The definition of land ownership and the mechanism for a state monopoly of land development through compulsory purchase and taking over land may appear clearly defined. In practice, the process, especially compensation arrangements, is really problematic because collective land ownership is a very ambiguous concept, as this case study shows. Government land management officials, academics, and even some farmers believe that in socialist China, the village collective ownership of land is only another form of public ownership, and farmers use of land was granted by the government. When the state requires the land, the farmers have no other options apart from relocation or some form of compensation.

6.3 Urban Village Redevelopment: The Case of SC Village

SC Village is one of the six traditional settlements (natural villages) under the administration of SC Village Committee, itself part of the Haidian Zhen (Town or Township before 2011) in Beijing's Haidian District. SC Village has a long history. During the Qing Dynasty, the village was an important agricultural, commercial and handicraft centre beside the Imperial Palace (圆明园). It benefited from the station of Imperial Guards from the 8th Military Division (八旗). Commercial activities in the village declined when the Imperial Palace was destroyed by European invasion at the turn of the twentieth century. SC Village remained predominately an agricultural area until 1949. Immediately after the Communist government land reforms, plots were redistributed to individual farmers. Between 1952 and 1958, various rural collectives were formed. In 1958, SC Village and several other villages in the area formed the Haidian People's Commune, which was replaced by the Haidian Township in 1984. Farmland owned by the village was redistributed and contracted to individual families under the 'responsibility system' for farming. Throughout all these periods, village residential land was under the control of individual families.

From the middle of the 1980s and especially the 1990s, farm land owned by the village was taken over piece by piece by the Beijing Municipal Government or large public institutions for urban development. Villagers gradually switched from farming to other activities, such as seeking jobs in the city or setting up family businesses. Accommodation and room renting to migrant workers also became a major source of family income when urban sprawl reached the area. While most families had come out of poverty and became prosperous, they remained poor in SC Village like many other suburban villages. This was due to diversification of economic activities and the physical and environmental conditions in the village (SC Village Committee 2004). Houses in the traditional style were not well maintained. A lack of planning control encouraged new buildings and extensions inside the family courtyards to provide more rooms for either family expansion or for rent.

Most agricultural activities had ceased by 2000 and cultivated land was taken over by the municipal government and other public institutions. Rents from migrant workers became a major source of income. In 2010, on average, each family could

earn about 5000 yuan a month from rent (interview with residents); but many villagers had to sacrifice their privacy and share their homes and facilities with lodgers. The village lacked some modern infrastructure, especially properly paved roads, sewage and drainage systems and private flush toilets. The large-scale increase in the migrant population made the living environment worse day by day. Foul-smelling sewage flowed openly along the sides of littered streets. Communal latrines and individual toilets in various traditional forms were dotted around the village with little by way of the planned structure. Various types of shops and services could be found along the main streets, including restaurants, food stalls, daily utility shops, barbers, electronic and car repairs, furniture, construction and DIY materials, distribution markets, waste collection and recycling, small and cheap hostels, etc.

SC Village began to plan for redevelopment in 1997. The scheme involved the relocation of villagers to new nearby high-rise housing estates to free the land for part of the city's planned green belt. In 2000, SC Village Redevelopment Plan was approved as part of the Beijing Green Belt and suburban village renewal scheme. The Haidian Township Government established the Beijing Wangseng Real Estate Development Company Ltd to carry out the redevelopment in the same year. The new relocation housing was on a new nearby housing estate - WSY Residential Estate, about 500 metre away on a piece of remaining farmland owned by the village. Original villagers (homeowners, excluding migrants) were to relocate to this new housing estate. Construction work started in the autumn of 2000 and most buildings in the new estate were completed by 2004.

The completion of the new housing estate was intended to bring this traditional village into the normal life of the capital city and integrate the villagers with the local urban community. The physical changes were, however, not completed, nor were they matched by social developments. During visits each year from 2008 to 2015, it became apparent the old SC village was still there; only about half of the traditional houses were demolished before 2008. As relocation and compensation deals were negotiated between the residents and the developer on a family-by-family basis, some families accepted the relocation terms and moved to new flats in the WSY Estate. Their old houses were pulled down. Families who did not accept the relocation terms stayed. Demolition was selective and spread out across the village, so the remaining residents lived among the ruins of their neighbours' demolished houses and blocked roads and streets (Fig. 6.1).

6.3.1 Life in the Half-Demolished Village

The remaining families could not reach a satisfactory relocation and compensation agreement with the village authority and development company because they felt that:

- The decision-making process lacked transparency and they were not properly consulted.

Fig. 6.1 Traditional houses and street in SC Village, partially demolished in March 2008

- There was confusion over the organisation and responsibilities of the redevelopment process.
- There was confusion over the relocation and compensation policies and practice.
- There were unclear legal bases for the relocation.

Essentially, they were either not satisfied with the amount of cash compensation offered to them and/or with the new flat they might receive if moved. The remaining residents believed that powerful and rich families could bribe either the demolition company who carried out both the physical clearance and handled compensation on behalf of the developer, or the village leaders, who had control over the developer and the demolition company, for better deals. As a result, relatively poor families and larger families with small properties and therefore entitled to less compensation, had been left behind. Early movers were often given various incentives and had the right to select houses on the new estate, whereas those left behind had to choose from poorly located flats on undesirable floor levels or locations, for example elderly people may have to move to flats located on the 5th or 6th (top) floors. There were no lifts in these buildings.

Some complaints, such as the actions of corrupt officials, were verified by some of the ongoing building activities inside the partially demolished village. A one-story house was built in 2008, even after the demolition process had already begun. The new house also took over part of the old village street. The remaining residents cited this as an example of power abuse and corruption. ‘If they can build it, they will also have a way to claim compensation,’ said one local resident during the 2008 visit.

Fig. 6.2 A new house built inside the half-demolished village

There was no more evidence of demolitions between 2008 and 2015, but more new buildings were constructed over the demolished area. Some of the new buildings seen in 2010 were much bigger than traditional houses. They were up to three storeys in height with 10 to 15 rooms on each floor (Fig. 6.2). One new three-storey dormitory-style building had 10 rented rooms on each floor. The common corridors shared by tenants were well maintained. Rent for these rooms (about 12 square metres each) ranged from 550 to 650 yuan per month in 2010. The total rent for the whole building could be over 18,000 yuan per month. 'The landlord did not live here. His family had a house somewhere else', according to the caretaker of the building. Two new buildings next door were also three storeys in height, but were built together at the same time. They offered similar rooms for rent. 'These buildings belong to two landlords, they are relatives,' tenants reported. When villagers in both old and new areas were asked who built these new rental houses, they all indicated that it was village leaders. 'Who else can do that?' When asked whether they built on their original courtyard, the villagers replied, 'No, they built on land freed by others.' Did they build these houses for more compensation in the future? 'Not necessarily, they just take advantage of the free land at the time. They know that the final clear up is not going to happen soon, by the time it has to be demolished, they will earn enough money,' local residents said.

There appears to be no pressure for them to move for several years as for the remaining residents. As SC Village was planned as part of the green belt for the city, no commercial developer was there to push forward the relocation and demolition process. Suppose this land was planned for other uses such as commercial housing.

In that case, the relocation process could be much faster and possibly even violent as commercial developers could not afford to wait so long. During the 2008 visit, a large bulldozer was parked at the entrance of the village, waiting to push more houses down. It had disappeared by 2010.

Collectively owned properties, as well as residential buildings, were also rented out to migrant workers. A row of enterprise workshops owned by the village was turned into a rental accommodation. Because of the poor quality and facilities, rent was 200 yuan per month in 2008, cheaper than the properly built dormitories. The old village committee office quarter was also rented out to migrant workers. However, the rental income from these collectively owned properties did not necessarily end up in the communal village fund. Some of these properties were 'contracted out' to individuals many years ago. Their contracts have not yet run out, although the use has changed from township industries or businesses to rented accommodation.

There were about 2000 original residents in the village before the relocation, and around half of them moved into the new estate. Local residents estimated that more than 30,000 people were living in this half-demolished village in 2010. The total population had definitely increased substantially by 2013. Most tenants were migrant workers from rural areas or other cities. Sanitary conditions in the village declined. The streets were very muddy and malodorous, with rubbish dumps scattered here and there, often on top of debris from demolished houses. More shops, restaurants, barbers, snooker halls and other amenities emerged to serve the increased population. A small supermarket also opened in the village in 2010. Despite the declining environmental quality of life, the economic activities in this half-demolished village were much more vibrant and dynamic in 2013 than in 2008 (Fig. 6.3).

6.3.2 Life in the New Housing Estate

The new housing estate, WSY Xiaoqu, consists of around 20 mainly six-story tenement buildings without lifts (Fig. 6.4). It was also visited several times since 2008. Most buildings were occupied during that time, manifested by the amount of clothes hinging at balconies, steel barbed-wire windows, and air conditioning units fixed on the external walls. Only a small proportion of buildings remained empty, still waiting for those who had yet to move in. The number of empty flats was definitely not enough to accommodate those left behind in the old village. Some residents claimed that powerful families had bought two or more flats, and some were sold to people who were not residents of the original village. Trees and gardens between buildings were more established and more cars were found parked beside the buildings in 2013.

Those who had moved early were relatively happier when interviewed in 2008 because of the significant change in the general living environment and modern facilities that came with the move. However, the positive mood appears to have declined over time. 'There were a lot of attractions for us to give up our old house and move into a new flat in this estate, but I personally would prefer to stay in my original home. My old house brought us steady rental income and the money looked

Fig. 6.3 Typical street of old SC Village in 2010: increasing economic activities and population, but declining living environment

Fig. 6.4 Replacement flats in WSY (left) and new Village Committee office (right)

after my whole family. In the new housing estate, we have no extra space to rent and we have to pay for everything. We have to earn money somewhere else to look after this flat. I know the living environment in our old village was poor, but we could have improved the environment rather than destroy it' (Interview with a resident in 2010).

Another resident also said, 'I miss our life as farmers very much. It was a pity to see our fertile cropland and houses being turned into open space. Our land had served us for generations. I don't know what lies ahead for us and our children.'

When asked about life in the new estate, one resident summarised: 'There were both advantages and disadvantages in moving here. In general disadvantages were

more than advantages. The main problem is that in the past we could earn rent from our houses, now there is no such income, but we have to spend money every day on everything, including estate management fees. My family of three was given a flat about 90 square metres of floor space. After paying the costs of the new house, we also received about 600,000 yuan (other families could have more—700,000). This sounds a lot of money before you move. If everything is fine after the move, it can run for few years. If someone fell sick, the money could run out very quickly.' 'When you have nothing to do everyday, you tend to become sick easily. Many people my age now have diabetes' (Middle age resident living in the estate).

'Do you regret moving to here?' 'Yes, we should have stayed. Now they [the government] will have to pay a much higher compensation. The families who stayed behind will eventually get a better deal.' 'Why did you agree to move in the first place then?' 'They want Communist Party members, Communist Youth League members to set examples for others. Families were dealt individually, household by household behind doors. They offered a little more money as incentives each time, and we eventually gave up' (Local resident).

New houses in the estate were the so-called *xiaochanquan* housing—those with limited property rights (小产权房)—as the land they occupy is still owned collectively by the village rather than the state. These houses cannot be legally traded in the open market. This seems not to have concerned some residents who continue to rent or to sell properties on the estate. Advertisements on walls inside the estate and at the nearby estate agency offices showed that in summer 2010:

- A one-bedroom flat with furniture (56 m^2) in WSY could rent for 2000 yuan per month (equivalent to the rent of four rooms in the old village).
- A two-bedroom flat with some furniture (80 m^2) could get 2500 yuan per month.

These rents were cheaper than similar flats in commercial housing estates in the area. A similar-sized two-bedroom flat on a neighbouring commercial estate could get around 3,000 yuan per month. A one-bedroom flat (64 m^2) at WSY was marketed for 960,000 yuan. The asking price for a two-bedroom flat (88 m^2) was 1.05 million yuan. These were one-off payment cash prices. As these properties do not have full property rights, no bank loans can be secured. These sale prices were also much lower than those in the commercial market housing estates. For example, the sale price per square metre of construction floor space in the neighbouring upmarket estate Boya Garden, was more than 50% higher than that in WSY. Not many ordinary residents in WSY could afford to sell or rent their flats, as these houses were their only homes.

The new estate is managed by an estate management company set up by the village committee. The estate management fee was relatively low compared with commercial housing estates (Table 6.1). On average, each family had to pay about 1000 yuan management fee per year. If there were highly paid workers in the family, this should not pose a problem. If there were only lowly paid manual workers, the advertised service sector wage in the area was around 1,500 yuan per month, the family will have to rely on the compensation money they receive. Residents seem to take the estate management issue casually: 'If we cannot afford the fee, we don't

Table 6.1 Real estate management charges at the relocation housing estate

Name of charge	Annual rate of charge	Rate of Tax Payable (%)	Charge plus tax*
1. Gardening	0.55 per m^2	5.5	58.03
2. Sewage	0.3 per m^2	5.5	31.65
3. Management fee	2.4 per m^2	5.5	253.2
4. Small repairs	2.36 per m^2	5.5	248.98
5. Maintenance of public facility	1 per m^2	5.5	105.5
6. Building maintenance	5.42 per m^2	5.5	571.81
7. Service charge	12 per flat	5.5	12.66
8. Waste and rubbish collection and disposal	30 per flat	5.5	31.65
9. Public security and neighbourhood watch	60 per flat	5.5	63.3
10. Cleaning and public health	24 per flat	5.5	25.32
11. Other			
Total			1402.10

*Based on a unit of 100 m^2 of construction floor space

Source BeijingWSY Real Estate Management Company, August 2010

pay it. They [the Village Committee] have a lot of money from renting collectively owned properties and other business' (Resident).

6.3.3 The Final Clearance

For a few years around the 2008 Beijing Olympic Games, local authorities across the capital took a rather relaxed approach toward residential resistance to village redevelopment in order to avoid social disorder and confrontations. This was one of the reasons why the redevelopment process dragged for so long in SC Village. The half-demolished village was eventually cleared away in late 2016 and early 2017, more than 15 years from the initial launch of the village redevelopment project. The changing national and municipal political climate facilitated this move. At the national level, there was an emphasis on the improvement of the urban living environment and a campaign for speedy renewal of urban shanty towns. At the municipal level, there were policies to improve the general public images of the city, reduce the population of those on lower incomes, including migrants and removal of polluting industries. The municipal government had a very ambitious plan to reduce the total population in the six urban districts by 15% over five years (3% a year). To achieve this target, many political and economic measures were employed. By 2017, many small informal businesses were shut down, such as small restaurants, shops, fruits

and vegetable stores/stands and markets, through the Comprehensive Urban Management (城市综合整治), and Health, Sanitation and Safety Inspection (卫生治安大检查) schemes. Lower end or informal economic activities such as waste/recycling material sorting and wholesale trade (批发市场) in Beijing were also moved out of the main urban areas and relocated to the surrounding provinces and counties. Most of these activities took place in urban village settings. The city government also turned its back on low-income migrants. The campaign aimed to eliminate informal commercial and employment activities, and premises which provide jobs for unskilled migrant workers. In the past, the informal sector flourished through the so-called *waqiang kaidong* (literally: replace walls with shops and open windows for commercial activities). The new policy aims to mend and repair the walls and close the window shops in residential areas. Any unplanned extensions of buildings used as commercial activities can be demolished.

Urban villages like SC Village became the target for clearance. In August 2016, SC Village Residential Committee relaunched the relocation project, which involves 1224 yards/houses and 3149 persons across an area of 216,000 m^2 (Xu 2019).

The main reasons given by the Village Committee for the redevelopment project were:

- Improving the general living environment in the district.
- Beautification of the area.
- Reduction of non-local population.

New relocation flats were built and made available in a nearby new housing estate—Lijingyuan (丽景苑小区). Families and residents with local *hukou* rights were given another chance to sign the relocation agreement with the developer. The relocation and compensation arrangements for traditional house owners include:

- A new flat in the new housing estate with a standard allocation of 50 m^2 floor space per qualified person for only locally registered *hukou* holders.
- Housing floor space in an existing house could be exchanged for new housing, provided it fits within the 50 m^2 standard.
- If old housing floor space is large, cash compensation will be given for extra floor area (above 50 m^2 per person) at 40,000 yuan/ m^2.
- Only housing floor space with legal and registered entitlement will be exchanged or compensated.

Under this new political climate, it is not surprising to find that most remaining families quickly accept their location terms and move away. By the March 2017 visit, over 95% of the remaining families had signed the compensation agreement, and only a few of the original houses remained standing. Posters with large characters were hung on these houses issuing strong warnings to put pressure on the remaining residents to move. The water supply had been cut and one woman fetched water from a nearby tap which continued to run. The electricity supply remained on. Interviewees said that there was great pressure on them to accept the terms and move. Some of them were still not happy for the same reasons given previously: ‘People with connections and power can negotiate a better deal for their family.’ But all agreed that they had

to move eventually. By late 2017, the whole area was cleared for the city park. The general compensation scheme appears better than that offered during the last round, when only 30 m^2 replacement houses were allowed. The unit cash compensation for larger houses was also higher, but house prices in the area had at least tripled. No residents expressed regret at not moving during the first round. Although they have lived in poorer conditions for another 10 years, they could now enjoy larger replacement housing floor space (50 rather than 30 m^2).

6.3.4 Impacts on Renters and Migrants

The impact of the redevelopment of SC Village on migrant workers was similar to that of other urban village redevelopment schemes across the country, losing their temporary home without relocation arrangement and compensation. The only option was to move away from where they had been living. The notice in large characters placed upon the walls in SC village for migrants is very telling:

> …. All accommodation-renter friends, you have been living in SC Village for some time and your intelligence and hard work have made great contributions to the local economic development and environmental protection. We are very grateful!
>
> …… you come from all over the country, but all have high moral and civilised standards, hope you can see the overall picture …. Understand and support our redevelopment works; find new production and living places as soon as possible to ensure the smooth redevelopment work (SC Village Residential Committee 2019).

No one cares where migrants and other room renters go. In most cases, migrants will try to find a similar type of accommodation nearby for living or business operation, normally in another urban village slightly further away from the city centre. In SC Village's case, the delay in demolition and the revival of the old village gave migrant families many more years stay in this preferable location, with affordable housing and good access to nearby jobs. The development of informal economic activities in the village also provided many of them with employment opportunities; although their living conditions were similar to those in other urban villages, they were very poor in comparison to new and properly planned and built areas. With the more recent round of redevelopment, migrants all face very serious challenges. As large-scale urban village redevelopment clears away many areas similar to SC Village, the housing choices for low-income migrants become fewer and fewer. One of the main overall urban priorities for the municipal government is to reduce the low-income population. This means many migrants who lived in SC Village may have to move to other cities or return to their rural homes in other provinces.

A male migrant lived in SC Village for more than 10 years, running a waste collection and recycling business. He was one of the few left in the village in 2017, cleaning some old aluminium window frames from the ruins when interviewed. His wife only joined him recently. She worked as a cleaner in the area and earned about 2000 yuan per month. They have two grow up children, neither of them living with

their parents. Due to the redevelopment, they have to find a new place to live and work. Informal waste collection and sorting are unwelcome in the city; they may have to give up and return home.

> Beijing does not welcome migrants anymore. Many small businesses and shops were shut down. We cannot find reasonable food anymore. In the past, we could get a bowl of noodles for around 10 yuan, not anymore. … We migrants cannot afford to eat in proper restaurants, the only way now is to buy instant noodles from the supermarket. … For a large city like Beijing, migrants are necessary, why drive us all away? (Migrant living in the village).

6.3.5 Other Parties in the Redevelopment Process

The redevelopment of urban villages involves a change of land use from agricultural activities to urban uses. The process is complicated and involves many other stakeholders. With the market reform in cities, land values increased substantially in all areas. Land-use changes have become a very contentious economic and political issue. We looked at the impacts of the process on the original village residents and migrant workers. This section will focus on the other main players involved in the project.

The Constitution and central government policies laid down the main guidelines for state land requisition, development and compensation. Local governments produce detailed policies on redevelopment and compensation levels for their area. In Beijing, the Municipal Construction Land Compensation and Relocation Methods list the bodies responsible for land requisition and compensation. At the municipality level, the Land and Resources Management Bureau controls land-related compensation and relocation management. The Labour and Social Security Bureau is responsible for the employment of working-age farmers and arrangement of social security such as pension and health insurance. The Civil Affairs Bureau looks after other, non-working age people affected by the requisition. At District and County level, the corresponding departments take the same responsibilities within their jurisdiction. Other relevant government organisations, including the township government are required to assist and help with the land requisition process. Rural economic organisations and village committees are required to assist the process and perform appropriate works (Beijing Municipal Government 2004). Figure 6.5 shows the main actors in the SC Village redevelopment process. This is also why residents in SC Village felt the whole process was confusing and they did not know exactly where responsibilities lay. They were dealing with the demolition company on the surface, but in reality, there was a thick web of interests and powers in the background.

Firstly, the municipal government planned and negotiated the redevelopment project with the district government, the town/township government, and the village committee. The municipal government, in theory, has to make sure there is enough land for development; at the same time, it has to implement central government policies to protect agricultural lands and ensure a sufficient food supply. It also has an obligation to ensure farmers' interests are protected when land is required. In practice, the national food security priorities were not on top of the agenda for municipal

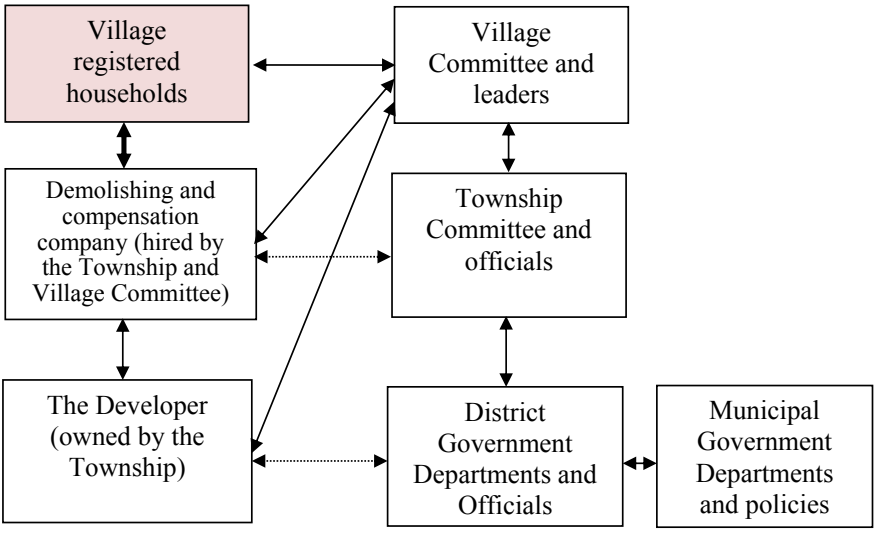

Fig. 6.5 Key stakeholders in village redevelopment and compensation

authorities, especially in the national capital city. Municipal governments are more interested in economic growth and meeting their financial demands. In relation to this particular village relocation project, it seems that the municipal and district government did not play a major role. In fact, the fate of the project was largely determined by the government even before it was started. The municipal government plays a crucial role in determining land uses and land values through its urban planning functions.

The value of a piece of land could be changed substantially by planning policies. While most fresh agricultural land in the surrounding areas has been appropriated and used for very profitable purposes, including commercial housing estates and the high profile Shangdi Information and Technology Industrial Park, the area occupied by SC Village and many other villages was intended to form part of the green belt in the northwest sector of the city. SC Village residents were to move into a high rise and higher-density new housing estates under the plan, and the land freed would be used for planting trees and open spaces. This reduced the market value of the traditional village residential area to nothing. To help with the village redevelopment and relocation, a municipal government fund had to be provided to pay compensation, which was often fixed and limited. This means that the SC Village redevelopment could never produce the millionaires created by other highly profitable redevelopment projects in the city. For SC Village residents, the redevelopment aimed only to improve their living conditions. This planning practice is very common in suburban areas of the city. In another case at the nearby village of Houying (后营), planning simply increased the original building density to enable redevelopment and also to accommodate villagers relocated from the neighbouring

settlement of Liulangzhuang. The land freed by Liulangzhuang village was used for other purposes.

Another important issue for SC Village's redevelopment was also determined by the government. Under normal circumstances, this type of redevelopment would involve a process of land ownership transfer from the village collectives to the municipal government, for both pieces of residential land—the old village and new housing estates. In SC Village, the old village residential land was taken over by the municipal government for the urban green belt and the Village Committee was compensated for helping with the redevelopment. In the case of the new housing estate, there was no change in village collective land ownership. The government only allowed this piece of agricultural land to be used for village relocation and housing development. This means the new housing estate remains a 'rural' community, rather than an urban community, with a 'Village Residential Committee', not an urban 'Neighbourhood Committee'. Those residents who moved into the estate only own part of the property, the so-called 'small rights' property, because the land they occupy is not state owned. For 'small rights' properties, the title for all rural village houses, has a much lower market value in Chinese cities, as discussed above in the section on rent levels and house prices. The government also retains the right to redevelop these types of areas whenever it becomes necessary. This land ownership arrangement considerably differentiates the new housing estate from neighbouring commercial housing estates and the move to the new housing estate became less attractive to many of the original residents of SC Village. Even for these who moved, their integration with the urban community is not complete.

Under the municipal government, district authorities—the Haidian District in SC Village's case—and the town/township government, Haidian Town, both played important roles in the redevelopment process. The implementation of municipal government land use and planning policies were carried through the District government and its relevant departments. The Haidian Town authorities were involved in the organisation of the redevelopment and direct negotiation with the Village Committee. Theoretically speaking, the Village Committee is a self-governing organisation of the rural collective and is made up by representatives from among the residents. In reality, the Village Committee is also the lowest branch of the government system, which follows orders from the Haidian Town authorities. When the government required village land, the Village Committee members had to face the choice between two different responsibilities: to help the government to secure the land for development or protect villagers' interests. It is almost impossible for the Village Committee to stand against the government's wishes by holding back the land. At best, it can bargain for more compensation for both themselves and the village as a whole. In some instances, there was strong resistance from individual village committee members. This explains the reason that residents were often unhappy with their village and township leaders.

Rather than organising and carrying out the redevelopment directly, it is common practice for township government and village committees to hire demolition and development companies to implement the schemes. Ostensibly, this seems to follow the principle of an open market economy. It also avoids direct confrontations between

the township/village officials and individual residents, which sometimes creates irregular opportunities that are difficult to check. Suppose the developer was a general commercial company for a piece of commercially valuable land. In that case, the township government and the village committee may work together on behalf of the residents for a better compensation scheme. In the SC Village case, the fixed amount of compensation came from the municipal government. This put the township government, the village committee, and the residents into very different negotiation positions. The developer was set up and owned by the township government with support from the Village Committee. This leaves individual families to struggle with the machinery of the whole development process, including their Village Committee, the demolition company, and the town government. It is not surprising that some poor and less powerful families were left behind.

6.4 Conclusion

> Urbanisation is the process of converting rural residents into urban citizens, and citizenisation is therefore the essence of urbanisation.
>
> (Pan and Wei 2013, p.3)

China's urbanisation level has increased exponentially over the last three decades. About one-third of the urban population are migrants, some 240 million in 2013, and suburban landless farmers. These groups of people have often been segregated from the established urban residents, and their inequality is enormous. The integration of rural migrants and landless farmers in Chinese cities is a process known as citizenisation. To achieve the desired overall level of urbanisation, China needs to convert 390 million rural residents into urban citizens by 2030. Wei and colleagues at the China Academy of Social Sciences identified several areas of change that are essential indicators of a successful citizenisation process for individuals or families (Wei and Pan 2016). These include:

- A change of social status from agricultural *hukou* registered at the migrant's original village to local urban residence *hukou.*
- Being granted full political rights: as migrant workers, rural residents do not have the right to stand for election in cities.
- Being given access to social and public services: migrants do not have a right for many social and public services such as health, education, employment, social security and housing welfare.
- A change in economic situation and life style: most rural to urban migrant workers are engaged in low level and low paid and insecure jobs. Their income is relatively low and their personal and family economic situation is often poor.
- Development of cultural and other social capitals: it is often assumed that rural residents and migrant workers possess backward cultural habits and customs

which are not suitable for urban life. The lack of proper education and training opportunities made their situation worse.
- Finally, being accepted by the urban society where they live.

Measured against these criteria, SC Village's redevelopment shows a very mixed picture. Firstly, it contributed little or nothing toward the integration of rural migrants who lived in the village. The final redevelopment ended their association with the village and loss of their rental and temporary homes in the area. The delayed demolition of the original village benefited the migrants most, as they (over 100,000 of them) gained a few peaceful and undisturbed years, though living under poor conditions. In relation to inequality, the redevelopment scheme increased rather than decreased the gaps between the migrants and other urban residents, both economically and politically. In terms of migrant integration and citizenisation, migrants have to find a new place in the city and start all over again.

For the original villagers, the landless farmers, there are obvious improvements in their general living environment. The modern flats in the new housing estates provide essential amenities and facilities such as water, electricity, gas, sewage and drainage. There are no more dangerous buildings, muddy roads, or shared unhygienic toilets. Many families no longer share their houses with lodgers and enjoy some privacy. On the other hand, they have lost many economic opportunities. Traditional village houses had economic functions alongside the living spaces. There is no way that the new replacement flats can be extended to create more rooms for renting. Family members had to find secure jobs in the city to earn a good income. Many of them did not succeed and rely on the compensation payments, which could last for some years if there were no major costs such as medical bills or other emergencies. All these changes are related to the loss of control of the housing land they had for generations. Balancing the gains and losses, some residents felt the relocation was not a good move. Redevelopment is not the preferred choice for many villagers.

The redevelopment process may have a very limited effect on levels of inequality among the village residents. Families with larger residential plots and larger houses had more bargaining power and would receive both more compensation and relocation housing floor space. Large families with a smaller residential plot and smaller traditional houses would receive less compensation and smaller flats. A superficial comparison between urban villagers and other urban residents could conclude that the redevelopment process enables villagers to capitalise rural collective land ownership and exchange it for new and modern flats, bringing their lifestyle into line with the rest of the population. In reality, the loss of land resources could affect the economic life and community support network for this and future generations. Urban village redevelopment actually created a special category of residents, one that differs from other urban communities in property management and ownership. The only difference is that the whole village now occupies less land and people continue living in a self-managed high-rise settlement.

The unique situation in SC Village and the long period of confrontation between the developer, the officials and residents, provide a useful case study for understanding the problems associated with urban village relocation and redevelopment.

Superficially, the problematic redevelopment process resulted from poor management and the corruption of local and village officials. A closer analysis highlights deeply-rooted problems within the Chinese land ownership system. The initial design of the project by the government resulted in unfair treatment of the villagers. Even if there was no local corruption, the new relocated housing estates would still have become second-class communities in the modern city. In this sense, if we must identify a loser, it would be the village as a whole, not just those who were left behind for years and only moved recently. In addition to the specific issues around land ownership system, there is a larger theme that comes through in many of the examples described in this case study, and that is the need for policymakers to think through more carefully the unintended consequences of reforms, and to respond more sympathetically and proactively to the concerns of those affected.

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Chapter 7
Renovation of Shantytowns and Construction of New Communities

A Comparative Study of Four Low-Income Settlements

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Abstract Large-scale shantytown renovation initiated in 2005 has completely changed the living environment of lower-income residents in Chinese cities. It has also brought about great changes in the make-up of urban communities. Over 100 million people now live in newly renovated former shantytowns, creating a new type of community across China's cities and towns. This chapter summarises the evolutionary phases in this process, outlining the characteristics and the different models involved. It then uses research from field investigations into four models of shantytown reconstruction to consider changes in social mobility and levels of segregation within the reconstructed communities. It also establishes the more holistic features of these new communities as a model for future development and greater social integration. The process draws on the shared heritage—the 'roots and souls'—of earlier communities and reshapes 'shantytown removal' in a more socially integrated way for the future development of Chinese urban society.

Keywords Shantytown renovation · Low-income settlement · New type of community · Shantytown removal

7.1 Introduction

Urban development follows a historically constant rhythm of rise and fall. Cities do not simply grow but also shrink and decline. Contemporary urban regression is mainly due to rapid changes in industrial structure. For instance, the economy of a rising industrial or mining city may suddenly decline as resources are exhausted, leading

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to structural and social decline. Faced with 'Resource Curse,'[1] the process of urban development changes from one of peripheral growth into a standard development model that aims to improve the efficiency of urban interior space. The urban renovation strategy then shifts focus from revitalisation, improvement and micro-updating to the concurrent regeneration of older areas alongside the introduction of large, new development projects. Meanwhile, contemporary ideological trends that emphasise continuity with the traditional context, such as inclusive and sustainable development, encourage a more comprehensive approach. This includes both social innovation and economic renovation and takes community as the essential foundational factor. The contemporary approach to urban regeneration involves remodelling the quality of life, and re-establishing and re-constructing positive community relations. The renovation of China's shantytowns is a successful example of contemporary urban regeneration in practice.

Most existing studies on urban renovation in China consider ancient big cities, such as old Beijing and the 'three-olds' (old towns, old factories and old villages) in Guangdong. Few studies cover shantytown renovation. From the perspective of traditional approaches to urban regeneration, the renovation of shantytowns is a lesser form of urban regeneration. Chinese urbanisation has grown at an unprecedented rate and scale since the 1970s. As the process continued into the present century, China began to optimise and upgrade the stock of urban buildings. This process has not only changed the urban architectural scene but also directly influenced social structures. The renovation of shantytowns has also dramatically changed urban communities. The typical classifications for Chinese communities were traditional: those connected with organisations, those consisting of commercial, residential houses, and those with a combination of organisationally run and commercial residential houses. These classifications correspond to the shift from a communist collectivist system to a market economy, with consequent changes in geo-social structures (Community Informatization Research Centre, Institute of Sociology, Chinese Academy of Social Sciences, 2014; Li Guoqing, 2007). It represents a substantial and significant shift. When the shantytown renovation project nears completion in 2020, over a hundred million people will live in some 54 million newly renovated shantytown houses, accounting for about 10% of China's total population. These newly renovated sites will undoubtedly form new communities within Chinese towns and cities.

Urban life is becoming more individualised on a global level, with enhanced administrative infrastructures developing to support this transition. In the case of the refurbishment of Chinese shantytowns, the government and residents made high demands for community sustainability and services. An emphasis on the role of the communities themselves in slum regeneration developed only gradually worldwide. Such communities were generally seen as passive social groups with limited active

[1] The resource curse refers to the income gap often observed between 'rich regions with access to advanced technology and regions that are rich in natural resources but poorer in technology' (Cao et al. 2015, p.1). This gap, sometimes called the 'paradox of plenty', can lead to 'can lead to a Kuznets trap, in which economic inequalities between the rich and the poor increase during the process of socioeconomic development. This can also lead to depletion of natural resources, environmental degradation, social instability, and declining socioeconomic development' (ibid).

functions. UN-Habitat, in the 2003 report *The Challenge of Slums: Global Report on Human Settlements* noted a change in attitude towards the involvement of 'folk society' and rural dwellers in the improvement of living standards and the promotion of the democratisation process (UN-Habitat 2003, 190). The report emphasised that, collective management is also an important feature for the redevelopment of lower-income settlements at the broader, societal level. A series of working groups and organisations are typically established to realise such collective endeavours effectively. These could include everything from water supply and other utilities to health services, education, health services, security and crime control. Voluntary and non-profit making groups and associations are also an effective way to mobilise and empower women in the decision-making process.

In China, the government both coordinates and strongly promotes shantytown community engagement in the redevelopment of former shantytowns. The government provides residents with comprehensive social security through a two-way process of community engagement. Meanwhile, government agencies actively cultivate the 'self-service' capacity of community organisations to empower them to make their own decisions in post-shantytown renovation. These communities largely consist of low-income earners, unlike those living in collective or in commercial, residential properties. Residents are consequently faced with the important task of developing their quality of life. The community becomes a crucial 'reciprocal platform' for two-way engagement with the administrative authorities. Not only does the community cooperate with the administration to provide social security services, but also helps to shape and diversify the services they receive.

Various studies chart the transition from a communist collective system to more communal or grass-roots systems within a market economy (Sun Liping 2003) as the process unfolded, the responsibility for managing the social life of residential 'units' transferred to the communities themselves (Yipeng et al. 2014). The second phase involved the transition from 'community management' to 'community governance'. At its heart was the empowerment of the public to participate in community affairs. Stakeholders were mobilised to form co-operative and mutual forms of governance and thereby invigorate social vitality (Qiang and Ying 2015). Hitherto, investigations into community structures were always derived from studies on system transition, social governance and organisational development. They lacked the awareness of problems with community structures as the standard, and lacked studies showing how to realise sustainable community development. As a result, they failed to develop a 'discourse' system centred on the community itself.

The social science disciplines have yet to fully explore and discuss these transitions. There is a dearth of studies of the preliminary stages of such developments and there is a need to clarify the relevant background information and knowledge required. To encourage this process, this chapter first briefly outlines the spatial–temporal characteristics of shantytown renovation. We then consider four types of shantytown to chart their formation, their separation from mainstream urban society, and various mechanisms for their renovation, development and integration as new forms of urban community. According to varied and complex historical processes and context, the four types of shantytowns shaped community characteristics in different

ways. Strategies for spatial management and social governance and their impact on communities varied during the process of shantytown renovation. Nevertheless, the four shantytown models share many features in common. They are characterised by a drastic renovation of social and industrial infrastructures against a background of a shared tradition in the 'communist collective system.' There have been dramatic changes in both their original physical layout and structures as well as the geo-political structures of Chinese society during the era of market reform. The rich and complex process of historical development that affects these newly renovated shantytowns can be encapsulated into a single conceptual framework where lower-income settlements are transformed into new forms of urban community. The chapter concludes by comparing the varying abilities of these four types of community to establish a shared economic base and common consciousness. What is required is a transformation of the heart and soul of these shantytowns to integrate more fully with the future development of mainstream urban society. An understanding of this process will inform the emergence of new lower-income communities and settlements in China.

7.2 Phases and Features of Shantytown Renovation

Large-scale shantytown renovation in China started in Liaoning Province in 2005. As urban redevelopment gathered pace, shantytown renovations were initially undertaken as humanitarian projects to improve the living conditions of lower-income groups. With changes in domestic and foreign policies, it became a new engine to boost economic growth and promote urban regeneration. The process offered benefits across social, economic and urban developments.

7.2.1 Three Phases of Shantytown Renovation

Launch and exploration phase (2005–2008)

The process began with the regeneration of state-owned industrial and mining enterprises in Liaoning Province. Shantytowns developed as a result of insolvency and industrial decline across state-owned enterprises following restructuring in 1993 (Xiangfei and Chunyan 2010, 5:58). Under the previous communist collective system workers lived in accommodation connected to the industries that employed them. As state-owned enterprises closed, communities lost both vital services and geographical cohesion, the support structures they needed in daily life. This resulted in a breakdown in community cohesion and a deterioration in health and public order.

In early 2005, Liaoning Provincial Party Committee launched centralised and continuous regeneration projects throughout the province. These arose both in

response to internal demand for urban development and direct government intervention to address social issues. The Party adopted a 'five in one' mechanism comprising party committee leadership, government promotion, social participation, enterprise support and community autonomy. By 2009 some 760,000 properties were undergoing continuous redevelopment, providing a model for state-owned industrial and mining shantytowns.

Transition from local to national policy (2008–2012)

The global financial crisis from September 2008 had a serious impact on Chinese exports. Economic growth declined sharply after a period of rapid and sustained growth. In response, the Chinese government introduced ten measures to expand domestic demand and promote economic growth. The first was to accelerate the construction of government-subsidised housing projects. In December 2009, five ministries, including the Ministry of Housing and Urban-Rural Development issued *Instruction on Promoting Shantytown Renovation of Urban and State-owned Industrial and Mining Enterprises*. This marked the formal launch of shantytown renovation projects nationwide. The relocation of shantytown residents comprised monetary and in-kind compensation, chosen voluntarily by each household, increased tax policy support, and reduced operating charges to reduce the renovation costs. In December 2009, the Datong Shantytown Renovation Work Conference extended the regeneration projects to state-owned forestry and reclamation areas.

In this period, a total of 12.6 million shanty dwellings were renovated nationwide. The government invested a total of RMB 150 billion, which has promoted investment and increases in household disposable income, and improved housing conditions among the preliminary results.[2]

Comprehensive extension of shantytown renovation (2013–2017)

In 2013, the new Chinese government proposed the objective of renovating another 10 million houses across four categories of shantytowns in cities, state-owned industrial and mining areas, forestry areas and agricultural reclamation areas. In 2014, the central government established the 'Three One-Hundred Million People' policy, which included renovating urban shantytowns and villages in cities of around 100 million inhabitants. The regeneration of shantytowns became the strategic pillar of a new approach to urbanisation. To realise this aim, the regeneration of shantytowns must be fully accelerated. For this purpose, in 2015, the State Council launched an initiative to renovate some 18 million dwellings, including dilapidated houses and run-down urban areas between 2015 and 2017.[3]

In February 2016, the Central Committee of the Communist Party of China and the State Council issued *Several Opinions on Further Enhancing Construction*

[2] "By 2020 in China, 21,770,000 sets of new shantytowns will have been completed, and the minimum investment will have exceed RMB 4,000 billion", https://money.163.com/14/0325/16/9O6OUATN00253B0H.html.

[3] *Opinions on Further Renovation of Urban Shantytowns and Urban & Rural Dilapidated Houses and Construction of Supporting Infrastructure.*

and Management of Urban Planning. This confirmed that shantytown and housing improvements were the primary goals in enhancing urban public services. The three-year campaign of shantytown renovation should remain a core priority and be carried out fully as possible. According to this policy, in May 2017, the central government introduced a new three-year plan to renovate another 15 million shanty dwellings from 2018 to 2020 to complete the regeneration within that time scale.

7.2.2 Four Types of Shantytown Renovation

The *National New Urbanization Plan (2014–2020)* issued in 2014 divided shantytown renovation into four types: renovation of urban shantytowns and of state-owned industrial and mining shantytowns, renovation of state-owned forest-area shantytowns and renovation of dwellings in state-owned reclamation areas. The first mainly involved the inclusion of both shantytowns and 'urban villages' in the regeneration process. The second involved communities within the railway, steel, non-ferrous and gold industries. In the third category, eligible communities in forestry areas were included in the local urban housing security system alongside those from state-owned properties. Equally, in the fourth category, non-state-owned farms and properties were also uniformly included in the regeneration schemes.

7.2.3 Main Achievements in Shantytown Renovation

From 2005 to the end of 2014, a total of 20.8 million shanty dwellings were renovated in China.[4] During the six years from 2015 to 2020, the phase of the 'Three One-Hundred Million People' policy, some 33 million houses will be constructed. On the calculation that there are 3.02 people per household in China,[5] these could accommodate about 100 million people. When examining the achievements of this remarkable regeneration from the perspective of urban sociology, it becomes readily apparent that these newly renovated areas form a new category of the Chinese urban community. The full impact and value of this aspect of urban regeneration warrant further study.

[4] Opinions on Further Renovation of Urban Shantytowns and Urban & Rural Dilapidated Buildings and Construction of Supporting Infrastructure of the State Council. People's Publishing House, 2015, P1.

[5] National Health and Family Planning Commission: Development of Chinese families presents seven big changes, Xinhuanet [cited on March 1, 2019].

7.3 Shantytowns Separation from Mainstream Society

Despite varying conditions and characteristics, there are striking similarities in the way Chinese shantytown communities developed within the four categories identified. The process involved different factors to those that affected the rise of slum areas in other countries. The study of social mobility explores dynamic trends in social stratification according to changes in social status. There are two important indices in the analysis of social mobility. The first is the rate of upward mobility. The rate of structural mobility depends on differences in class distribution caused by changes in industrial conditions. Such mobility is not a matter of personal choice but a 'passive mobility'. It is something that happens *to* people without their involvement or consent. Secondly, there is a 'circular mobility' rate, social mobility achieved through self-effort such as education and career advancement.

In 1992, Deng Xiaoping's South Inspection Speech brought China into a new round of political and economic reforms, leading to a period of rapid economic development. In 1993, the Third Plenary Session of the 14th Central Committee of the Communist Party of China decided to adopt the market economy system. Reforms of state-owned enterprises went beyond the adjustment of management structures. It extended deeply into the revision of property rights and joint-stock system reforms entered the mainstream. Many state-owned industrial, mining, forestry, reclamation and agricultural enterprises went bankrupt through industrial depression, serious operational losses and a failure to adopt market mechanisms. The result was a continuous deterioration of living conditions in shantytowns through industrial and systemic failure. Shantytown dwellers were left behind as rapid industrial and economic development took place across mainstream urban society. People living in these areas were excluded from the process of modernisation and urbanisation and lost the capacity to join the mainstream trajectory of Chinese urban life.

7.3.1 Industrial and Mining Shantytowns

The social status of industrial and mining workers underwent dramatic fluctuations both before and after the renovation of shantytowns. Liaoning Province provided China's older industrial base. Figure 7.1 shows the location of shantytowns connected with state-owned enterprises within the province. Cities developed around state-run industries such as coal mining, rather than natural population growth on a mercantile model. As coal reserves were exhausted from the 1980s, economic depression and decline followed.

Following the economic reforms from 1993 onwards, former industrial dormitory areas became run-down shantytowns. Control of both the enterprises and their associated worker accommodation transferred to the local government level. Over the course of time, this led to the spread of large areas of self-built and maintained properties. Very unusually, most shantytown residents in Liaoning Province had

Fig. 7.1 State-owned industrial and mining enterprise shantytowns in Liaoning Province

permanent urban residence certificates, unlike migrants from rural areas. Workers who had once been employed in large collective or state-owned enterprises lost social status during the industrial and economic reforms. An example is the community in Beihou, Fushun City. In 2004, there were more than 1,600 households, including over 400 farming households. The total population was over 4,800, more than 1,200 of the farmers. Over 800 people lived in individual units, more than 1,680 lived in collectively owned units and over 20 in individual households. As can be seen from Table 7.1, the highest proportion of workers—47.5%—lived in the large collectively owned units.

Social mobility for shantytown residents tended to be downward. Mining was the most prestigious occupation in the old industrial base of Liaoning Province, with extensive growth and development in state-run extraction enterprises. There were up to 120,000 workers in Benxi Mining Bureau in 1988. Mining was the core industry in 'The City of Coal and Iron'. Underground workers enjoyed special privileges such

Table 7.1 Original ownership structure of shantytown residents (%)

	Tieling city (Yinzhou district)	Fushun city (Beihou community)	Shenyang city
State-owned enterprises	17.5	22.3	18.9
Large collectively owned units	47.5	47.5	8.7
Individual households and others	35	30.2	72.4

Data source Statistical data provided by the cities to the research group

as exclusive access to wine and meat coupons. The mining industry entered recession, reserves were exhausted, there were financial losses in successive years, and mining became the primary focus for industrial reform. The government undertook management buy-outs, and awarded compensation of nearly RMB 10,000 to each miner to enable them to leave the industry and re-enter wider society. The social and economic status of former miners declined rapidly. They went from respected workers in state-owned enterprises to poor shantytown dwellers. Their social and economic status dropped from bourgeois to that of the proletarian poor.

The economic decline led to community collapse. Before the industrial reforms of the 1990s, employers' logistics department provided services and social security functions. Social relationships in these neighbourhoods reflected the relatively high status and prestige of the workers themselves. There were high levels of social cohesion and order. With economic decline, municipal authorities took responsibility for former work-unit communities. They became defined by geographical location rather than links with particular industries and the support infrastructure these provided. Municipal governments were unable to cope with large-scale industrial reform and community organisations were paralysed by the size and rapidity of these changes.

As a culture of poverty developed, social security systems deteriorated. Unemployment led to serious social security problems across shantytowns. Without steady and reliable sources of income, many residents turned to crime. The older collective system's social cohesion and regulatory frameworks broke down, leading to a rise in anti-social behaviour. In addition, levels of educational attainment in shantytown were comparatively low, mainly only up to primary and junior high school levels. Low educational and cultural aspirations contributed to social problems.

Table 7.2 shows that, Shenyang had an exceptionally high level of residents educated to senior middle school level, some 70%. In the other five cities most people had only attended junior middle school and primary school. A poor educational background restricted the employment opportunities and economic capacity of shantytown residents.

Table 7.2 Education background of newly renovated shantytown residents in six cities of Liaoning Province (%)

Education background	Mean	Shenyang	Fushun	Benxi	Chaoyang	Tieling	Fuxin
Primary school	13.3	0.5	15.3	19.8	15.1	6.8	21.5
Junior middle school	53.3	23.7	62.7	61.4	59.2	65.5	45.7
Senior middle school	29.5	70.0	21.5	13.5	20.2	23.3	31.4
University	3.9	5.8	0.5	5.3	5.5	4.4	1.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Data source Statistical results of questionnaire made by 2012 research group investigating shantytown renovation in Liaoning Province

Fig. 7.2 Slum-dwellings in reclamation area in Jiangxi Province

7.3.2 Slum-Dwellings in Reclamation Areas

China's state-run farms form a gigantic socio-economic system with four million employees, a population of twelve million and over 47,000 km^2 of arable land. It comprises the country's base for commercial grain production and strategic food reserves. In 1957 in response to a call for the development of mountainous areas, land-reclamation projects were established in Jiangxi Province (see Fig. 7.2). Over 50,000 cadres drawn from Communist Party and government organisations, demobilised troops and educated youths from Shanghai and Yangzhou travelled to the deserted beaches and remote mountains far away from cities and major transport links. Jiangxi Province had a large number of designated reclamation areas. They covered a total area of 16,000 m^2, and consisted of reclamation farms, companies, enterprises, schools and managed villages, with some 163 independent accounting units. The location of these reclamation areas and the slums that developed around them can be seen in Fig. 7.2. By the end of 2016, the total population in the Province's state-owned reclamation areas was 1.3 million in some 383,000 households.[6] The population was divided into four categories: land-reclamation workers, their families, non-manual workers, and villagers in settlements attached to land-reclamation farms.

With China's economic reforms, industrial, commercial, architectural and service enterprises developed rapidly, with their total output value exceeding agriculture. Many former farm workers subsequently found employment in other industries. There has been a gradual decline in state-run agricultural and land-reclamation schemes since the 1990s, as their economic planning and operational management

[6] Data taken from the Report on the Reconstruction of Slum-Dwellings in State-Owned Reclamation Areas in Jiangxi Province, 5 September 2017.

systems proved inflexible. Financial debts and the adverse social impact were felt heavily across this sector. By 2009, the asset-liability ratio reached 119%. There was low social security provision for workers and heavy burden on the state-run farms.

In 1994, state-owned farms reversed their policy of arranging employment for the children of employees. In November 2010, Jiangxi Province issued *Instruction on Promoting Reform of State-owned Land-reclamation Enterprises in the Whole Province*. The reforms involved job realignment, historic debt repayments, outsourcing social services, and more flexible ways of operating. An early retirement policy was introduced for those staff due to retire within five years. The farms disbursed living expenses and paid staff endowment and medical insurance every month until retirement. For those due to retire after five years, compensation payments were arranged based on their length of service. Their endowment and medical insurance were paid under the 'One Compensation and Two Insurances' scheme. Some agricultural workers returned to work the arable land as individual tenant farmers or labourers rather than state employees. Most chose to work in cities, while a few remained in farms as contractors and farm labourers. At present, there are a total of 317,000 employees in Jiangxi land-reclamation schemes, including those formerly employed under the old system. The total is made up of 100,000 primary-industry employees, 109,000 secondary and tertiary-industry employees and 108,000 retired workers.

There are three main causes for the gradual deterioration of housing stock within the state-run reclamation schemes. During the 1950s, the 'Great Leap Forward' period, priority was always placed on production, with quality of life a lesser concern. Farm workers and their families mainly lived in 'army barracks' and 'tube-shaped apartments' initially built with coal cinders, mud bricks and timber. Settlements were scattered in remote mountain areas with primitive facilities for water, electricity, gas and other services. Secondly, by the mid to late 1990s, the agricultural economy within these schemes began to decline. With lower financial resources, older houses fell into disrepair. Thirdly, the remote mountain and lake locations with infrequent transport and poor medical, health, cultural and education conditions, restricted opportunities to improve living accommodation. With no development of commercial, residential houses, living conditions lagged behind those of the surrounding villages.

7.3.3 Shantytowns in State-Owned Forestry Areas

Heilongjiang Forest Industry Group (HFIG) is one of the four big forestry organisations in China. It comprises four forest warden authorities and 40 forestry divisions. HFIG specialises in large-scale afforestation and forestry operation and management, and at the height of its output, its timber yield accounted for 33.5% of the national supply. It has produced a total of 519 million cubic metres of timber, accounting for 21% of the overall national output. HFIG has established social housing projects in small towns dotted across secluded areas of original virgin forest, see Fig. 7.3. These

Fig. 7.3 Shantytowns in state-owned forestry area in Heilongjiang Province

towns are designed to be ecologically sustainable and have advanced industrial and social systems.

Founder Forestry Bureau was founded in 1958 and was the first to reform shantytowns in forestry areas. It closely combined both physical and social regeneration, providing a blueprint for subsequent schemes nationwide. Heilongjiang Founder State-owned Key Forest-area Management Committee was founded in 2015. By the end of 2018, these forested areas had a total population of 59,298 across 25,476 households. There were 4,428 workers on the payroll, including 2,682 employed forestry operatives. Forestry areas were divided into two main categories: working and living space in the mountains and residential areas on the plains. There are ten mountain forest farms and Gaoleng Bureau comprises 22 departments, including public security and justice, culture, education and health, a tax bureau, water-power-heat supply and property management. The sub-district office was established in 1959, and sub-district cadres were all regular staff of the Forestry Bureau. The sub-district consisted of five communities and six neighbourhood committees, and its main mission was to organise workers' families to contribute to food production and alleviate the shortage of vegetables and cereals. Forestry areas were supplied with economic, administrative, and social management services and were remarkable for self-management, autonomy, and community cohesion.

Before 1970 all forestry workers constructed their houses independently. The Forestry Bureau provided land, timber and other construction materials. Houses were mainly simple and crude with walls made of straw mixed with yellow mud held together by panels. From the 1970s, the Forestry Bureau began to supply brick-and-tile bungalows for the workers. The living area was generally 25 m^2 for each household comprising two generations; and 30–35 m^2 per household of three generations. As the population increased, people built new thatched extensions both in front and

behind the main house and these soon deteriorated and many of the housing schemes became slums.

In 1984, the forestry authorities implemented housing ownership reform, and some staff purchased their public housing. In 1998, the Founder Forestry Bureau issued a one-off voluntary severance payment and some 4,000 employees accepted compensation and withdrew their membership. The economic status of forestry workers remained consistent with fiscal and industrial trends until the 1990s, when forested areas entered recession. There were two main factors, a lack of sustainable resources and an economic crisis brought on by excessive logging and over reliance on the single 'wood economy.' Profits declined, and incomes dropped below the national mean level. Following redundancy, many younger or active workers sought work elsewhere. In October 2000, the government launched the Natural Forest Protection Project. Key state-owned forestry areas reduced their timber yield greatly, and commercial logging of natural forests stopped completely in 2014. Safe-guarding China's ecological security has become the priority. With a shift from plantation operations to forestry management and protection, the demand for employment was greatly reduced. The Founder Forestry Bureau relocated 3,000 surplus staff, and the number of registered employers reduced to 4,428, only 2,682 of them actively in service.[7] The income of these service staff grew slowly. In 2005, the Forestry Bureau implemented the second housing reform, whereby all publicly owned dwellings were sold to individual staff. Housing ownership and the relocation of workers were important factors in the formation of forestry shantytowns. The Forestry Bureau's main source of income comes from national investment in the Natural Forest Protection Project. Consequently, the Bureau was no longer responsible for repairing public housing. The ability of workers to fund repairs weakened through unemployment, and housing settlements gradually deteriorated to become dilapidated shantytowns. Nevertheless, even before the sustained regeneration of shantytowns began, some former forestry employees were able to raise money to improve their living conditions. Those who increased their income from running their own enterprises took the lead to improve building standards and conditions. By the time of the formal launch of regeneration projects, the remaining residents faced economic hardship.

7.3.4 Urban Shantytowns: Examples from Beiliang, Baotou City

Beiliang is the common name for the Northern Plateau in the Donghe District of Inner Mongolia (see Fig. 7.4). The heritage of Baotou is rooted in Donghe with its cultural 'heart and soul' drawn from Beiliang. These locations are shown on Fig. 7.4. As the birthplace of 'Zouxikou Culture' from the late Qing Dynasty to the formation of the Republic of China, many Han people in Shanxi-Shaanxi area migrated to

[7] Report on the Transformation of Shantytowns in Fangzheng Forest District, Heilongjiang Province, 5th, March, 2019.

Fig. 7.4 Urban shantytown in Beiliang, Baotou City, inner Mongolia

Baotou. The most famous of these were the mercantile and financier Qiao's Family, who settled in Baotou during the reign of Emperor Qianlong to open up trade and access to Fushenggong from Qi County, Shanxi. They laid the foundation for the policy of 'Fusheng First, Then Baotou'. Beiliang enjoyed a prosperous trade in furs and feathers, tobacco, tea and other enterprises, and formed 'Nine Business Industries and Sixteen Handcraft Industries.' The area became an important centre for commerce and trade in the Northwest by shipping goods along the Yellow River. For this reason, older, traditional dwellings in Beiliang combined both residential and commercial or workshop accommodation. They typify the characteristic traditional vernacular building style of old Baotou, and have extremely high cultural value.

In 1953, the state established large-scale steel enterprises drawing on mineral resources in Bayan Obo. The development of Baogang was identified as a national key project of the 'First Five-year' plan, and Baotou entered the era of heavy industrialisation as 'Grassland Steel City.' After Baogang became established, Baotou New City moved westward to Kundulun District and Qingshan District. Baotou Municipal Government moved out of Donghe District, along with all the employees involved in larger enterprises. Those left in Beiliang were employed in small and medium-sized enterprises supporting Baogang. Many settlements in Beiliang degenerated into shantytowns following the development of a market economy in the 1980s. Due to technical weakness and low market awareness, the local enterprises gradually lost competitiveness. During the economic reforms across regional state-owned enterprises in the 1990s, the previously prosperous Bayantala Street in Donghe District declined and many residents were unemployed or faced redundancy. The Beiliang area had a weak municipal infrastructure, with no heating, sewer pipe network and gas facilities or even fire-fighting services. Old and dilapidated earth and timber dwellings accounted for above 90% of the housing stock. Living conditions were

primitive. The impact of the severe earthquake that hit Baotou in 1996—at 5.3 on the Richter Scale—reduced already run-down areas to the largest urban shantytowns in the Inner Mongolia Autonomous Region.

Beiliang shantytowns covered 13 km^2, with a population of 124,000 across 47,000 households. The residents mainly comprised people living on minimum incomes, retirees and vulnerable groups. The reforms of state or collectively owned enterprises in the 1990s resulted in high unemployment and an influx of poorer residents. Over 70% of the population in shantytowns had no regular income. The number of registered unemployed in Donghe District rose to 11,800, 70% of them living in Beiliang. Those on minimum income accounted for 18% of the city's population. Within Donghe District, there were 30,100 people living at minimum income levels, accounting for nearly 50% of the population, with over 40% centred around Beiliang (Baoshan et al. 2015, 38). The population was also ageing; most young people left the region to find work, increasing the proportion of elderly people and retirees. Beiliang took on the characteristics of a migrant city, home to some seven minorities, including Mongol, Hui and Man. Alongside ethnic diversity came cultural and religious diversity. Five major religions co-existed, Buddhism, Taoism, Islam, Catholicism and other forms of Christianity. The renovation of shantytowns had a direct impact on the stability of religious and ethnic relations.

7.4 Shantytown Renovation and the Remodelling of Communities

Strong central policies, inclusive local strategies and practice, have both consolidated China's ability to implement the large-scale regeneration of shantytowns, making it become new forms of more integrated mainstream urban settlements. Government policies that emphasised joint 'central/local' action and local interventions, were the fundamental means to assure effective control of the regeneration process. More specifically, the policies replaced existing social and planning mechanisms with new forms of a community organisation that enabled residents to adapt to the market economy and establish new economic and social life forms. There were dramatic changes in community organisation, culture and governance. These changes were driven by requirements at both government and community level. Firstly, the state needed to reconstruct a community organisation to assist the government in providing social security and public services. Secondly, the residents of newly renovated shantytowns required a community platform to support economic and social life into the future. The high degree of overlap between 'official' and 'private' requirements in the public realm became a feature unique to the newly renovated shantytowns.

7.4.1 Shantytown Development of Community Organisations: Liaoning

Renovation of the living environment

Residents lived in apartment buildings following the regeneration of shantytown areas. The living environment was integrated with surrounding communities living in privately rented flats. The first of the major regeneration projects, the Modi Community in Fushun City, serves as a good example. By the end of 2009, after five years of construction, a total 106 apartment blocks replaced the original shanty dwellings, comprising a population of 16,300 people in 6,400 households. After renovation, the average housing area per household reached 53.8 m^2, with a per capita living space of 18 m^2. There were major environmental improvements. The introduction of central heating reduced emissions. Asphalt roads now extended to the entrances of housing settlements. Improved lighting and other infrastructure projects enhanced the environmental quality and two public squares became the focus for cultural and leisure activities.

The regeneration of community

The emergence of regenerated community structures is the highlight of shantytown renovation in Liaoning. The Civil Affairs Department formulated a community reconstruction plan before the physical works took place, based on a core working platform of community's Party organisations. This was an innovative way organising public services in China at that time. Alongside the community's Party Committee, it also established Community Neighbourhood Committee, Residents' Congress and a Community Council. Benxi City established and further developed this community network model involving the alderman, community assistants, residents' representatives, advocacy organisations, and volunteers to ensure smooth communication and service delivery channels.

These measures established good order and community cohesion. Following the renovation, the new community settlements varied in size from between 3,000 and 10,000 inhabitants across some 1,000 to 3,000 households,[8] far greater than those in the older 'unit' communities. The increase in scale required new measures for security and social management. The residents selected their floors and living areas independently following a fair distribution principle, as the newly formed community came from different shantytowns, and did not know each other. The newly renovated shantytowns were equipped with community police stations and officers according to national standards and security patrols. Crime prevention and emergency management were strengthened, and community security improved significantly.

Public service facilities were also enriched. Health services are one example. As the state-owned enterprises closed, the unemployed lost medical service assurance, and public health levels declined. Following the regeneration projects, each settlement had a community clinic and full-time medical workers. Changes in health

[8] Report on the Reform of Shantytowns in Liaoning Province, 2012.

service infrastructure have greatly improved the quality of life for the residents. After the move from shanty dwellings to more substantial buildings, the biggest change residents identified was the improvement in the image of their communities. They had become a mainstream urban community with a clean environment and modern facilities.

Increased levels of social mobility became the most significant effect of shantytown renovation. The inhabitants of the newly renovated shantytowns were mainly former employees of large state or collectively owned enterprises who had fallen into poverty during the reforms and the process of industrialisation and urbanisation. The regeneration of shantytowns supported redundant miners, reversed the decline in social status and brought them back into modern urban society.

7.4.2 Housing Regeneration and Community Reconstruction in Jiangxi

Shantytown renovation combines with new urbanisation

The renovation of housing stock in Jiangxi Province started in 2011, the first time any remedial work had taken place since the construction of large-scale barrack style accommodation in the 1950s. It began with the construction of 331,000 social affordable housing, including the renovation of 60,000 substandard dwellings in reclamation areas.[9] The project covered 157 land-reclamation units and involved 71 administrative districts in across the whole province.[10]

The project focused on the renovation of run-down households within the managerial district of the reclamation areas, and gave priority to supporting the most vulnerable families, or those on the lowest levels of social security. To be eligible for renovation, houses had to be either:

- over 40 years old with signs of serious deterioration;
- constructed from mud and thatch;
- identified by the provincial construction department;
- deemed unsafe due to unqualified gas supply, lack of fire-fighting and other facilities, and pose serious potential safety hazards;
- or part of residential areas where more than 50% of the housing stock was centrally owned or in disrepair.

[9] Report on the reconstruction of slum-dwellings in state-owned reclamation areas in Jiangxi Province, 5 September 2017.

[10] September 4 to 10, 2017, the research group went to Jiangxi Province Agricultural Reclamation Office, Dongxiang County Hongxing Reclamation and Plantation Farm, Damaoshan Reclamation and Plantation Farm, Wuxing Reclamation and Plantation Farm and Yunshan Reclamation and Plantation Farm to conduct field surveys of the renovation of dilapidated houses in state-owned reclamation areas.

The regeneration of these properties in Jiangxi was typical of similar renovation projects in state-owned housing across China. The project placed urban regeneration as an important part of a new approach to urbanisation. The basic philosophy was to group population density into open areas, localise industry onto industrial parks, and to modernise agriculture. A new tripartite pattern of community developed comprising modern open 'parkland' for residential and industrial areas, tourist attractions and new forms of urbanisation. By adopting this approach, people could be accommodated more strategically and new patterns of urbanisation encouraged. It combined urban regeneration with the construction of market towns with surrounding villages within easy reach. The larger villages were within 3 km of each market town with smaller hamlets only another 3 km further from the central market hub. The demolition process ensured that the inhabitants were moved closer to key tourist attractions, agricultural and industrial districts and industrial parks. There were 1.1 million people living in land-reclamation projects across Jiangxi Province, and through the urban regeneration project, a quarter of a million moved to the open countryside, some 30% of the total population. There was a total of 155 small towns in land-reclamation areas across Jiangxi, and the total urban area exceeded 450 km^2. There is a large-scale urban population at 690,000, 62.1% of which live in towns, which is a proportion about 11% higher than the mean value of the whole province (Xinhua News Agency Jiangxi Branch 2013, 173).[11]

By 2016, over a quarter of a million run-down properties were renovated and newly built houses covering an area of over 17 km^2. Nearly 17 km^2 of dilapidated housing had been cleared and over three quarters of a million people rehoused. The older barracks and adobe houses were all replaced with brick and concrete structures. In the Yunshan Group, for example, per capita, living space more than doubled from 20m^2 to 45m^2. In residential districts, improvements in piped drinking water introduced centralised sewage systems, clean energy and brought living standards to the same level as urban areas. With the improvement of employment, education and hospital conditions, peasant farming went from low-income physical labour to a respected and dignified career.

Rustic market town communities

As the predominant economic activity within the reclamation areas was farming, living standards and accommodation inevitably took on a primitive, rustic character. A key aim of the regeneration projects was to reinvigorate and revive rural life, respecting the rustic character but introducing modern facilities and infrastructure. An example can be given from Jiangxi Yunshan Group's Fruit Forest Company. Displaced communities were resettled in new accommodation in Dayuan Village managed by Yongxiu County. Residential workers within the Yunshan Group' were completely integrated with local villagers, and a community centre provided a shared leisure square with fitness equipment, basketball court, outdoor stage and a rural history museum. Following the agricultural reforms of the 1990s, most workers,

[11] Report on the reconstruction of slum-dwellings in state-owned reclamation areas in Jiangxi Province, 6th, Sep, 2017.

except for a few in managerial posts, no longer relied on farms for employment, and travelled away to find work alongside local farmers. They would leave the elderly and children behind and return home only during holidays and festivals. Unlike the local farmers, the agricultural labourers came from other parts of China away from their native home towns. The newly renovated housing settlements were often not their only place of residence and internal migration gave the children of farm workers more employment choices.

7.4.3 Forest-Area Shantytown Renovation

Forest-area shantytown renovation

Heilongjiang Forest Industry Group and Founder Forestry Bureau were the first forestry areas to renovate shantytowns within their jurisdiction. The first phase of renovation ran from 2009 to 2011, with 900 new houses built. The second lasted from 2011 to 2015, with a total of four thousand new houses completed. Before 2012, these projects drew on supporting funds from provincial government. Later, there was a subsidy of RMB 300 per m^2 from the state alongside funds raised within the enterprises themselves.[12] The third phase ran from 2015 to 2017, and except for funds released from the national budget, it completely relied on policy loans from state-run banks, and the annual interest burden was heavy.[13]

Founder Forest Bureau received a total investment of RMB 1.13bn and renovated some 21,600 shantytowns, including, 10,762 newly built settlements within the areas under its jurisdiction. Some 464 settlements were established or refurbished within forestry plantations and this encouraged workers deep in the upland areas to migrate to settlements on lower ground. The result was the urbanisation of forest society as businesses and urban development spread to forestry areas. Maintenance and renovation projects involved mainly old, unfit or dangerous houses in plantation dormitories. A total of 10,390 units were refurbished with replacement windows, external-wall insulation and roof tile reinforcement.

Community development in forestry shantytowns

In 2005, against the background of a nationwide move to promote the construction of new urban communities, the forestry Neighbourhood Committee finished the process of community transformation. Community structures developed as the regeneration projects progressed, and the number of Neighbourhood Committees increased from six to ten. Each community had office space of around 500 m^2, with a multi-purpose community service hall, charity supermarket, daycare room, the school for the children of residents, etc. The range of public services increased.

[12] Report on the Transformation of Shantytowns in Fangzheng Forest District, Heilongjiang Province, 6 March 2019.

[13] March 4 to 9, 2019, the research group surveyed shanty town renovation in Heilongjiang Province Founder Forestry Bureau and Qinghe Forestry Bureau.

Previously, these community services had been restricted to the most basic needs such as local Communist Party construction, family planning, civil affairs and re-employment training. A standard service system developed during the shantytown renovation process, drawing on the experience gained from projects in Ang'angxi District and Qiqihar City. The main difference between community organisations in forestry areas and those in cities was that the former had a vertical management structure. All 70 cadres for the sub-districts and five communities were employed by the Forestry Bureau, and under its direct management.

Newly renovated settlements in forestry areas were organised and managed individually rather than collectively. Each unitary settlement could make decisions on investment, development, and management, making full use of the renovation project and applying planning standards set by Harbin's provincial capital. This led to a high standard of construction across junior and senior middle schools and Forestry Bureau Hospitals in newly developed areas. Not only did the standard of facilities and equipment exceed that of surrounding cities and counties, but the winter heating service extended a month beyond that of adjacent areas. Distinct communities began to emerge with a shared destiny.

7.4.4 Shantytown Regeneration in Urban Areas

Physical renovation of urban shantytowns

In February 2013, the authorities in Beiliang began the process of acquiring, relocating and refurbishing shantytowns and temporary settlements across the region. The process involved three compulsory acquisition and relocation campaigns, known as the '100-day Problem Solving', the 'Spring Battle' and 'Autumn Battle.' By October 2014, a total of 124,000 people across 47,000 households were rehoused in new properties or had their homes redeveloped. The total living space involved amounted to 4 km^2 houses within an area of 13 km^2. Two methods were adopted to manage the relocation of shantytown dwellers. The first combined monetary compensation with property-rights exchange, and some 14,000 residents from the 47,000 households received monetary payments. Another 15,000 were relocated through buy-back of commercial residential houses, with a monetary repayment rate of 61.7%.[14] The second measure combined relocation away from the shantytown areas, supplemented by in-situ renovation. To respect the customs of the predominantly Muslim Hui people's in living close to places of worship and their taboos against the removal of tombs, relocation areas were chosen around the Grand Mosque.[15]

By the end of 2015, 33,000 new or buy-back refurbished houses were completed and delivered, the relocated residents were all in place. The per capita living space

[14] Report on the renovation of shantytowns in Hedong District, Baotou, Inner Mongolia, June 4–8, 2018.

[15] June 4 to 8, 2018, the research group made field surveys of shanty town renovation in Donghe District, Baotou City.

for former inhabitants of Beiliang shantytowns more than doubled from 12 m^2 to 26 m^2. Among the 45,000 replacement houses were 20,000 self-owned dwellings with property rights. The area of these homes ranged from 75 m^2 to 90 m^2. A total of 25,000 economically affordable houses were provided with an area of between 50 m^2 and 65 m^2 as well as and lower-rent houses for those on low-incomes.[16]

Community development in urban shantytowns

Drawing on experience from previous renovation projects, Baotou City planned to establish a relocation area of some 4.78 km^2 near the city centre, in order to engage the interest of those moved from the shantytowns. Two large areas of newly built houses were built to the north and south of the catchment area consisting of five communes and 15 residential communities. Altogether, some 33,000 replacement houses were constructed. Each of the new communities comprised around 6,000 households with a population of between 3,000 and 10,000, far greater than that of other schemes. Each settlement was simultaneously equipped with six primary and secondary schools, eight pre-school nurseries, nine community service centres, two community health service centres and a large park square. The new living space environment aimed to satisfy the requirements of young people to in order to retain a population balance and ensure the longer sustainability of the communities.

Whereas the regeneration process in Beiliang prioritised people's economic livelihood, the schemes in Baotou City encouraged the improvement of basic public services. The endowment insurance rate increased from 79% to 91.3%, and the medical insurance rate increased from 82 to 100%, achieving full coverage of the population. The schemes actively encouraged growth in public-welfare employment. When the programme was first launched in early 2013, the number of unemployed in Beiliang town stood at around 10,000, with another 8,000 added as the shantytowns were dismantled. By providing employment in property management, cleaning, ecological projects and social security roles, supporting vocational training schemes, total 9,277 people were redeployed with minimum salaries coming into line with the city's 'mainstream' population.[17]

7.5 Social Characteristics of Newly Renovated Shantytowns

The shantytown renovation projects, which started in 2005, will come to an end in 2020. What historical and theoretical perspectives and lessons can we apply from the process? In the first instance, the regeneration projects involved physical improvements, but this led to a deeper community and social development level. The process has completely transformed the living conditions of poorer urban communities. It

[16] Report on the renovation of shantytowns in Hedong District, Baotou, Inner Mongolia, June 4–8, 2018.

[17] Report on the renovation of shantytowns in Hedong District, Baotou, Inner Mongolia, June 4–8, 2018.

brought lower-income residents living at the bottom of urban society back into China's urbanisation process and achieved a balance between urban regeneration and social harmony.

By prioritising social and physical development, the Chinese experience can contribute to urban regeneration practice worldwide. These projects achieved a balance between centralised initiatives and local autonomy by re-constructing the social and community structures. They deployed a range of agencies from centralised authorities through local governments and the residents themselves. Together, they have completed the heavy tasks of shantytown reconstruction and the relocation of their inhabitants. New forms of settlement are becoming the most important platform for lower-income residents from the former shantytowns. This has helped them to achieve a higher residential status and reconstructed their economic and social life. Residual traces of shantytowns are gradually phased away as these new settlements integrate into modern urban life.

These new forms of urban community are of deep social significance, and provide strong and valuable lessons for urban regeneration practice worldwide.

7.5.1 Urban Regeneration as an Agent for Social Mobility

China's shantytowns arose as the result of industrial and decline and the passing of older forms of state-controlled and collective systems of organisation. As China's economy developed rapidly, shantytowns were left behind in the process of industrialisation and urbanisation. Before the economic reforms of the early 1990s, employees of state-run enterprises lived in industrial dormitories and enjoyed medium economic social status. As the planned economic system failed to keep pace with the rapid development of the market economy, their status declined, and their dormitory areas deteriorated.

The renovation of former shantytowns has transformed the image of these communities reduced the gap in living standards and layers of social division within urban areas. It has brought poorer populations back into mainstream urban society by a powerful policy of social redistribution. As a people-centred project, these programmes rebalanced the expectations and living standards of previously disenfranchised communities. As a form of 'Urban Development' practice, China's urban regeneration programmes demonstrate a particular 'socialist' approach to the reconstitution of urban space. It is clearly a very different approach to the process of slum-clearance and 'gentrification' in both Western contexts and the somewhat scattered and piece-meal regeneration practices encountered in Latin American countries.

7.5.2 Reconfigured Living Space for Lower-Income Urban Dwellers

In the early phases of shantytown renovation, the focus was very much on enabling people to fully enjoy the fruits of China's economic and social reforms. After 2008, the emphasis broadened to encompass a response to the global financial crisis. As well as tackling issues of social mobility and equality, the regeneration programmes provided a mechanism to boost consumption, expand investment and invigorate the management of land resources. With the introduction of the 'three one-hundred-billion people' policy in 2014, the mission was expanded again, and the regeneration programmes became a vehicle for new forms of urbanisation and environmental management. As a 'development project' these schemes sought to achieve a more harmonious relationship between humanity and the environment, balance the needs of the economy and society, and improve urban quality.

From the perspective of urban sociology, the distinctiveness of the Chinese experience lay in this multi-functional and multi-dimensional approach to driving economic development. In this important respect, it differed from Western forms of urban regeneration and gentrification, in that the shantytown residents were always the largest beneficiaries. The projects were inclusive and people-centred and did not create artificial separations between economic and social benefits nor create distinctions between the affected groups.

The success of China's shantytown renovation demonstrated the possibility of improving the physical environment and integrating former residents into contemporary urban life. The biggest challenge facing the newly renovated or relocated settlements was how to transcend purely physical regeneration and achieve systematic and permanent reforms in community life.

7.5.3 Shantytown Regeneration as a Two-Way Process

The Chinese government always played a central co-ordinating role in the redevelopment of shantytowns. While local authorities prepared and implemented the programmes, the strategic steer came from national government policy. In 2009 the Ministry of Housing and Urban-Rural Development issued *Instructions on Promoting Urban and State-owned Industrial and Mining Shantytown Renovation.* This emphasised the need for strong public policy and welfare programmes alongside the physical refurbishment and placed organisation and guidance, funding and support firmly in the hands of government agencies. The redevelopment schemes resolved the housing problems of lower-income groups. Improving the quality of life and environment,

enhanced the public perception of the Chinese Communist Party and central government. The programmes involved local people and empowered them to participate in developing solutions and creating greater social cohesion.[18]

The process of 'community transmission' involved the government in a co-ordination role that proved key to the success of the regeneration programmes. The government's initiative proved to be the major driver and was the decisive factor in the reconstruction process. Community structures and organisations provided synergies by conveying residents' social security and other requirements to central government through advocacy networks. The particular features of shantytown community organisation meant that human and financial resources' commitment was greater than those that applied to mainstream communities. For example, Liaoning Province's newly renovated shantytowns received an injection of human and material resources for community governance, improved social services and facilities. These resources became the key mechanism for improving the quality of life for the local community. Within Beiliang New District, Baotou City has established mechanisms for community development under the direct management of district government at all levels. These systems comprise interdependent networks with the local Communist Party Committee as the central hub, service delivery organisations responsible for implementation and neighbourhood committees sharing responsibility for governance. With social groups fully participating in the process, this forms a symbiotic 'circle' to coordinate and deliver community services.

7.5.4 Community Infrastructure and Improved Services

The improvement of housing conditions and living environment was the first step in the regeneration process. Once residents moved into the newly built or refurbished properties, the next step was to 'de-shanty town' the emerging communities. The key challenge was to reduce the gap between the lower quality of life previously experienced by shantytown dwellers and the wider, strategic goal of integrating them into contemporary urban economic society.

The refurbishment and redevelopment schemes contributed to rising social mobility. Those who embraced the changes enthusiastically were faced with the fresh challenge of adapting to new urban and community life forms. Unlike their neighbours, residents of the newly redeveloped communities were originally employed in collective or state-owned enterprises. Consequently, they tended to have a single vocational skill and less capacity for re-employment in other industries. They lacked the social resources to cope with market competition. Most workers from heavy industrial or mining operations held lower-skilled, non-technical roles. Those from agricultural or forestry backgrounds worked in lower-skilled or semi-technical roles

[18] Ministry of Housing and Urban–Rural Development, *Instructions on Promoting Urban and State-owned Industrial and Mining Shanty Town Renovation*, https://www.mohurd.gov.cn/wjfb/201001/t20100107_199192.html.

and consequently lacked employment prospects in other sectors. Workers living in urban shantytowns tended to be mostly self-employed or freelancers and so were in a comparatively strong position to adapt to the new market economy. Our field surveys found that the increasing age of industrial and mining workers in the newly redeveloped areas further increased their difficulties in finding alternative employment. The educational background of younger residents was improved, but they tended to move away, resulting in a predominantly ageing community with associated problems.

All these factors meant that former shantytown residents relied heavily on social and administrative services and mutual support networks within their community. Community structures and organisations assumed a far greater importance within the new or refurbished settlements than in other residential areas. A wider and more complex support network was required to manage the transition to new and improved living accommodation and meet the social, economic and cultural challenges of building new communities. These new communities had particular challenges and were a 'special case' in wider urban development. Their integration into contemporary urban life was the key challenge to overcome as China entered a new era of urbanisation.

7.6 Comparative Analysis of Community Reconstruction Projects

A common feature across China's newly renovated shantytowns was the lack of access to economic and social resources. Most residents were self-employed having lost employment in state-owned enterprises. Their only option was to reconstruct their economic and social position in order to enter mainstream urban society by using what resources were available to them within their communities. Community development and capacity-building was an urgent need.

The future of these communities depended on a process of reconstruction and transformation. The historical legacy of older collective and communist collective systems forged uniquely distinctive communities. The erosion of these systems during China's economic reforms affected the ability of these communities to organise and support themselves. It could be argued that the capacity for community development within the four categories of shantytowns described in this study varied with the extent of decay within their original social structures. The level of social deterioration determined the extent to which these communities were able to reconstruct themselves.

The most dynamic forms of community reconstruction occurred within urban shantytowns such as those around Beiliang, Baotou City. In this instance, regional state-owned and collective enterprises had become bankrupt during early economic reforms in the 1980s. Residents abandoned the thought patterns and behavioural models associated with a planned economic system, and adapted to the new market conditions. With no other sources of enterprise support, intervention from the urban

government was substantial. Through a meticulously planned market and living environment, these communities have retained their young people and achieved a more balanced age profile.

In the case of settlements in agricultural and forestry areas, once the commercial and administrative functions were separated through the system reforms, state-owned enterprises survived as managers and custodians of state assets. They retained sufficient economic resources to support employment initiatives and entrepreneurship. The special co-operative relationship between state-owned enterprises, local government and the newly renovated shantytowns created favourable conditions for subsequent development.

Within state-run industrial and mining communities such as those in Liaoning Province, the picture was very different. The depletion of natural resources and the effects of systemic reform led to the complete disintegration of the original state-owned enterprises. Lacking other forms of support, the former mining and heavy industrial areas became the exclusive focus of efforts to renew and reinvigorate any semblance of community cohesion. The reform process began relatively early in Liaoning Province, with the result that many former shantytown residents were ageing and less economically active. Economic decline across local cities had weakened their capacity to support community reconstruction, and urban inclusion faced difficulties.

7.6.1 Mechanisms to Build the Capacity for Self-Development Across Urban Shantytowns

As already noted, the former shantytown areas around Beiliang had the strongest capacity for self-development. Their ability to reconstruct their social structures and community cohesion relied predominantly on the strong role of national urban integration initiatives (Dan 2018). To strengthen community services' capacity, Baotou City implemented a model of direct district management in Beiliang New District. The existing three tiers of management—'District/Sub-district/Local Community' were replaced with a flatter and more direct 'District/Community' structure. Donghe District Government engaged with each community directly, in order to facilitate detailed community management, and respond to problems more quickly. National integration systems could effectively mobilise and direct cooperation between the main agencies within society. Premier Li Keqiang twice inspected the Beiliang communities and took a direct, personal involvement in the regeneration projects. He promoted the transition from communities that were simply surviving—'worrying about living'—to communities that were 'liveable and viable', such intervention laid a solid foundation for subsequent self-development within these communities. Beiliang's regeneration schemes received full support from China Development Bank, large-scale enterprises, social organisations and other agencies in financing, project development and social services. Tsinghua University and the China Urban Planning

and Design Institute formulated a detailed regulatory plan of Beiliang's clearance areas. This ensured that residents had access to the same educational, medical, environmental and cultural, public services or information resources as other residents across the whole city. Indeed, the level of facilities available began to exceed that of surrounding cities, and the social stigma associated with lower-income shantytown settlements was eliminated.

Forms of community self-governance emerged from the regeneration process. North 1st Community, the first to be directly managed by the government of Donghe District, is one example. It fully implemented Communist Party policy,[19] with over 15 full-time staff, plus public-welfare posts for college students and volunteers, a total of over 30 workers in all. They operated from a centre which occupied some 2,300 m^2, which provided a 'one-stop' hub for 29 integrated services, including localised Communist Party branches, sub-district and civil affairs, social security and family planning, Every 300 households within the community were organised into a network of individual units, each with their own manager and sub-tiers within each residential block, forming three-levels of management. Beiliang New District had 28 social organisations, 38 co-constructed organisations, six residential voluntary organisations and five groups. These groups included meetings of residents' representatives, a consultation committee and owners' committee, and enterprises governed by the residential units, all of which worked together to build and develop the community. The settlements established and promoted their own community organisations to meet grass-roots requirements.

Finally, systems were established to empower communities to organise themselves. The focus was on raising awareness of working in partnership, capacity-building and helping communities adapt to the changes in their society. Beiliang's 'Zouxikou' culture provided the model for these self-support mechanisms, an approach that developed as modern Shanxi and Shaanxi Han peoples conducted business in Baotou. It combined a strong sense of self-determination, endurance and the ability to negotiate and seek consensus or compromise with teamwork, a sense of neighbourly responsibility mutual assistance. Local cultural attributes of this kind were embodied and exemplified in the process of shantytown clearance. The regeneration schemes drew on the inherent sense of self-determination that characterises the culture of Beiliang, so that community spirit developed organically. The tradition of local community festivals continued, and extended the ability to forge and deepen personal relationships. With the new residential blocks as the core unit, the new settlements drew on traditional social roles such as 'Peacemaker' and 'Old Uncle' to mediate in neighbourhood disputes, and implemented forms of participatory community governance.

[19] Communist Party Committees (General and Branch) Workstation of Communities model.

7.6.2 *Sustainable Development in State-Owned Agricultural and Forestry Areas*

Within the former state-run industrial and mining areas, the Government had no option but to intervene directly to reconstruct community organisations and provide social security services. In these areas, state-run enterprises survived the reforms, and provided the backbone structure and framework for later regeneration programmes. Newly renovated communities strove to establish alternative industries within the forestry areas alongside innovative forms of forest management. With the introduction of the Natural Forest Protection Project in 2000, ecological services provided by international management and protection agencies replaced timber production. Drawing on the rich natural and landscape resources of forested areas, tourism, conservation, the planting of indigenous species and forestry maintenance became the main alternative industries.

Forestry areas also had an intrinsic advantage when it came to promoting community cohesion. Forestry communities had developed around common goals and a sense of a shared future and so were willing to invest capital in local education training, medical health and house building. The emphasis on improving the welfare of employees meant that the level of public services was generally higher than those of surrounding counties. Forestry societies were built on strong personal relationships. Community cadres and service provision were run by Forestry Bureau staff and the combination of close geographical and working relationships ensured effective communication and the development of appropriate and carefully planned and targeted services. The state-run Forest Management Co., Ltd. managed substantial forestry resources, and became a regional hub for commerce, health, culture, education, retail and employment.

Two outstanding issues remain to be resolved in future redevelopment within state-run agricultural areas. Firstly, occupation levels within the renovated settlements remain low, due to the mobility of the workforce. Many residents travelled away to find work with children and the elderly forming the core of the community. There are still issues with low levels of supporting infrastructure, which cannot satisfy water, electricity, waste disposal and other requirements. Failures in water and power supply, and infrequent waste disposal, remain common problems. Furthermore, residents of the new communities were unaccustomed to the bill payment system of collective dwellings, and at present, recently refurbished dwellings rely heavily on maintenance carried out by small enterprises for the agricultural or forestry workforce.

The communities' own self-support system proved equally important as the Government's urban integration and management systems. The ability of these new settlements to support themselves depended on the capacity of each individual community. The strengthening and building of capacity for community governance and participation will both reduce the expense of property management and the ability of public services to meet basic living requirements.

7.6.3 *Ageing Populations in State-Run Industrial and Mining Settlements*

In 2005, Liaoning Province took the lead in the regeneration of shantytowns in state-owned industrial and mining areas, a process which has lasted 14 years. Before the first of the major co-ordinated schemes, the responsibility for shantytown renovation lay with local authorities. Time scales were tight since the houses had to be demolished, constructed and occupied within the current single fiscal year. Construction quality was low, often leading to subsequent maintenance and management problems. The biggest problem was low expenditure on maintenance, mainly due to the general ageing of the population. Workers made redundant in the 1990s entered old age ten years after the renovation schemes, and employment difficulties increased for those groups with lower skills and weak employment prospects. The continuing gap in living standards between former shantytown residents and other urban communities led many 'second generation' shantytowns dwellers to move away. This weakened these communities' capacity to organise themselves when they still had a long way to go.

There were also problems shantytowns consolidation and sustainability. The level of poverty and lack of capacity meant that state support was still required. To ensure sustainable development into the future, capital support should be ensured by helping local communities establish maintenance funds. Combining central and local financial initiatives should be possible to sustain the operational capacity of these newly renovated settlements.

7.7 Conclusion

As urbanisation increases and societies become more individualised, people rely less on the public domain, and community cohesion tends to decline. Within China, however, particular factors encourage community reconstruction. Communities provided the essential platform for the transfer of systems and services from state-run enterprises during the economic reforms. With the rise of greater social mobility, the community played an important role in promoting social integration as an intermediate platform connecting the state and the individuals.

It must be emphasised that, following the transformation of the economic system, and the renewal of community structures, the renovation of shantytowns became a major force for community development. As the public domain between Government and individuals, the local community provided common living space and was the nearest approximation to the private domain. The living requirements of residents became the main driver for productivity within these communities. All communities and all societies require geographical links and associations to maintain and improve their quality of life and civilisation. A responsive approach to the needs of individual

communities became the main theme and hall-mark of new forms of urban community within China. The community-centred approach of promoting social cohesion by transforming the subordinate status of communities was the outstanding feature of these social regeneration projects. Community needs were the central focus in each case.

We envisage that in future, the redevelopment of these communities will break the cycle of community administration → administrative dependence → insufficient capacity for self-management. Instead, greater levels of empowerment will resolve economic and social development problems at a local level. Communities faced three main challenges in the transition from shantytowns to new forms of urban settlement.

Firstly, they required a balanced population structure to remain sustainable, and scientific planning and regulation were required to achieve this. Baotou began its shantytown renovation eight years after Liaoning Province, and consequently, Beiliang had the advantage of learning from previous experience. There was a high standard of planning with improved living standards as the goal. There were greater public service resources available than in surrounding areas, enabling the schemes to meet the basic living, cultural and educational requirements. This encouraged younger people to stay within the community, avoided rapid ageing and ensured regional vitality. A balanced population structure relied on sound planning and design and also required constant improvements in living standards. The basic conditions to ensure a population balance included better living facilities, a more 'fashionable' environment, improved public services and sufficient employment and self-employment.

These newly regenerated settlements should remodel the 'heart' of the community at a grass-roots level. The foundation for this transformation involves the vigorous improvement of the employment and entrepreneurial environment, and reconstruction of living standards. Redundant workers urgently need retraining in areas such as tourism, catering, nursing, housekeeping, child-care, and other specialist occupational skills. They required venture capital support to overcome reliance on public-welfare employment and to enhance their employability in the open market. The communities themselves were not an economic entity or source of employment. To secure employment residents had to contact a range of government agencies, universities, scientific research institutions and forestry or agricultural enterprises. They also had to innovate and establish their own enterprises, and explore what local resources were, available.

These new settlements need to cultivate the 'soul' of community. This involves improving governance and levels of participation, creating as sense of identity, improving the cultural level and gradually blending into surrounding urban societies. The main theme of development was to cultivate a sense of self-renewal and communal renaissance to create new forms of intentional community. This required a major shift in systems for community and economic resources, environmental management and governance frameworks.

China's large-scale 'shantytown renovation' brought over one hundred million lower-income workers into the modern urban living environment. It is truly an exceptional achievement and a global miracle of urban regeneration. As the traces of the

old shantytown conditions fade at both the economic and social level, these communities will steadily integrate into the surrounding urban environment. Wider urban regeneration practice could benefit from the study and consideration of the Chinese experience.

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Chapter 8
Public Service Provision in China: Towards a More Equal Access System

Jingjing Shan, Yanan Geng, Jin Fu, and Binglei Yu

Abstract The challenge facing urban policymakers is how to tackle the long-standing differences in social welfare and basic public services provision for migrant and incumbent workers arising from the dual-household registration system. In this chapter, we quantify inequalities in access to basic public services between migrant workers and the local urban population across different regions of China. We consider both inequalities within urban areas, and inequalities that exist between urban and rural areas. For urban areas, we find large inequalities in access to basic public services between the indigenous urban population and migrant workers. There are also significant differences between urban and rural areas. The level of basic public services in the West of China lags behind other regions. Across China as a whole, the gap within regions is greater than the gap between regions. Internal variations within a region arise mainly from inequality in access to basic public services between urban and rural populations and across urban neighbourhoods. Chinese public services are characterised by 'dualisation' in urban–rural provision and 'fragmentation' across regions in terms of the level and quality of service. These two features constitute a formidable obstacle for the 'citizenisation' of migrant workers. We provide detailed examples from across China of countermeasures and strategies currently being implemented to reduce inequalities in public service provision.

Keywords Migrant workers · Citizenisation · Basic public service · Inequality

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8.1 Introduction

In this chapter, we investigate the inequalities in access to public services that have emerged as a result of the urbanisation process over the past 40 years. The urbanisation rate in China increased from 17.9% in 1978 to 59.58% in 2018, with an annual average growth rate of 1.04%. The urban population increased from 172 to 831 million, with an annual average increase of 16 million. Since 1995, the rate of urbanisation has accelerated, increasing by 1.33% every year. The urban population has also increased by more than 20 million every year, which is greater than the total population of a medium-sized European country. (For a more detailed discussion of the phases of China's migration, urbanisation and growth, see Chap. 5).

China's urbanisation process, however, can be considered incomplete in the sense that although large numbers of migrant workers have settled in cities and are counted among the urban population, they do not have urban *hukou* (or non-agricultural *hukou*), which confers citizenship rights. Despite moving to the city, the status of their *hukou* registration remains rural or agricultural, which means they do not have full rights of citizenship in terms of access to urban public services.[1] They have become industrial workers and made a great contribution to urban construction and development. Nevertheless, they are restricted by the long-standing urban/rural division due to the prevailing dual system of household registration, and cannot enjoy the same access to basic public services as the permanent urban population. They have restricted access to employment, medical treatment, provision for the aged, children's education, welfare housing and social security. As a consequence, it is very difficult for them to integrate into urban society fully. They become the 'migrant bird' population, wandering between urban and rural areas. Large-scale and pendulum-type population movements encourage families to draw on facilities and resources in their native rural homelands and cities. It also brings about household separation, left-behind children, a predominance of elderly and women in rural areas and many other social problems. These may generate many risks and hidden dangers to the healthy and stable development of the economy and society.

Both the *National New Urbanization Plan (2014–2020)* unveiled in 2014, and the *Report of the 19th National Congress of the Communist Party of China* in 2017, placed a priority on new 'people-centred' urbanisation processes and improved quality. New models of urbanisation must encompass an increase in the number of towns, the expansion of urban space and the higher proportion of the population living in cities. They must also deal with the transformation of human production and living standards through improvements in the quality of urban development.

The key feature of these new models of urbanisation is that they are 'people-centred'. They aim to promote the 'citizenisation' of migrant workers through the process of industrialisation and urbanisation in order to comprehensively transform the employment prospects, identity, status, ideology, working conditions and living standards of migrant workers. The aim is to transform them into urban residents and

[1] Migrant workers are those who are registered for census returns in rural areas, but who work outside their registered location for six months and more each year.

enable them to obtain the same basic public services and social benefits that registered urban residents currently enjoy, thereby improving living standards and community cohesion. Whether this process is considered in a more specific sense—the status and living conditions of migrant workers—or in broader societal terms, the promotion of the equality of access to basic public services is a key factor and a core challenge. The so-called 'equalisation' of basic public services means that the government should provide common and roughly equal public services across society. These services should be appropriate for various economic and social development levels and should reflect principles of fairness and justice. They should allow all members of society to share equally in the achievements of China's reform and opening-up policies and in the country's economic and social development.

The Chinese government has set development goals of permanently settling around 100 million migrant workers in cities and extending access to the benefits of urbanisation to another 100 million people in central and western areas. In order to achieve this, there needs to be equal access to basic public services, making it easier for migrant workers to integrate successfully into urban society. The goal is also to achieve more equal access to public services between urban and rural areas and across different regions. There is an ultimate commitment to encourage 'about 100 million people' to remain within the central and western regions allowing them to benefit from 'nearby urbanisation' in their own areas.

Many studies show that the main challenge to this core mission is the slow progress of reform of the urban–rural dual-household registration system. This leads to disparities in access to social welfare and basic public services and related social problems (Zhao and Wang 2002; Liu et al. 2008; Cai et al. 2005; Zhao 2006; Zhang 2008; Ji 2009).

Our focus in this article is on the following research questions:

- To what extent do gaps exist in the basic public services of China?
- Are such gaps mainly between different regions, urban and rural areas, or between migrant workers and local residents in cities?
- What are the key challenges for China to overcome in order to promote equality of access to basic public services for migrant workers?

Our hope is that research and discussion on these problems can strengthen the determination of regional governments to accelerate the process of equalising access to basic public services and the 'citizenisation' of migrant workers.

A considerable body of research has emerged from Chinese scholars on reducing inequality in access to basic public services. For example, Hu et al. (2013) utilised data from 2006 to 2010 to comprehensively evaluate the levels of development in basic public services during the '11th Five-Year Plan' period. They found very evident increases in the levels of access to public services across various regions. In the meantime, due to rapid progress in less developed areas, regional gaps were decreasing, with levels of access gradually becoming more equal. The assimilation rates within infrastructure and basic environmental services increased the fastest. Yu (2012) utilised the Theil index to measure the gaps in public investment in compulsory education in different regions of China from 1995 to 2009. The study concluded that

these gaps decreased by varying degrees from 2005 to 2009. Huang and Fang (2008) analysed the internal and regional differences across eastern, central and western regions in aspects of public health expenditure from 1997 to 2005. They found that the overall gaps represented a downward trend from 2000, which mainly came from the internal differences within each region. Research conducted by Ouyang and Ding (2011) found that from 2000 to 2008, the difference in social security expenditure presented a downward and fluctuating trend. The differences mainly derived from inside the regions, with relatively large variations within the eastern region and relatively smaller variations across central and western regions. Wang (2012) applied an empirical analysis to the configurations of basic public cultural service resources (such as cinemas, library books, and libraries) in eastern, central and western regions of China in 1999 and 2009, and found a consistent upward trend in equality of access in recent years. At the same time there were increasing disparities between different provinces, regions and municipalities. Lu (2012) studied data from 31 provinces from 2003 to 2009 and found that the overall levels of basic public services increased markedly. Various regions presented obvious step characteristics. The overall level of basic public services in the eastern region was higher than in central regions, which were higher than in the western region. But it should be noted that from 2008, the basic public service level of the western region exceeded the central region. Zhao (2013) utilised the statistical data from 2011 and conducted a comparative evaluation on the rural grass-roots medical service levels of 28 provinces across mainland China. The analysis indicated that in general the overall degree of differentiation in levels of rural grass-roots medical services positively correlated with the total fiscal revenue of each province, region or municipality. Feng (2014) adopted an entropy method and conducted spatial analysis into the development and quality of basic public services across prefecture-level cities in 2001 and 2010. This showed that the public services within most regions in 2001 were seriously insufficient, and the overall public service level increased at a lower rate in 2010. Ren (2009) applied Gini coefficient to analyse inter-provincial basic public service levels from 2000 to 2006. The study identified an increasing trend for disparities in public services provision across different provinces in China.

While Chinese scholarship on reducing inequality of access to public services has created a useful theoretical framework, the research perspectives mainly focus on regional comparison or on certain individual public services. There are few systematic studies around the ‘citizenisation’ of migrant workers, and a particular shortage of studies examining disparities across different groups within a region—such as between urban dwellers and migrant workers. At the same time, there is insufficient research into the social costs for increasing equality in access to basic public services.

8.2 Evaluating Levels of Equality in Accessing Basic Public Services

At present, China is vigorously promoting a new people-centred approach to urbanisation, and focuses on solving three so-called '100 million people' problems.[2] If China is to guide about 100 million people into a localised urbanisation process in central and western regions, we need to further reduce inequality in access to basic public services across different regions and between urban and rural areas.

Our approach involves three steps: firstly, to establish the basic public service evaluation index system based on a list of measures that capture the availability of public services, such as the number of doctors per 10,000 people, and the percentage of people with unemployment insurance. Secondly, to use the TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) method to measure and evaluate the development levels of basic public services. Finally, to use the Theil index model to measure and evaluate inequality of access to basic public services between migrant workers and local urban populations in eastern, central and western regions, between urban and rural areas and within cities throughout the country respectively.

8.2.1 The Evaluation Index System

In response to the need to evaluate the degree of equality in access to basic public services, we have selected 15 evaluation factors to establish a representative and scientific evaluation index system for public services based on available data. Such factors mainly focus on medical health, compulsory education, cultural facilities and social security (see Table 8.1).

8.2.2 Establish Theil Index Model to Measure Equality of Access to Basic Public Services

There are many measurement methods which could reflect the degree of inequality in access to public services, such as the coefficient of variation, Gini coefficient and range ratio. Although these indices could properly reflect the overall level of equality, it is difficult to use them to reflect the contributions that particular aspects of inequality—such as inequality within regions versus inequality between them—make to the overall levels. The Theil index model is our preferred approach as it

[2] Three '100 million people' problems is the name given to development goals put forward in the Chinese government work report 2014, i.e. 'promote about 100 million migrant workers settling down in cities and towns, transform the shanty towns and villages in cities where about 100 million people live, and guide another 100 million people into the urbanisation process in central and western regions.'.

Table 8.1 Evaluation index system of basic public services

Primary index	Secondary index
Medical health	Number of hospitals and health centres for every ten thousand persons (hospitals/10,000 persons)
	Number of doctors every ten thousand persons (doctors/10,000 persons)
	Number of beds in hospitals and health centres for every ten thousand persons (beds/10,000 persons)
Compulsory education	Number of middle schools for every ten thousand persons (schools/10,000 persons)
	Number of primary schools for every ten thousand persons (schools/10,000 persons)
	Number of middle school students for every ten thousand persons (persons/10,000 persons)
	Number of primary school students for every ten thousand persons (persons/10,000 persons)
	Number of middle school full-time teachers for every ten thousand persons (persons/10,000 persons)
	Number of primary school full-time teachers for every ten thousand persons (persons/10,000 persons)
Cultural facilities	Number of cinemas for every ten thousand persons (cinemas/10,000 persons)
	Number of public library books for every ten thousand persons (books/10,000 persons)
	Number of public libraries for every ten thousand persons (libraries/10,000 persons)
Social security	Coverage of urban employees' basic endowment insurance (%)
	Coverage of urban basic medical insurance (%)
	Coverage of unemployment insurance (%)

makes up this deficiency due to its 'decomposability'—that is the Theil index can be 'decomposed' to show the contributions to overall inequality made by particular subgroups and areas as a way of investigating the structure of inequality. We use this decomposition approach below to measure the degree of inequality across basic public services among different regions, between urban and rural areas and between different populations throughout the country.

Theil index is initially used for measuring the income gap or the degree of inequality between individuals or regions. A larger Theil index indicates a larger overall income difference between individuals or regions; a smaller Theil index indicates a smaller overall income difference between individuals or regions; a Theil index of 0 means the income is completely equal. The fundamental formula of the Theil index is:

$$T = \frac{1}{n}\sum_{i=1}^{n}\frac{y_i}{\overline{y}}\lg\left(\frac{y_i}{\overline{y}}\right) \tag{8.1}$$

Of which, T indicates Theil index, y_i indicates the income level of individual i, and $\overline{y}$ indicates the average income of all individuals. When formula (8.1) is applied to measure the inequality in access to basic public services, income is replaced by population as the weight, and the above formula can be converted into:

$$T_{\text{total}} = \sum_{i=1}^{n}\frac{p_i}{p}\lg\left(\frac{\mathrm{P}_i/\mathrm{R}_\mathrm{i}}{\mathrm{P}/\mathrm{R}}\right) \tag{8.2}$$

Of which, p_i indicates the basic public service level of city i, p indicates the basic public service level of the whole country, R_i indicates the population of city i, and R indicates the total population of the whole country. The degree of inequality across basic public services is inversely proportional to T. The smaller T is, the lower the level of inequality.

We use the bivariate Theil index to investigate the level of equal access to basic public services across the whole country. Firstly, we divide the Theil index into inter-regional gaps and intra-regional gaps, and formula (8.2) will be converted into:

$$T_{\text{total}} = T_{\text{inter-regional}} + T_{\text{intra-regional}} \tag{8.3}$$

$$\boxed{T_{\text{inter-regional}} = \sum_{j=1}^{4}\frac{p_j}{\mathrm{p}}\lg\left(\frac{p_j/R_j}{\mathrm{p}/R}\right)} \tag{8.4}$$

$$T_{\text{inter-regional}} = \sum_{j=1}^{4}\frac{p_j}{p}T_j. \tag{8.5}$$

where j denotes region. The Theil index of each region is then further split into the gap between urban and rural areas and the gap within urban or rural areas. The Theil index T_j within region j can be indicated as:

$$\boldsymbol{T}_\mathbf{j} = \boldsymbol{T}_{\mathbf{j}\,\text{urban-rural}} + \boldsymbol{T}_{\mathbf{j}\,\text{intra-urban or rural}} \tag{8.6}$$

$$\mathrm{T}_{\mathrm{j\ urban\text{-}rural}} = \frac{\mathrm{P_{ju}}}{\mathrm{P_j}}\lg\left(\frac{\mathrm{P_{ju}}/\mathrm{R_{ju}}}{\mathrm{P_j}/\mathrm{R_j}}\right) + \frac{\mathrm{P_{jr}}}{\mathrm{P_j}}\lg\left(\frac{\mathrm{P_{jr}}/\mathrm{R_{jr}}}{\mathrm{P_j}/\mathrm{R_j}}\right) \tag{8.7}$$

where $\mathrm{T}_{\mathrm{jurban-rural}}$ is the Theil index, which reflects the basic public service gap between urban and rural areas of region j, $\mathrm{P_{ju}}$ indicates the basic public service level in the *urban* area of region j, $\mathrm{P_{jr}}$ indicates the basic public service level in the *rural* area of region j, $\mathrm{P_j}$ indicates the basic public service level of region j, $\mathrm{R_{ju}}$ indicates

the *urban* population of region *j*, R_{jr} indicates the *rural* population of region *j*, R_j indicates the total population of region *j*.

The Theil index, which reflects the inequality of access to basic public services within the urban and rural areas in each region, is further divided into the Theil index T_{ju} which reflects the level of equal access to basic public services within urban areas across the region, and Theil index T_{jr} which reflects the inequality of access to basic public services of rural area in the region, then:

$$\boldsymbol{T}_{\mathbf{j}\,\text{intra-urban or rural}} = \frac{P_{ju}}{P_j}T_{ju} + \frac{P_{jr}}{P_j}T_{jr} \tag{8.8}$$

$$T_{ju} = \sum_{i=1}^{287} \frac{P_{jui}}{P_{ju}} \lg\left(\frac{P_{jui}/R_{jui}}{P_{ju}/R_{ju}}\right) \tag{8.9}$$

$$T_{jr} = \sum_{i=1}^{287} \frac{P_{jri}}{P_{jr}} \lg\left(\frac{P_{jri}/R_{jri}}{P_{jr}/R_{jr}}\right) \tag{8.10}$$

$$\begin{aligned}\boldsymbol{T}_{\mathbf{j}\,\text{intra - urban or rural}} &= \frac{P_{ju}}{P_j}T_{ju} + \frac{P_{jr}}{P_j}T_{jr} \\ &= \frac{P_{ju}}{P_j}\sum_{i=1}^{287}\frac{P_{jui}}{P_{ju}}\lg\left(\frac{P_{jui}/R_{jui}}{P_{ju}/R_{ju}}\right) + \frac{P_{jr}}{P_j}\sum_{i=1}^{287}\frac{P_{jri}}{P_{jr}}\left(\frac{P_{jri}/R_{jri}}{P_{jr}/R_{jr}}\right)\end{aligned} \tag{8.11}$$

Of which, P_{jui} indicates the basic public service level of urban areas *i* in region *j*, P_{ju} indicates the basic public service level of urban areas in region *j*;P_{jri} indicates the basic public service level of the rural area *i* in region *j*, P_{jr} indicates the basic public service level of rural areas in region *j*; R_{jui} indicates the population of the urban area *i* in region *j*, R_{ju} indicates the total population of urban areas in region *j*; R_{jr} indicates the population of the rural area *i* in region *j*, R_{jr} indicates the total population of the rural area in region *j*; R_j indicates the total population of region *j*.

$$\begin{aligned}\boldsymbol{T}_{\text{total}} &= \boldsymbol{T}_{\text{inter}-\text{regional}} + \boldsymbol{T}_{\text{intra}-\text{regional}} \\ &= \boldsymbol{T}_{\text{inter}-\text{regional}} + \left(\boldsymbol{T}_{\text{intra}-\text{regional}-\text{urban}-\text{rural}} + \boldsymbol{T}_{\text{intra}-\text{regional}-\text{intra}-\text{urban or rural}}\right) \\ &= \sum_{j=1}^{4}\frac{p_j}{p}\lg\left(\frac{p_j/R_j}{p/R}\right) + \sum_{j=1}^{4}\frac{p_j}{p}\left[\frac{P_{ju}}{P_j}\lg\left(\frac{P_{ju}/R_{ju}}{P_j/R_j}\right) + \frac{P_{jr}}{P_j}\lg\left(\frac{P_{jr}/R_{jr}}{P_j/R_j}\right)\right] \\ &+ \sum_{j=1}^{4}\frac{p_j}{p}\left\{\left[\frac{P_{ju}}{P_j}\sum_{i=1}^{287}\frac{P_{jui}}{P_{ju}}\lg\left(\frac{P_{jui}/R_{jui}}{P_{ju}/R_{ju}}\right) + \frac{P_{jr}}{P_j}\sum_{i=1}^{287}\frac{P_{jri}}{P_{jr}}\lg\left(\frac{P_{jri}/R_{jri}}{P_{jr}/R_{jr}}\right)\right]\right\}\end{aligned} \tag{8.12}$$

8.2.3 TOPSIS Evaluation of Basic Public Service Level

The TOPSIS evaluation method is a technique for ordering preferences by similarity to an ideal solution. The basic idea is that, based on the original evaluation matrix, a dimensionless method is used to process the data to obtain a standardised matrix. Once this has been done, based on index weighting, it is possible to establish a weighted decision matrix to identify further both the optimal scheme and the worst scheme in the existing scenario. Then, it is possible to calculate the distances between the subject of evaluation and both the optimal and worst schemes, to obtain the degree of relative closeness between each subject and the optimal scheme, and to use this as the basis for evaluation sequencing. The specific steps are as follows:

Firstly, search the relevant data according to the index system, and establish original matrix X:

$$X = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix}_{m \times n} \tag{8.13}$$

As the evaluation on basic public services involves a larger amount of varying index data, all with different dimensions, magnitudes and amplitudes of variation, direct totalling and comparison becomes unfeasible. Dimensionless processing is therefore required when handling such data. The specific method is as follows:

$$X_i = \frac{x_i - \min\limits_{1 \le i \le n}(x_i)}{\max\limits_{1 \le i \le n}(x_i) - \min\limits_{1 \le i \le n}(x_i)} \tag{8.14}$$

Of which: X_i is the standardised value of index i; x_i is the original value of index i; $\max(x_i)$ is the maximum sample value of index i; and $\min(x_i)$ is the minimum sample value.

Normalisation processing is then carried out to the original matrix to obtain the normalised matrix Y:

$$Y = \begin{bmatrix} y_{11} & y_{12} & \cdots & y_{1n} \\ y_{21} & y_{22} & \cdots & y_{2n} \\ \vdots & \vdots & & \vdots \\ y_{m1} & y_{m2} & \cdots & y_{mn} \end{bmatrix}_{m \times n} \tag{8.15}$$

The positive utility index is given by,

$$y_{ij} = x_{ij} \Big/ \sum_{i=1}^{m} x_{ij}, i = 1, 2, \ldots, m \ j = 1, 2, \ldots n$$

And the negative utility index is given by:

$$y_{ij} = \frac{1}{x_{ij}} \Big/ \sum_{i=1}^{m} \frac{1}{x_{ij}}, i = 1, 2, \ldots, m \ j = 1, 2, \ldots n$$

We then use the entropy weight method to determine the attribute weight,

$$H_j = -\sum_{i=1}^{m} y_{ij} \ln y_{ij} \tag{8.16}$$

then calculate the index difference degree,

$$K_j = 1 - \frac{H_j}{\ln m} \tag{8.17}$$

And finally the entropy weight,

$$w_j = \frac{K_j}{\sum_{j=1}^{n} K_j} \tag{8.18}$$

We use the following formula to convert the decision matrix $X = \left\{x_{ij}\right\}$ to normalised decision matrix $Z = \left\{z_{ij}\right\}$

$$z_{ij} = x_{ij} / \sqrt{\sum_{i=1}^{m} x_{ij}^2} \tag{8.19}$$

Form the weighted normalised matrix $G = \left\{g_{ij}\right\}$

$$G = \begin{bmatrix} g_{11} & g_{12} & \cdots & g_{1n} \\ g_{21} & g_{22} & \cdots & g_{2n} \\ \vdots & \vdots & & \vdots \\ g_{m1} & g_{m2} & \cdots & g_{mn} \end{bmatrix}_{m \times n} \tag{8.20}$$

where $g_{ij} = w_j \times z_{ij}, i = 1, 2, \ldots, m; \ j = 1, 2, \ldots n$, w_j is the weight of index j.

Screen out the optimal value and worst value of each evaluation index, and build the optimal solution vector G + and the worst solution vector G−:

$$G_j^+ = \max(G_{1j}^+, G_{2j}^+, \ldots G_{mj}^+) \quad \mathrm{j} = 1, \ldots \mathrm{n} \tag{8.21}$$

$$G_j^- = \max(G_{1j}^-, G_{2j}^-, \ldots G_{mj}^-) \quad \mathrm{j} = 1, \ldots \mathrm{n} \tag{8.22}$$

Calculate the distances of each evaluation unit with the optimal solution and worst solution respectively:

$$D_i^+ = \sqrt{\sum_{j=1}^{n} (g_{ij} - g_i^+)^2}, i = 1, \ldots m \tag{8.23}$$

$$D_i^- = \sqrt{\sum_{j=1}^{n} (g_{ij} - g_i^-)^2}, i = 1, \ldots m \tag{8.24}$$

Of which, D_i^+ indicates the distance from the optimal solution; D_i^- indicates the distance from the worst solution.

Calculate the relative closeness degree C_i between each evaluation unit with the optimal solution:

$$C_i = \frac{D_i^-}{D_i^- + D_i^+}, \quad i = 1, 2, \ldots m \tag{8.25}$$

A larger C_i value which is tending towards 1 indicates a smaller distance between this evaluation unit and the optimal solution, that is to say, it is closer to the optimal vector, and the comprehensive evaluation degree is higher.

8.3 Results and Analysis

8.3.1 Descriptive Statistics

We drew data from *the China Statistical Yearbook, the China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015, then applied the TOPSIS method to measure the levels of basic public services in different regions of China (see Table 8.2).

The table demonstrates that public medical health services in the northeast are relatively good, followed by the eastern region, central region, and western region. The public medical health service indices are 0.4034, 0.3614, 0.3351 and 0.3048 respectively. The main reason of this kind of result is that the net outflow of population from northeast China has been ongoing for 20 years. In the past 10 years, the net population outflow has exceeded 1 million. No significant adjustments in medical institutions have been made accordingly, so per capita public medical health service

Table 8.2 The Development Indices of Basic Public Services in Different Regions of China (2015)

	Eastern region	Central region	Western region	North-eastern region	Mean value	Standard deviation
Medical health	0.3614	0.3351	0.3048	0.4034	0.3512	0.0362
Compulsory education	0.3202	0.3300	0.3260	0.2628	0.3097	0.0273
Cultural services	0.3020	0.2083	0.1741	0.2163	0.2252	0.0471
Social security	0.5220	0.1472	0.1127	0.2395	0.2554	0.1608
Combined indices	0.3764	0.2551	0.2294	0.2805	0.2854	0.0556

Source The China Statistical Yearbook, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015

resources are relatively abundant. In contrast, since the 1980s, the eastern region has been the main destination of population migration, and the growth in health services cannot keep up with population growth, so public medical health service resources are relatively tight.

The Chinese government has made great efforts to promote compulsory education since 1948. More than 98% of the country's children now receive compulsory education. Therefore, the level of access to compulsory education is fairly stable across the various regions. Nevertheless, a serious 'brain drain' from Northeast China has created a relative scarcity in high-quality full-time teachers in primary and secondary schools and the compulsory education index is comparatively lower.

The eastern region has the best provision for services promoting social and cultural development, while the north-eastern, central and western regions lag behind in comparison.

The level of development for social security services is far ahead in the eastern region, with a social security index of 0.5220, followed by the northeast region, with a social security index of 0.2395. The western and central regions are lag seriously behind in these indices.

Overall, access to compulsory education is the most equally distributed basic public service, with social security the most unequal in terms of access.

Table 8.3 used the TOPSIS method to measure the urban and rural basic public services in different regions of China. It is clear that in terms of compulsory education, medical health, cultural services and social security, urban levels of public services in all major regions exceed that in rural areas. We will analyse this further below.

Table 8.3 The Development Index of Urban and Rural Basic Public Services in Different Regions of China (2015)

		Eastern region	Central region	Western region	North-eastern region	Mean value	Standard deviation
Medical health	Urban area	0.3784	0.3782	0.3088	0.4083	0.3684	0.0327
	Rural area	0.2969	0.2901	0.3029	0.4055	0.3238	0.0424
Compulsory education	Urban area	0.3631	0.3559	0.3357	0.2597	0.3286	0.0367
	Rural area	0.2234	0.2994	0.3218	0.2599	0.2761	0.0337
Cultural services	Urban area	0.3409	0.3082	0.2347	0.2986	0.2956	0.0344
	Rural area	0.2478	0.0998	0.1148	0.0904	0.1382	0.0571
Social security	Urban area	0.5705	0.1844	0.1205	0.2743	0.2874	0.1541
	Rural area	0.4462	0.1062	0.1040	0.1835	0.2100	0.1253
Combined Indices	Urban area	0.4132	0.3067	0.2499	0.3102	0.3200	0.0527
	Rural area	0.3036	0.1989	0.2109	0.2348	0.2370	0.0363

Source The China Statistical Yearbook, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015

8.3.2 Inequality of Access to Basic Public Services Among Different Regions

Using data from the *China Statistical Yearbook*, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015, we applied the Theil index model to measure inequality of access to basic public services at different levels throughout the country.

The results showed that the Theil index of national basic public service is 0.156 (>0.1), indicating that the supply of basic public service at the national level is generally unbalanced. The intra-regional gap of basic public service is higher than the inter-regional gap of basic public service (see Table 8.4).

We mainly observed and compared the availability of basic public services in eastern, central, western and north-eastern regions of China and the gaps between the regions. The results measured by the TOPSIS method showed that the comprehensive indices of basic public service levels were: 0.3764 for the eastern region (highest); followed by 0.2805 for northeast region; 0.2551 for central region; and 0.2294 for the western region (lowest). The basic public service level of the eastern region is far

Table 8.4 Contributions of inter-regional and intra-regional to Theil index (2015)

	Medical health (%)	Compulsory education (%)	Cultural facilities (%)	Social security (%)	Combined index (%)
Inter-regional	10	13	10	16	12
Intra-regional	90	87	90	84	88

Source *The China Statistical Yearbook*, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015

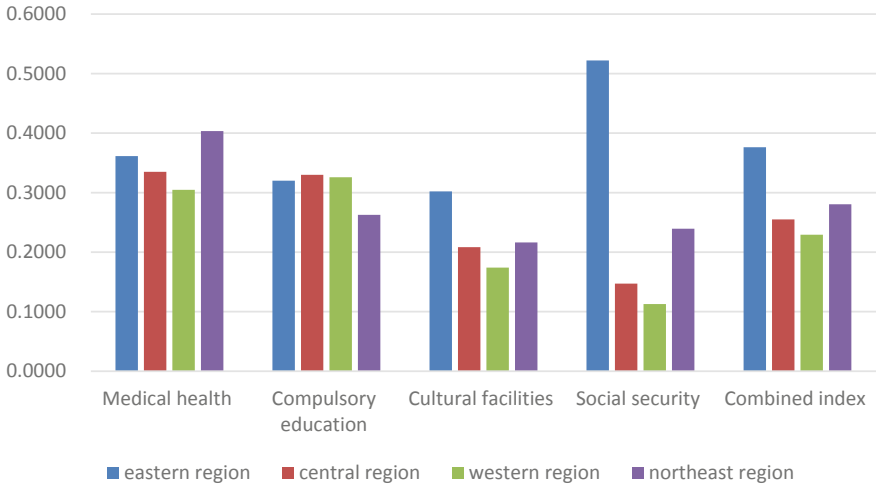

Fig. 8.1 Comparison of levels of basic public services in four regions of China (2015). *Source* TOPSIS scores computed using data from the *China Statistical Yearbook*, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015

ahead of other regions, and western region lags behind other regions (see Figs. 8.1 and 8.2).

We found that compulsory education had the highest degree of equality across the different regions, followed by medical health , and public cultural services. Social security had the greatest inequality of access (see Figs. 8.2 and 8.3).

8.3.3 Urban–Rural Inequality of Access to Basic Public Services

We mainly observed and analysed the supply balance and availability of basic public services in a region. The evaluation results showed that from an intra-regional perspective, the most unequally distributed aspects of basic public services were

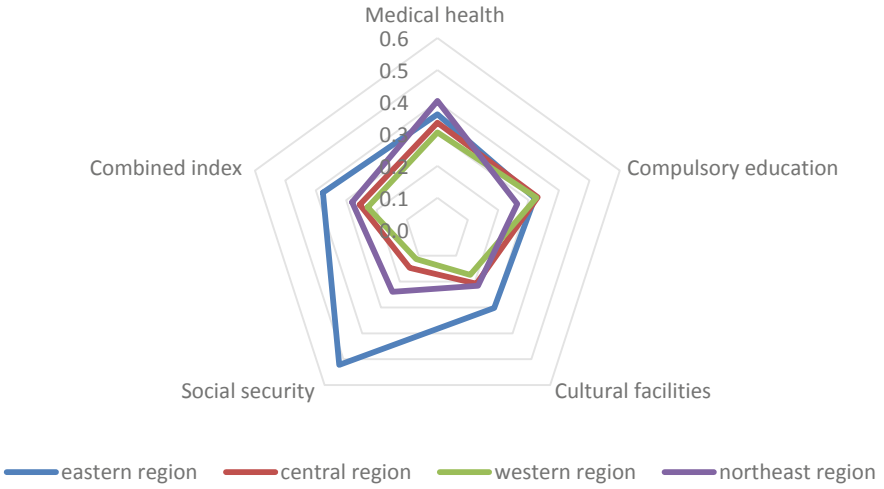

Fig. 8.2 Comparison of basic public service gap in four regions of China (2015). *Source* TOPSIS scores computed using data from the *China Statistical Yearbook*, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015

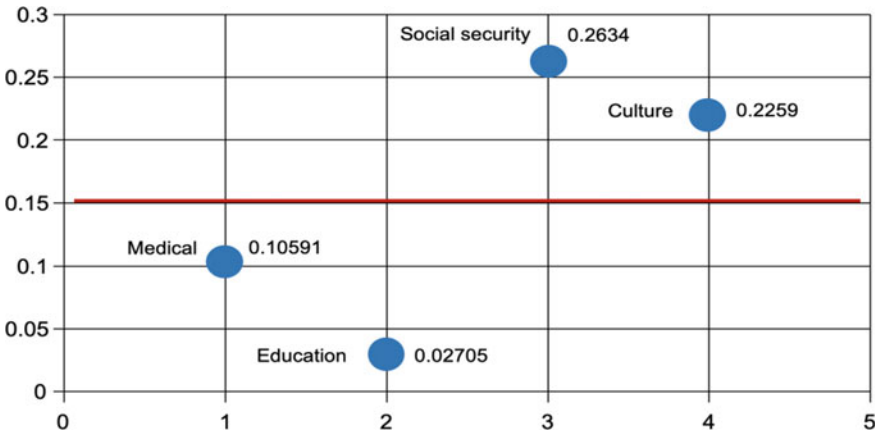

Fig. 8.3 Comparison of inequality in access to various basic public services in four regions of China (2015). *Source* calculated according to the relevant statistical data in the *China Statistical Yearbook*, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015

mainly concentrated around urban–rural divisions and focused primarily on cultural services provision and social security (see Table 8.5).

Based on the per capita resource, we observed the urban/rural discrepancies in the supply of various provincial basic public services. The results showed that although various per capita resources in urban areas were generally higher than those in rural

Table 8.5 Contributions of regional groups of China to Theil index (2015)

	Medical health (%)	Compulsory education (%)	Cultural facilities (%)	Social security (%)	Combined index (%)
Urban–rural	30	12	35	50	41
Inter-urban	20	22	39	26	30
Inter-rural	50	66	26	24	29

Source Theil index applied to the relevant statistical data in the *China Statistical Yearbook*, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015

regions, there were differences across individual provinces . In some rural areas in certain provinces , the per capita compulsory education resource and public medical health service resources exceeded those available in urban areas. This indicated that during the urbanisation process, as the rural population moved towards cities and towns or travelled to work outside their communities, the rural population decreased sharply. In some areas, public service resources allocated to the permanent or 'registered' population were seriously wasted or used inefficiently (see Figs. 8.4, 8.5, 8.6 and 8.7).

For example, in the past 20 years, the number of primary school students in China's urban areas has increased by more than 28 million, but the number of schools has decreased by 45,000. Conversely, with the rapid advancement of urbanisation, the number of students in rural areas has continued to decline sharply. In recent years, however, the number of newly built schools in rural areas has increased year by year. This reminds us that we should not adopt rigid and mechanical methods to promote the equalisation of basic public services. Instead, we must reasonably optimise public service resources based on population distribution.

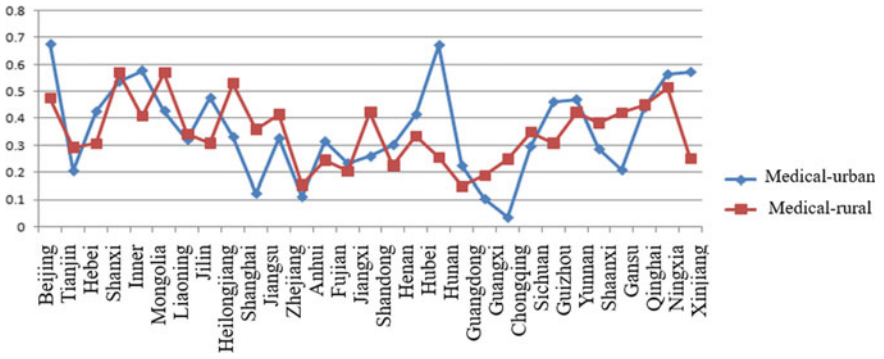

Fig. 8.4 Urban–rural comparison of basic medical public service supply levels across major provinces on the Chinese mainland (Calculated according to resources owned per 10,000 persons). *Source* The *China Statistical Yearbook*, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015 (Because the statistics of Xizang Province and Hainan Province are incomplete, they are temporarily not included in this evaluation)

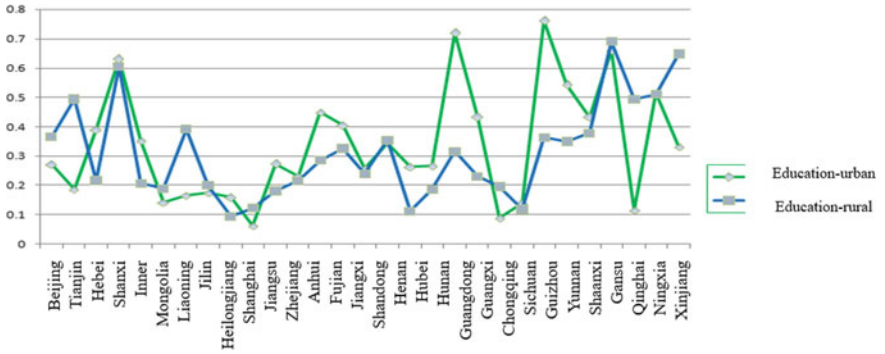

Fig. 8.5 Urban–rural comparison of basic educational public service supply levels across major provinces in mainland China (Calculated according to resources owned per 10,000 persons). *Source* The *China Statistical Yearbook*, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015 (Because the statistics of Xizang Province and Hainan Province are incomplete, they are temporarily not included in this evaluation)

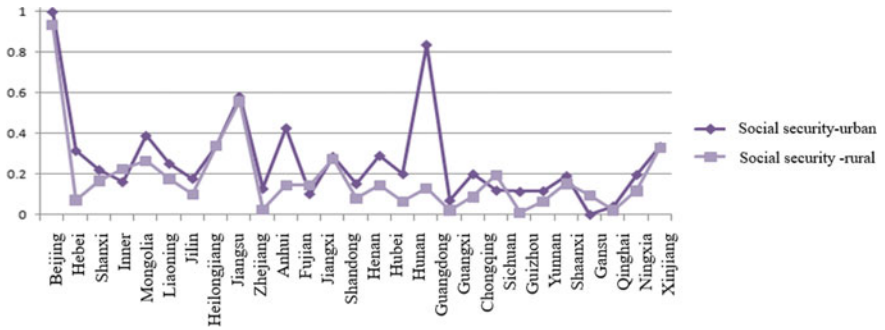

Fig. 8.6 Urban–rural comparison of social security levels across major provinces in mainland China. *Source* The *China Statistical Yearbook*, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015 (Because the statistics of Xizang Province and Hainan Province are incomplete, they are temporarily not included in this evaluation)

Figure 8.8 below shows the urban/rural gaps within the provision of basic public services among various provinces throughout the country. We find that generally, the gaps are larger in regions with a more developed economy. The urban/rural discrepancy was smaller in some regions, but their basic public service levels were also relatively lower, thus presenting a low-level balance (see Fig. 8.8).

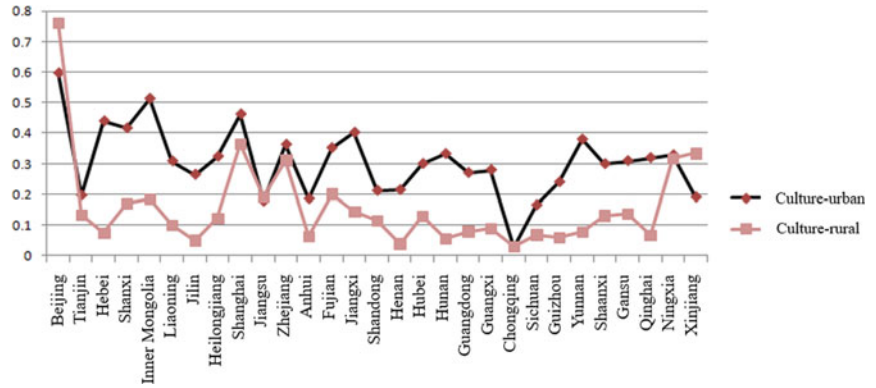

Fig. 8.7 Urban–rural comparison of public cultural service supply levels across major provinces in mainland China (calculated according to resources owned per 10,000 persons). *Source* The *China Statistical Yearbook*, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015 (Because the statistics of Xizang Province and Hainan Province are incomplete, they are temporarily not included in this evaluation)

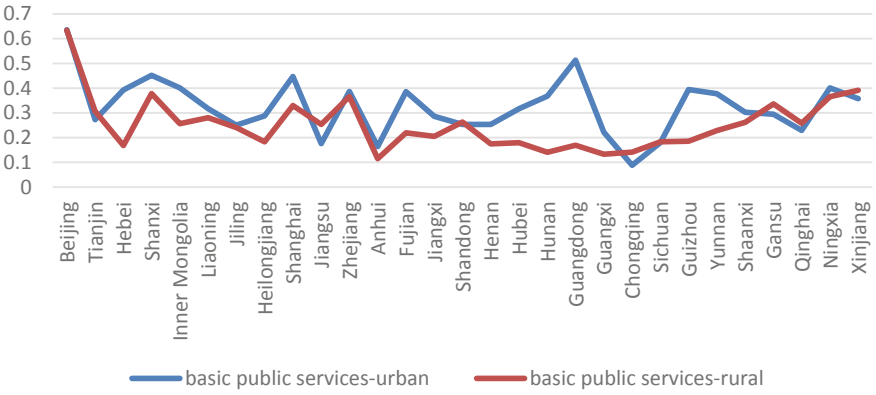

Fig. 8.8 Urban-rural comparison of basic public services in major provinces of the Chinese mainland. *Source* calculated according to the relevant statistical data in the *China Statistical Yearbook*, the *China City Statistical Yearbook* and the statistical yearbooks of various provinces and cities in 2015. (Because the statistics of Xizang Province and Hainan Province are incomplete, they are temporarily not included in this evaluation)

8.3.4 Intra-Urban Inequality in Access to Basic Public Services

In this section, we analyse the gaps in access to basic public services between migrant workers and the local urban population from the perspectives of employment, education, public housing and social security.

The public employment service system provided by regional governments for migrant workers has improved gradually over recent years, but up to 2017, still only about a third of migrant workers had received appropriate vocational skills training.

According to the *Research Report on the Situations of Left-Behind Children in Rural Areas and Urban–Rural Migrant Children of China* published by the All-China Women's Federation in 2013, there are 35,810,000 urban–rural migrant children across the country. These children accompany their parents as they migrate to cities. Pre-school migrant children (0–5) make up some 27.4% of the total. School-age children in the compulsory education stage (primary school and junior middle school stages, 6–14) comprise 41.1%, and older migrant children (15–17) another 31.5%. Most migrant children within the age range for compulsory education (aged 6–14) can study in local primary schools or junior high schools. However, it is harder for pre-school aged migrant children to enter kindergartens and for older ones to enter high schools. In recent years, as the Chinese government pays more attention to the education of migrant children, urban public and private schools are opening-up to these children, and the education for migrant children of migrant workers has greatly improved. According to the *Migrant Workers Monitoring Survey Report 2018* published recently by the National Bureau of Statistics, the schooling rate of migrant children of migrant workers in the compulsory education stage has reached 98.9%. The kindergarten admittance rate of migrant children aged 3–5 (including pre-school) has reached 83.5%, and the degree of satisfaction of migrant workers with their children's education has reached 75.3%. Nevertheless, those children outside the age for compulsory education who want to leave for local cities to continue their education at senior high school or university still face some institutional barriers.

When it comes to access to cultural and sports services, our research in 2010 and 2014 found that most migrant workers rarely or never used the available public cultural service facilities or participated in related activities. However, more recent research shows that more than a quarter (26.5%) of migrant workers now participate in activities organised by local communities. More than 10% of migrant workers now participate in cultural recreation, sports, training and learning activities in their spare time.[3] For example, Hangzhou has carried out a series of public cultural services for its migrant population, providing a lecture hall for citizens, migrant workers cinema, supermarket, and migrant workers culture club. These play a very positive role in improving the cultural life of migrant workers and strengthening their social cohesion.

The main types of accommodation available for Chinese migrant workers in 2009 were the employer's dormitory (33.9%), factory premises or production and operation sites (17.9%) and rented houses (34.6%). By 2018, the proportions had changed with the employer's dormitory accounting for 12.9%, rented houses for 61.3% and private self-bought property at 19%, a rise from 0.8% in 2009. The per capita living

[3] Data source: National Bureau of Statistics, *Migrant Workers Monitoring Survey Report 2017*, and *Migrant Workers Monitoring Survey Report 2018*.

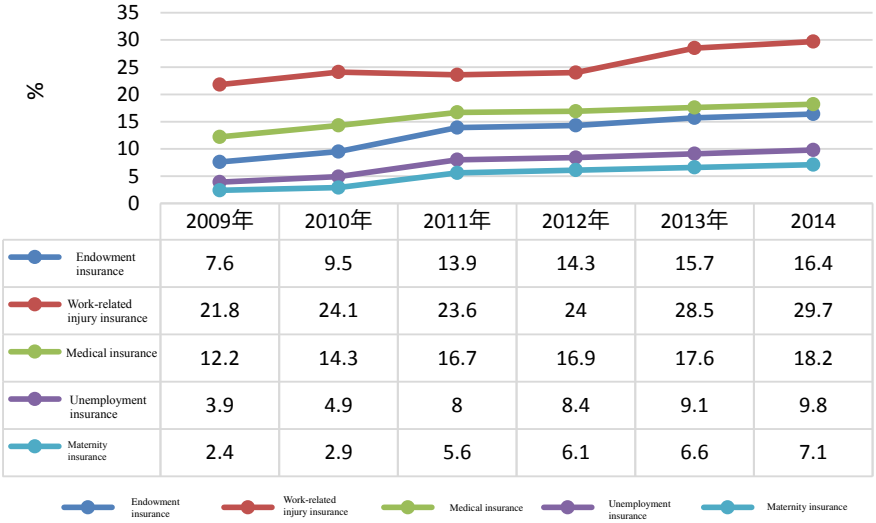

Fig. 8.9 Percentages of migrant workers participating in social security. services from 2009 to 2014. *Source* arranged according to the relevant data in the Migrant Workers Monitoring Survey Report 2009 to 2014, National Bureau of Statistics

space reached 20.2 m^2. Some 2.9% of migrant workers are entitled to government-subsidised housing, including 1.3% of public rental housing and 1.6% of self-bought government-subsidised housing.[4]

From 2009 to 2014, the proportions of Chinese migrant workers participating in various insurance schemes increased, including employment injury insurance (from 21.8% to 29.7%), medical insurance (from 12.2% to 18.2%), endowment insurance (from 7.6% to 16.4%), unemployment insurance (from 3.9% to 9.8%) and maternity insurance (from 2.4% to 7.1%) (see Fig. 8.9). Although in recent years, the coverage rate of social security services for migrant workers increased markedly, a larger gap still exists compared with the urban population. During the year 2014, for example, where the social security data is relatively complete, the proportions of migrant workers participating in employment injury insurance, medical insurance, endowment insurance, unemployment insurance and maternity insurance are only equivalent to 1/2, 1/4, 1/4, 1/4 and 1/6 of the coverage rates of urban employees (see Fig. 8.10).

[4] Data source: National Bureau of Statistics, *Migrant Workers Monitoring Survey Report 2009*, and *Migrant Workers Monitoring Survey Report 2018*.

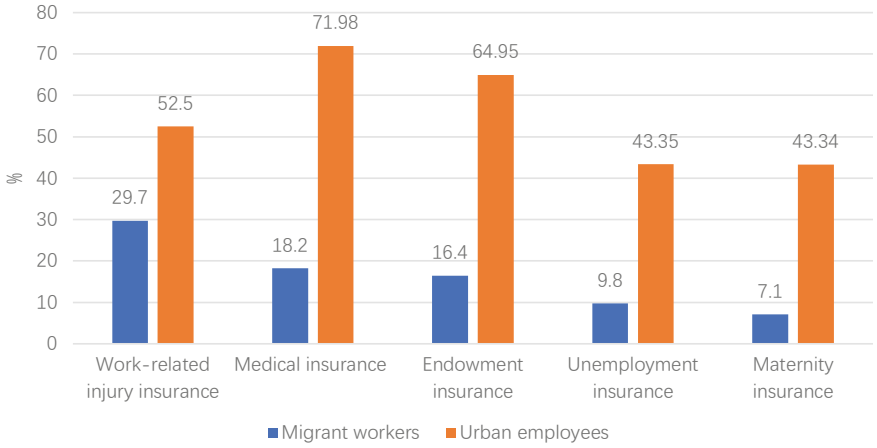

Fig. 8.10 Comparison of social security coverage between migrant workers and urban employees in 2014. *Source* calculated according to the relevant statistical data in the *China City Statistical Yearbook 2015* and the *Migrant Workers Monitoring Survey Report 2014*

8.4 Policy Implications

In the light of these very significant inequalities in access to basic public services between migrant workers and the local urban population across different regions of China, what should policy makers do? In this section, we summarise some policy implications.

8.4.1 Administrative and Expenditure Responsibilities

In a market economy, the government's most important administrative function is the provision of basic public services. The clear definition of administrative and expenditure responsibilities at all levels of government and the establishment of systems that combine fiscal and regulatory powers is both the precondition and basis for promoting equitable coverage for regional public services.

The clear definition and demarcation between administrative and financial responsibilities between central and local governments would encourage collaboration and help ensure that different levels of government carry out their duties and maximisation efficiency.

8.4.2 Transfer Payment System

Most countries implement a single vertical transfer payment system for the disbursement of public funds from central government. The typical transfer flow runs from central to local government and down to the 'lowest' levels through a hierarchical system. In China, there is a large development gap between the eastern and the central and western regions, and the central government's financial resources are relatively limited. There is a need to establish a rational and consistent financial transfer payment system so as to promote regional equalisation of basic public services.

Horizontal transfer payments typically operate across the same tiers of government. A local government with a relatively developed economy will directly transfer a portion of its fiscal revenue to the less developed regions to support their development. The most developed regions within eastern China are currently approaching the levels of developed countries worldwide. These regions have the capacity and conditions to support less developed areas financially. A horizontal transfer payment system will promote co-ordinated inter-regional development and enhances overall economic development at a national level.

In the meantime, we need to facilitate vertical transfer payments below the provincial level. We should strengthen transfer payments between provincial and county levels, to equip and empower the lower tiers of local government to own and manage expenditure effectively to meet regional requirements. The second point is to actively promote financial system reform at county and town-level to best achieve the financial system reforms necessary to achieve consistency and deliver more equal access to public services.

8.4.3 Public Service Supply

In order to satisfy the increasingly rising public demand for more and higher quality services, we must align relations appropriately between government, market and society, integrate public service resources, and update service delivery. A co-ordinated approach gives full play to the positive roles of market and society and ensures that government takes the lead in providing public services.

A marketisation process is necessary to achieve and maintain service efficiency and equality. The procurement of specific services can be devolved from government to appropriate and suitably qualified social organisations or profit-making companies. The government then purchases these services according to quantity and quality.

Another step would be to change the payment model by adopting a voucher system. For education, medical health, provision for the aged, employment training and other services that relate directly to individuals, the government's prime responsibility is to intervene when demand cannot be satisfied, or else the price exceeds public purchasing power. At this point, government can provide appropriate subsidies to guarantee that all residents can benefit from these services.

A third objective would be to establish new investment systems to help secure the participation of social organisations. Appropriate and qualified social or profit-making organisations can be allowed to expand the investment channels available for public services through franchising, competitive tender, rental contracts, or government participation. If we take social security as an example, we can build a cooperative platform between commercial insurance and social insurance, to harness the advantages of commercial insurance provision. We also need to resolve current problems in community management and give more support to people with particular needs. By combining the advantages of assistance, welfare and insurance, we can establish a comprehensive and water-tight system with the participation of government, society, employers and employees.

Public services can be planned and delivered more accurately and intelligently with input from social organisations. As they are rooted in specific communities, they offer the great advantage of grass-roots insights to help tailor services to meet local conditions. Services can then be delivered in a more timely, appropriate and professional way to satisfy local demand.

8.4.4 Integration of Resources

The current low level of coverage and access to public services for migrant workers is a major challenge and concern. There is a need to increase access and continue to deepen the reform of the household registration system. We must enable qualified migrant workers to settle in cities with as much right and opportunity to access quality public services as the permanent and registered resident population.

Disparities between urban and rural services lie largely in service inefficiencies and poor service quality in the countryside. We should improve levels of take-up and service efficiency and quality to redress this imbalance. This can primarily be achieved by combining and rationalising systems and service delivery. For instance, basic urban medical insurance and new rural cooperative medical care systems can be combined into a provincially unified and integrated whole. The same could apply to social security endowments and subsistence allowance systems resulting in a relatively unified system but pitched at a level appropriate for local conditions. A balanced approach to the allocation of resources and service delivery could maximise social security coverage and reduce the gaps in service level between urban and rural areas.

The western region especially faces double challenges of lower service quality and insufficient coverage. In the future, we should look to increase both coverage and quality across less developed regions. Improved payment transfer systems at all levels of government should help to achieve this. At the same time, investment, training and policies should strengthen targeted support to improve the professionalism of public service development, especially in poorer and less developed regions.

8.4.5 Use of Information Technology

The construction of appropriate information platforms and the deployment of digital information technology is crucial if we are to improve the quality and efficiency of public service delivery across China. The marketisation, planning and socialisation of service supply depends on the development of national and provincial data platforms to serve various priority services.

A cohesive and unified social security information system is vital. This could take the form of a 'One Card' approach with applications across social and medical insurance, unemployment and maternity benefits. Information could be shared across employment and labour relations services and social assistance institutions.

Another example would be compulsory education, where online technologies could allow resource-sharing to gradually reduce regional and urban/rural differences and disparities between different types of school. Within medical health, we should actively promote online inquiry, telemedicine, and resource-sharing across regions and between towns and the countryside.

Information technology should also be utilised to build user-friendly, barrier-free transfer and renewal systems for social insurance services. Levels of expenditure could be equalised between educational provision in urban and rural areas to follow the principle of 'expenditure moving with people'—the allocation of resources to the points of greatest need.

8.4.6 Standardisation of Laws and Regulations

The gradual establishment and improvement of laws and regulations around basic public services is of great significance in achieving equality of access to public services. The process involves the following three aspects:

First, experience from other countries shows that it is necessary to establish a basic framework for the division and allocation of inter-governmental administrative and financial powers and responsibilities. In doing so, we ought to clearly and specifically stipulate financial authority, rights and obligations at all levels of governments. At present, China has no legal provision for the division of inter-governmental administrative and fiscal power. Inter-governmental relations currently generally follow the principal guidance of Communist Party and government documents. This creates a degree of policy instability at a local level as it becomes easy to distort investment, consumption and labour market behaviour. Moreover, some local government agencies may limit the free flow of labour and other production factors to gain regional advantage, an example of what is known in the economics literature as the 'externality' problem. Such 'externalities' arise when the behaviour of a person, firm or government department 'changes the cost of some subsidy or alters the revenues collected from some tax, thereby affecting the wellbeing of taxpayers in general' (Browning 1999, p.3). The financial externality problem arises when one

local government's financial investment benefits or damages others but is unable to charge or compensate them. The administrative and financial externality problem may influence the normal exercise of administrative and financial powers of local governments. Most importantly, the fiscal externality problem makes it harder to divide central and local responsibility. The central government may shift their administrative responsibilities away and on to the local agencies. To avoid situations of this kind we must strengthen the legal system to establish clear lines of authority for inter-governmental administrative and financial powers.

The second aspect is the need to further develop more detailed legislation relating to public services. There is a need within China for greater legislative definition within public service areas like compulsory public education and health care, for instance. Public education is governed by policies contained in *Education Law* and C*ompulsory Education Law*. Within public health care there is the *Law on the Prevention and Control of Infectious Diseases* and the *Health Law.* These policies tend to govern broad brush policy areas and often provide insufficient detail for those charged with implementing the policies to follow. In some instances, those delivering services have no option but to act 'at will' without clear or adequate guidelines, introducing uncertainty, inconsistency and even serious compromises in the quality or appropriateness of service delivery.

Third, further development is needed on the regulation of the marketisation and socialisation of public services. China is consistently applying measures to marketise and socialise service delivery but with few specialised laws and regulations to govern and supervise the processes involved. We must accelerate the formulation and introduction of relevant legislation to build a more open, equal and fair environment for the marketisation and socialisation of basic public services.

8.5 Conclusions and Recommendations

In this chapter we have provided a systematic way of quantifying inequalities in access to public services arising from the dual-household registration system. We reported four main sets of results. Firstly, there are still marked inequalities in access to basic public services between urban populations and migrant workers. These migrant workers generally face more difficulties in receiving medical treatment, entering schools, obtaining social security provision, and enjoying entertainment. Services for migrant workers in urban areas are poorly available and narrow in scope and these are the main reasons for the sense of a lack of belonging and integration among these groups in Chinese cities.

Secondly, there is an urgent need for improving service quality in education and medical health provision in rural areas. It is not a problem of insufficient supply as rural areas have received compulsory education and medical health provision for many years. The issue is one of quality and a disparity between rural and urban areas. At present, the largest gap occurs within public cultural services, often seriously insufficient in rural areas. In recent years, although China has made great efforts to

establish public cultural services in rural areas, the 'take-up' is generally low due to a failure to grasp the real requirements of people in the countryside. The Rural Library Project can serve as one example. In many rural areas the population largely consists of children and elderly people left behind as migrants headed to the cities to find work. The elderly generally have a lower degree of education and seldom read. There are often fewer books for children in rural libraries which largely stock reference books on agricultural science and other practical applications. Consequently, many book resources are underutilised.

Thirdly, the overall levels of access to basic public services vary very little across China's eastern, central and northeast regions. The basic public service level within the western region does lag behind the others in relative terms. The public service which shows the smallest regional variance is basic education. There are greater regional differences in public cultural services and social security, especially in central and western regions, which trail behind the other regions.

Fourthly, when examined from the perspective of the whole country, it is evident that basic public services in China are generally unbalanced in terms of access and coverage. The gaps are more evident between regions rather than within each region itself. These gaps are most clearly seen in the disparity between urban and rural public services and between permanent and migrant populations in cities. Furthermore, China's basic public services are currently characterised by the coexistence of a 'dualised' urban–rural divide and also 'fragmentation' between regions. An example is a difficulty in transferring and renewing social security claims and entitlements, which forms a great barrier for the reasonable flow of migrant workers. Finally, there are disparities between increasing public demand for basic services and improved quality of life and the relatively low level of development, coverage and quality of some of the available services.

It is clear then that China still has a long way to go to promote and realise consistent provision of basic public services. There remain large differences in the economic level and financial strengths of different regions. Gaps in provision cannot be filled in a short time. On the other hand, China is undergoing rapid urbanisation and the pace of this process makes the widening of provision to migrant workers a key and pressing problem. Equally, it is not enough to simply provide wider coverage of basic public services, issues of supply, quality and public satisfaction should also be taken into account. In order to promote urbanisation and the 'citizenisation' of migrant workers, and to establish a financial system with matched financial and administrative power, China needs to:

- *delineate administrative and expenditure responsibilities,*
- *develop a transfer payment system,*
- *diversify and enhance public service supply,*
- *integrate resources,*
- *use information technology to reduce public service inequality,*
- *standardise laws and regulations.*

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Chapter 9
Housing Policies for Rural Migrant Workers in China

Yeqiang Wang and Xin Dong

Abstract Lack of housing security is a major problem for rural migrant workers in China. This chapter explores the range and depth of housing problems facing rural migrants. These challenges include issues of affordability and poor housing quality and administrative barriers that inhibit access to commercial housing and housing welfare programmes. There is a big difference between the housing consumption pattern of migrant workers in the city and that in the countryside. This is due to large discrepancies in levels of access to good quality accommodation between migrants from rural areas and the established urban population. These inequalities are exacerbated by inherited forms of residential registration that adversely affect rural migrants settling in towns and cities. The situation is further exacerbated by land use regulations that restrict the construction of collective dormitories for rural migrant workers. The key is to promote the system reform of rural land and speed up the establishment of a free market homestead and rural housing. Policy responses over the past twenty years are evaluated, and recommendations for future policy development are proposed to improve housing conditions, including reform of land use regulations and improved property rights for migrants.

Keyword Migrant workers · Housing Policies · Urban housing security system · Dual housing consumption modes · Household registration system

9.1 Introduction

The current lack of urban housing security for rural migrants in China constitutes an important barrier to their 'citizenisation'[1]—the acquisition of full rights as citizens—and hinders the process of urbanisation in China. The lack of proper housing

[1] Citizenisation refers to rural migrants who have worked in the city for a long time. They need to be given the same rights as urban residents in education, medical care, social security and other aspects, so as to integrate into the city in culture, psychology, lifestyle and other aspects.

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or poor housing conditions hinders rural migrant workers from developing a sense of belonging in the city. Housing is one of the most basic physical and social requirements and a lack of housing security makes it harder for rural migrants to integrate into urban life. The increased sense of alienation and psychological distance from urban society is a potentially important source of urban disharmony.

In this chapter, we describe the challenges facing housing provision for rural migrants in China and evaluate the policies that have been introduced. In Sect. 2, we summarise the main housing problems facing rural migrants (Sect. 2), and in Sect. 3, we provide an overview of the changes in China's housing policies. In Sect. 4, we evaluate these housing policies and consider the implications for future policy development in Sect. 5. We conclude with a brief summary.

9.2 Housing for Rural Migrants

This section considers the housing situation for rural migrants from three directions: housing conditions, housing security, housing affordability, and government and market failures.

9.2.1 Housing Conditions

Lack of adequate living space, poor environmental quality, and inadequate living facilities all shape the general housing experience for rural migrants in China. Compared with the increasing per capita living area and improving living conditions of permanent urban residents, urban housing for rural migrants falls far short of what is becoming the national norm. Because of their poorer economic status and lack of official local household registration, rural migrants can only choose rented accommodation. The explosive growth in urban populations and rising real estate prices in recent years have forced them to settle mainly in older urban neighbourhoods that are relatively remote, inaccessible, seriously polluted, and lacking in green or open space, or else in rural areas on the edge of the city. This has serious implications both for their health and their personal security.

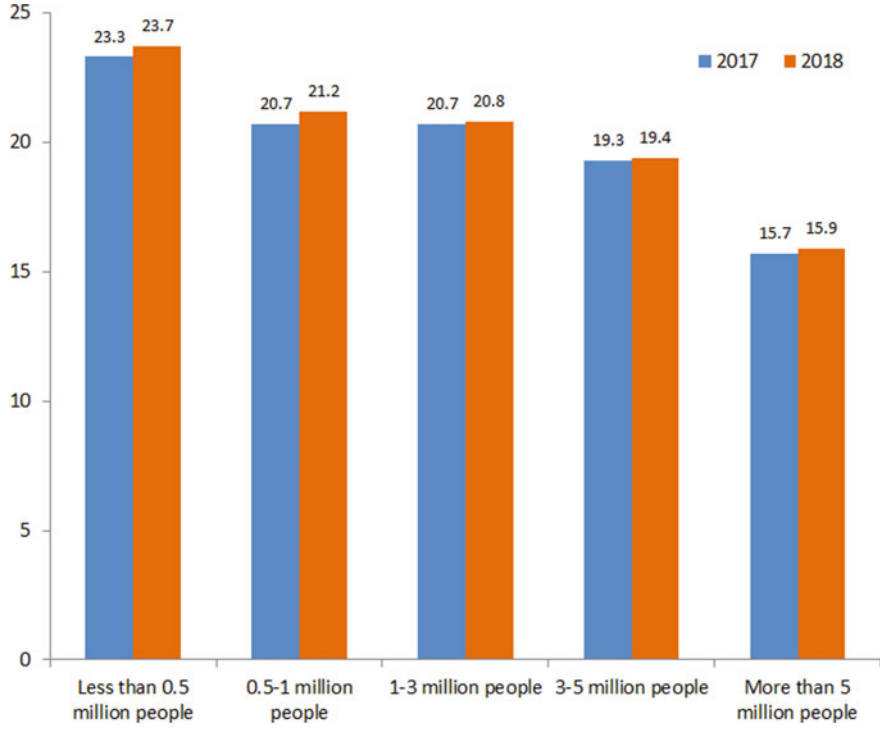

Fig. 9.1 Per capita living area of rural migrants in cities by city size

Nevertheless, in recent years, across a range of areas, including housing location, resources and facilities, as well as lifestyle, the living conditions of rural migrants[2] in cities have generally improved.

The *Monitoring and Survey Report on Rural Migrant Workers* of the National Bureau of Statistics of China have reported on the housing locations, and access to resources and facilities for rural migrants since 2016. The per capita living area of urban–rural migrants was 20.2 square metres in 2018, an increase of 0.4 square metres over the previous year. The proportion of rural migrants with a per capita living area of just five square metres or less accounted for 4.4% of the total, a decrease of 0.2% over the previous year. Figure 9.1 shows how the per capita living area decreases with

[2] The term rural migrant workers refers to workers who still hold rural registered permanent residence and are engaged in non-agricultural industries in cities or have been employed outside their hometown for six months or above. The term local rural migrant workers refers to those who work within the township area of their household registration, whereas outgoing rural migrant workers refers to those who work outside the township area of their household registration. The term urban migrant workers refers to those who live in urban areas. The urban area is divided according to the *Provisions on Statistical Division of Urban and Rural Areas* of the National Bureau of Statistics, and is consistent with the territorial scope for calculating the population urbanisation rate.

city size and also shows how the living area of rural migrants increased modestly across all cities between 2017 and 2018.

9.2.2 Housing Security

The proportion of rural migrants provided with housing by government-funded work units *danwei*[3] or employers has declined significantly. While the proportion of rural migrants purchasing housing has increased, the proportion of rural migrants enjoying housing security is still very low. Rental accommodation has become the primary form of accommodation for rural migrants in Chinese cities.

Rental housing has overtaken the work unit dormitory as the most prominent form of accommodation for rural migrants, but a considerable proportion still live in construction site sheds and on production and operation sites. The proportion of rural migrants who commute to work from home has increased significantly, while the proportion of rural migrants purchasing housing in the cities where they work has increased slightly though it is still very low. In 2015, 37% of outgoing rural migrants rented houses, 28.7% lived in dormitories, 15.9% lived in construction site sheds or on production and operation sites, 14% commuted from home, 1.3% purchased housing in cities where they worked, and 'others' accounted for 3.1% of the total.

In 2016, the statistical calibration for the *Monitoring and Survey Report on Rural Migrant Workers* of the National Bureau of Statistics changed from source to destination of rural migrant workers. In 2016, 62.4% of rural migrant workers lived in rented houses, of which 61% lived in rented private houses, and 13.4% lived in houses provided by work units or employers. In 2018, 61.3% of urban–rural migrant workers lived in rented houses, an increase of 0.3% over the previous year; 12.9% lived in houses provided by work units or employers, 0.4% lower than that of the previous year; and 19% purchased housing, the same as the previous year. Some 17.4% purchased commercial housing, the same as the previous year.

Various factors contribute to the pressures facing rural migrants during the transition to urban life: the restriction of household registration, difficulties for their children entering school, a higher cost of living and limited living space. Most rural migrant workers usually live and work in the city alone, and often rent housing jointly with colleagues and workers to save rent. This results in a relatively lonely lifestyle, forced to live apart from their families. The dislocation and separation of partners,

[3] *danwei* refers to the employing organisation other than the enterprise. During the pre-reform period, most urban employers were either state owned institutions, state owned enterprises, or collectively owned enterprises. They were all referred as 'danwei' (work unit). Every working age person in a city had a 'danwei'. Since the reforms, the urban economy has become mixed, with more privately owned companies, institutions and enterprises, but the phrase *danwei* (work unit) is still in use. In general, it now means 'employer', including private sector employers as well as those in state-run enterprises. Danwei and work unit, both are used commonly in Chinese studies. This is the sense in which they are used in this chapter—work units but not necessarily government funded ones.

parents and children, siblings and other relatives is a common feature of migrant life in urban China. It is not conducive to the healthy development of family life and leads to complex social problems around issues such as left-behind children—offspring of migrant workers left in the care of rural relatives while their parents work and live in the city.

The proportion of rural migrants purchasing housing near their places of work has increased and is a prominent trend. According to data from the National Bureau of Statistics' *Monitoring and Survey Report on Rural Migrant Workers* in 2015, 1.3% of rural migrants purchased housing in places where they work. In 2016, 17.8% of urban–rural migrants purchased housing, an increase of 0.5% over the previous year. Some 16.5% of these rural migrants purchased commercial houses, an increase of 0.8% over the previous year. Based on data collected in 2016, in 2015, 17.2% of urban–rural migrants purchased housing, while in 2015, only 1.3% of purchased housing close to their work-place. Such a large gap is probably due to migrants purchasing properties in small and medium-sized communities nearer their hometown.

At the same time, the proportion of rural migrant workers enjoying urban housing security is still very low. In 2016, less than 3% of urban–rural migrant workers purchased affordable housing and took public rental housing lets. In 2018, 2.9% of these workers enjoyed affordable housing, an increase of 0.2% over the previous year. Among them, 1.3% rented accommodation from publicly owned sources, an increase of 0.2% over the previous year; and 1.6% purchased affordable housing, the same as the previous year. It can be seen that the role of urban housing security in solving the housing problem of rural migrants is still very limited.

9.2.3 Housing Affordability

The ability to afford accommodation can be further refined to reflect rental or purchase payments. The rent-income ratio of rural migrant workers does not exceed the reasonable standard, but the corresponding housing conditions are poor. In 2015, the per capita monthly living expenses of rural migrant workers in cities and towns amounted to ¥475, the per capita monthly income was ¥3,072, and the proportion of living expenses to income was 15.5%. Internationally, the accepted reasonable level for the rent-income ratio is no more than 30%. According to this standard, it appears that Chinese rural migrants do not lack sufficient levels of affordable housing in cities and towns. However, their low living expenses correspond to relatively poor housing conditions. A considerable number of rural migrants live in urban villages (Chap. 6), shanty towns (Chap. 7) and work sheds.

In the case of the affordability of purchased housing, the house price-to-income ratio shows that the ability of rural migrants to purchase housing is generally insufficient. The specific calculation method for the house price-to-income ratio is as follows: the ratio of the average sales price of commercial housing to the average annual household income of outgoing rural migrants. The average sales

Table 9.1 House price-to-income ratio of outgoing rural migrants' families in various regions

	2008	2009	2010	2011	2012
Whole country	9.9	11.9	10.6	9.5	9.3
Eastern region	13.1	15.8	13.9	12.1	11.8
Central region	6.6	7.5	7.3	7.1	6.8
Western region	7.5	8.5	8.1	7.7	7.5

Data source Calculated according to the data of *2012 National Monitoring and Survey Report on Rural Migrant Workers* of the National Bureau of Statistics and *China Statistical Yearbook*

price for commercial housing (yuan/flat) is calculated by multiplying the average sales price of commercial housing (yuan/m^2) by the per capita housing construction area (m^2) and then multiplying the average household population of urban residents (person/household) (assuming that each household has a flat). The average annual household income of rural migrants (yuan/household) is calculated by multiplying the assumed average number of personnel working away from their homes per household[4] (person/household) by their average annual income (yuan/person). By comparing the two, we can obtain the house price-to-income ratio for migrants' families in various regions from 2008 to 2012,[5] as shown in Table 9.1.

From Table 9.1, it can be seen that from 2008 to 2012, the house price-to-income ratio for rural migrants' families in the national housing market was 9.3–11.9, 11.8–15.8 in the eastern region, 6.6–7.5 in the central region, and 7.5–8.1 in the western region housing market. The lower the house price-to-income ratio, the higher the level of affordability. The comparable international range for a reasonable house-price-to-income ratio is 4–6. However, considering the actual situation in China, it is more suitable to adopt the house price-to-income ratio range of 5–7 as a reasonable standard (Dong 2012). According to this measure, in recent years, the overall house price-to-income ratio for rural migrants' families in the national housing market has exceeded the reasonable standard, indicating a generally insufficient level of housing affordability for such families in China. The house price-to-income ratio for such families in the eastern region is much higher than the reasonable range, indicating a low level of affordable housing in the eastern region. In central and western regions, the house price-to-income ratio for these families is slightly higher than the reasonable standard. In some years, the house price-to-income ratio for the families of rural migrants in the central region lies within the reasonable range, indicating a good level of affordable accommodation. On occasion, there is a better level of housing affordability in the central region than in the western region.

[4] Outgoing migrant workers: refers to rural labourers who have worked outside their township area for six months or more during the survey year.

[5] Due to the limitation of data acquisition, only the relevant data from 2008 to 2012 can be acquired.

9.2.4 Government and Market Failures

With the rapid growth in the number of rural migrants, the increasing time they spend living in cities, and greater measures to improve integration, the housing problems of rural migrants are receiving more attention. The *Several Opinions of the State Council on Solving the Problems of Rural Migrant Workers* promulgated in 2006 proposed to solve housing problems through multiple channels to ensure that accommodation meets basic health and safety conditions. The *Several Opinions of the State Council on Solving Housing Difficulties of Urban Low-income Households* promulgated in 2007 included rural migrants alongside other urban groups with housing difficulties. In 2007, the Ministry of Construction, the Development and Reform Commission and other departments jointly issued the document, *Guiding Opinions on Improving the Living Conditions of Rural Migrant Workers*, proposing that employers should take responsibility for improving living conditions for workers. These documents established the basic direction of housing policies for rural migrants. Some areas have also actively resolved migrants' housing problems, introducing measures which include the establishment of apartments for rural migrants (affordable rental housing), the inclusion of qualified rural migrants into the urban housing security system, the establishment of a housing provident fund system for rural migrants, and financial and tax support for rural migrants to purchase housing. The general situation, however, is one of both market and government failure, mostly manifested in the following four aspects:

(i) *Urban–rural division of the household registration system:* this is the primary root cause of the housing problems facing rural migrants. China still implements the dual household registration structure that has perpetuated urban–rural divisions since the 1950s. This creates a significant obstacle for rural migrants entering the city. The cultural level and social status of rural migrants makes it difficult for them to live and work in the city, and China's household registration system reinforces the disparity at a fundamental level. Rural migrants have never been able to enjoy the same medical, employment, pension, education and other rights as urban residents. Restrictions on the status and 'identity' of rural migrants increase their living costs and make it difficult for them to integrate and generate a sense of belonging. The dual household registration system and the inequalities it creates is the fundamental cause behind the housing problems facing rural migrants.

(ii) *Commercial Housing Market Barriers to Entry:* The income level of the vast majority of rural migrants is far lower than the urban house price and rent level. Except when an employer provides housing, most migrants have to rent from private landlords. However, due to their limited economic capacity, migrants can only rent private houses from farmers on the urban–rural fringe or relatively low-priced substandard housing in the city centre. The demand for housing for rural migrants is very strong, but the market will not automatically produce a supply to match this demand. The market fails to resolve the housing problems of rural migrants. Urban villages comprising rural migrants and

collective rental patterns reflect the disparity between supply and demand. If the supply structure is not adjusted, these urban villages and collective rental patterns will be difficult to resolve and will have an adverse impact on the entire urban housing market. See Chap. 6 for further discussion of urban villages.

(iii) *Exclusion from the Urban Housing Security System:* Under the urban–rural dual household registration system, rural migrants are regarded as an 'external population' and 'temporary resident population.' They have not been subject to status change and cannot enjoy the same protection rights as urban residents. Although the *Guiding Opinions on Accelerating the Development of Public Rental Housing* jointly issued by seven ministries and commissions in 2010 proposed that rural migrants shall be included in the urban housing security system, so far, the coverage of housing security system for rural migrants is still insufficient, and rural migrants are still excluded from the urban housing security system in China. Although some cities have proposed to include rural migrants in the urban housing security system, there are too many restrictions, the threshold for rural migrants to enter the urban housing security system is too high, and government failures do exist.

(iv) *Land Use Policy:* At present, there are three ways to construct such collective dormitories: (1) enterprises in the development zones or industrial parks use transferred land to build staff dormitories near the factory production areas; (2) enterprises and agricultural collectives cooperate to build dormitories using collective farm land in the urban–rural fringe area; (3) renovate or construct dormitories for rural migrants using redundant factories left by bankrupt or closed enterprises. The problem is that these solutions conflict with current land policy. For instance, the use of transferred industrial land to build dormitories for rural migrants conflicts with the current industrial land policy; the use of collective land to build dormitories for rural migrants conflicts with the current collective construction land transfer policy; the use of redundant factories as dormitories conflicts with the current land acquisition and reserve policy.

In addition, there needs to be further improvement in the exploration and development of local policy. For example, sources of funds that could provide affordable housing are uncertain, there is a lack of suitable housing stock, a lack of detailed rules for the housing provident fund system, and housing financial services for rural migrants are almost non-existent'. Therefore, much still needs to be done to improve the housing security system, to boost housing supply and to match the needs and characteristics of rural migrants.

9.3 Changes to Housing Policies for Rural Migrant Workers

The State Council's government work report in 2016 reaffirmed the 'three 100 million people' policy goal,[6] and proposed 'to achieve the settlement of about 100 million agricultural transfer populations and other permanent residents in cities and towns'. It declares that urbanisation is 'the biggest potential of domestic demand and development momentum in China', and established a policy objective 'to achieve the urbanisation rate of permanent residents of 60% and the urbanisation rate of household registration of 45% by 2020.' These goals are related to the migration of agricultural transfer population, which is closely related to urbanisation and economic promotion. The report of the 19th National Congress in 2017 proposed to 'take urban agglomeration as the main body to build a coordinated development pattern of large and medium-sized cities and small towns, and accelerate the citizenisation of agricultural transfer population.'

Migration involves two related processes. The first is the migration of populations from their place of origin, and the second is the settlement of these migrants in their place of destination (Berger and Blomquist 1992; Cai 2001). Rural–urban migration has become an important issue in developing countries (Brueckner and Lall 2015). Migration processes can also be further sub-divided into permanent migration and non-permanent migration. As the term suggests, permanent migration refers to patterns whereby migrants intend to live at their chosen destination for a long time without returning to their original places of residence. Conversely, non-permanent migration refers to migration patterns where migrants do not, or do not intend to, stay for an extended period (Ma and Meng 2003; Cai and Wang 2007). At present, the key issue for Chinese urbanisation is the second process of population migration, that is, realising and consolidating permanent migrations and the 'citizenisation' of agricultural migrants within urban centres. This is an important aspect of what has become known as 'New Urbanisation' (Dong 2015).

Housing has become an increasingly important factor affecting population migration. Even without institutional barriers such as household registration, current problems within China's housing market erects a practical barrier to family migration. Housing issues have become the dominant factor in the social exclusion of migrants in major cities (Zhao 1999a, b; Li 2008). Where migrants are unable to bear the costs of urban housing, it becomes impossible for them to settle permanently or for lengthy periods. This creates transient or circular migration patterns, which prolongs the process of rural–urban migration and slows down urbanisation (Ren and An 2011). Meanwhile, China's rural land system closely related to rural housing is the

[6] The State Council's government work report in 2014 emphasised the need to promote the new people-centered approach to urbanisation and proposed for the first time to focus on solving the 'three 100 million people' issue, that is, 'promoting the settlement of about 100 million agricultural transfer population in cities and towns, renovating the urban shanty towns and urban villages where about 100 million people live, and guiding the urbanisation of about 100 million people in the central and western regions.'

main reason for the agricultural transfer population's short-term and highly mobile migration (Zhao 1999a, b; Yan et al. 2014).

The development and evolution of housing policies for rural migrants since 1998 can be divided into three periods: the lack-of-policy period from 1998 to 2004, the multi-party exploration period from 2005 to 2010, and the unified integration period from 2011 to the present.

9.3.1 The First Stage: Lack-of-Policy Period (1998–2004)

During this period, the rate of internal migration slowed and labour shortages began to appear in the absence of sufficient rural migrants. In 1997, as the financial crisis in Southeast Asia broke, China's economic development slowed, and many township enterprises went bankrupt. In addition, in the middle and late 1990s, large numbers of employees in state-owned enterprises were laid off, urban employment intensified, and internal migration again increased, but at a slower rate.

As China's economic development gradually stabilised in the early 2000s, the rate of rural–urban migration increased. At the beginning of 2004, enterprises in Guangdong, Fujian, Zhejiang and other economically developed southeast coastal areas found it harder to recruit workers. In the second half of 2004, labour shortages spread across the country, although the pattern and intensity varied across different regions. Across inland provinces such as Jiangxi and Hunan, the traditional sources for migrant labour, enterprises found it harder to recruit workers. Authors such as Cai (2010) believe that 2004 was the 'Lewis Turning Point' when the growth rate in labour demand exceeded the growth rate of supply. There has been a nationwide labour shortage since 2004, and wages have increased significantly since that time. In 2004, the National Bureau of Statistics conducted a sample survey of 68,000 rural households and more than 7,100 administrative villages in 31 provinces (regions and cities). It estimated that the number of rural migrants who worked outside of their hometown in that year was about 118 million, accounting for 23.8% of the rural labour force. If the rural labour force employed in local township enterprises were to be included, the total number of rural migrants could be as high as around 200 million.[7]

There were no specific policies for rural migrants between 1998 and 2004, and there were only occasional references in some related policies. At this stage, the housing problems facing rural migrants steadily worsened. Specific policies for rural migrants were more concerned about employment restrictions, wage arrears and other aspects, with few directly relating to housing issues. In July 1998, the State Council issued the *Notice on Further Deepening the Reform of Urban Housing System and Accelerating Housing Construction*, clearly requiring all provinces, autonomous regions, and municipalities directly under the central government to stop the physical

[7] Research Group of the State Council Research Office: Investigation Report on Chinese Migrant Workers, China Yan Shi Press, 2006 Edition.

distribution of housing in the second half of 1998 in order to phase in the monetisation of housing allocation. China's real estate market began to take shape from this point, and the urban housing market also entered a highly market-oriented stage. The housing situation for rural migrants changed as the proportion of rental houses increased while the proportion of accommodation provided by work units decreased. Migrants' expenditure on accommodation increased in relative terms, without any improvement in housing conditions. Levels of satisfaction with the available accommodation declined as accommodation problems for rural migrants mounted. In 2003, the General Office of the State Council acknowledged the need to improve living and working conditions for internal migrants. Policies at this time were mainly concerned with improving the basic health and safety conditions within rural migrants' housing.

At this stage, economic growth became an important theme within China's macroeconomic policies to lessen the impact of the Southeast Asian economic crisis. The stimulation of domestic demand was a key factor, and housing marketisation played an important role in this process. The ability of rural migrants to enter the housing market became one of the driving forces for economic growth.

9.3.2 The Second Stage: Exploration Period (2005–2010)

As the numbers of rural migrants increased across China's towns and cities, their living conditions attracted more attention from social services and sociologists. At the end of 2008, the National Bureau of Statistics established a statistical monitoring and investigation system for rural migrants. For the first time the recording of statistics relating to rural migrants was supported by authoritative data. In 2008, the total number of rural migrants nationwide[8] reached 225 million. In 2010, the had risen to 242 million, an increase of 12.45 million over the previous year. The increase of 5.4%, can be taken as the high-water mark for the growth in rural–urban migration. As China's macroeconomic development stabilised, the accumulated housing problems facing rural migrants became increasingly apparent. Central and regional levels of government have issued policies on rural migrants' housing since 2005.

At the national level, housing policies for rural migrants have shifted from ownership to user rights. From 2005 to 2007, the housing policies for rural migrants focused on the purchase of housing and housing provident funds for rural migrants. From 2005, research and the resolution of migrant housing problems was first incorporated into the work of the Ministry of Construction. From 2007, the Ministry of Construction proposed gradually expanding the legal coverage of the housing fund system to include rural migrants with stable occupations in cities for the first time.

[8] The statistical definition of migrant workers is the workers who still hold rural registered permanent residence and are engaged in non-agricultural industries locally or have been employed outside their hometown for 6 months or above. Unless otherwise noted, the data of migrant workers used in this study are all from the *National Monitoring and Survey Report on Migrant Workers* of the National Bureau of Statistics.

From 2007 to 2010, housing policies for rural migrants shifted further from ownership to user rights. Measures included compliance with basic health and safety conditions, and the development of collective dormitories on industrial sites which were not to be sold as commercial housing. Renovation of urban villages would consider the living needs of rural migrants, and collective dormitories would comply with urban planning and overall land use standards where conditions permitted. Accommodation for rural migrants would be built under government guidance and operate according to preferential market policies for affordable housing. Rent would be maintained at a reasonable level for rural migrants.

It is worth noting that these measures differed from previous legislation. First, it was clearly proposed that dormitories constructed in development zones and industrial parks could only be rented to rural migrants, and not be sold as commercial houses. Second, it was stressed that, where conditions permit, housing that met the particular needs of rural migrants should be built and rented to them as a specific group. There is no mention of payment of housing provident funds to enable rural migrants to purchase or rent their own houses. These new measures represented a shift from ownership to rental rights against the background of increased worker mobility and a lower level of house purchase.

At the same time, more specific policies were introduced to address issues of responsibility and governance in addressing housing conditions, such as the provision of free or subsidised accommodation and low-cost leasing. When rural migrants make their own residential arrangements, employers should subsidise their rental payments. Those enterprises with large numbers of rural migrants should make full use of their own employee dormitories or raise housing resources for rural migrants by leasing and purchasing. Collective dormitories for rural migrants built in a centralised way should be left to rural migrants and not sold or rented as commercial housing. There could also be active measures on the urban–rural fringe to encourage local residents to rent their own housing to rural migrants.

Regional governments have also explored specific policies and practices to resolve migrant housing issues at a local level. Provinces and cities have issued a series of local supporting policies following the lead of the central government. The ‘Chongqing Model’ has emerged as a prominent measure, one which transforms vacant houses or unfinished buildings into rural migrants’ apartments. The ‘Changsha Model’ is another initiative that provides rural migrants’ apartments across rural collective land in the urban–rural fringe. The ‘Shanghai Model’ concentrates migrant accommodation in industrial parks while the ‘Huzhou Model’ establishes a housing provident fund system adapted to the needs of rural migrants.

The Chongqing Model: Chongqing was one of the earliest cities to explore and resolve the housing problem of rural migrants in China. The city authorities transformed vacant or unfinished buildings into rural migrants’ apartments. Typical examples include the ‘Bangbang Apartment’ and ‘Yangguang Apartment,’ which transform vacant or unfinished buildings scattered across the city into low-cost apartments.

In Hunan Province, the Changsha Model was also among the earliest cities to adopt targeted measures to address the issue of migrant worker accommodation.

The authorities built on rural collective land across the urban–rural fringe with the 'Jiangnan Apartment' as the representative example.

The Shanghai Model saw the centralised concentration of migrant apartments in industrial parks. Its typical representative is the 'Yongsheng Rural Migrant Workers' Apartment' in Malu Town, Jiading District, Shanghai.

The Huzhou Model incorporates rural migrants into the housing provident fund system and formulates a special funding policy suitable for their needs. Rural migrants have lower incomes than permanent residents and are highly mobile. To address these particular factors, Huzhou City introduced an innovative policy by establishing housing provident funds for rural migrants. It introduced a low threshold to encourage take-up and allowed those leaving employment to withdraw funds at any time and those withdraw funds for the housing rents. The model also provided preferential housing loans and interest subsidies for poorer families and supported rural housing construction.

At this stage, both central and local governments have introduced various migrant housing policies and actively sought to resolve housing issues. Measures include adjustments in policy focus, assignment of responsibility and programmes that meet particular local conditions.

9.3.3 The Third Stage: Unified Integration Period (2011 to Present)

The annual growth of migration within China declined from around 10 million between 2011 and 2012, to around six million between 2013 and 2014 and to around four million from 2015 to 2016. The total number of rural migrants reached 288 million by 2018, with less than 2 million being recent migrants. Since 2014, the total growth rate has remained below 2% (see Fig. 9.2). Housing policies have continued to respond to these developments with various improvements, increased integration and realignments. Under current conditions, policy changes relating to rural migrants' housing can be summarised as follows.

First, the responsibility for migrant housing has shifted from employers to local authorities. In September 2011, the General Office of the State Council proposed, to adhere to the principle of owner investment and to actively explore recovery of investment in publicly owned rented property. Local authorities would be empowered to fulfil their responsibilities within overall guidelines set by provincial people's governments. Municipal and county-level people's governments would be responsible for the specific implementation of policy, including preliminary work, construction funds, land supply, quality control, affordable housing rental management and supervision. This was a complete contrast with previous legislation, which put the onus on employers and placed responsibility at the government level.

Second, rural migrants were to be included in the urban housing security system. The General Office of the State Council proposed to provide publicly owned rented

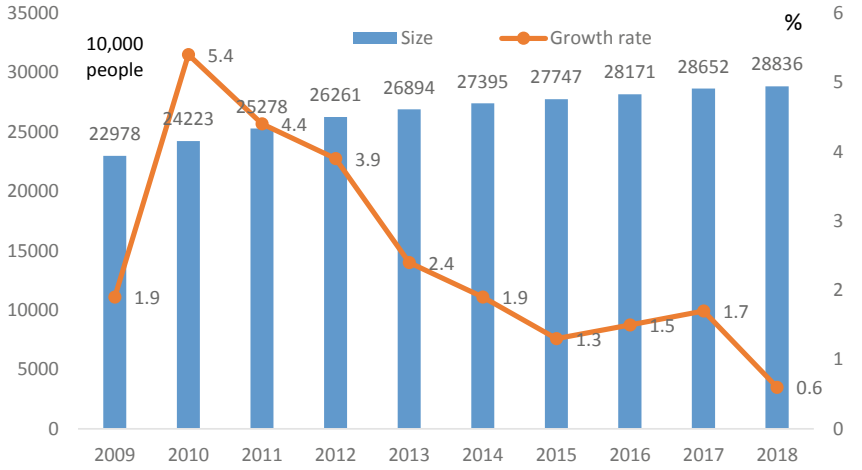

Fig. 9.2 The size and growth rate of migrant workers in China. *Data source* National Monitoring and Survey Report on Rural Migrant Workers of the National Bureau of Statistics over the years

accommodation to poorer or middle-income families and to recent migrants as well as those with stable occupations. The new provisions differ notably from previous legislation in that the caveat, 'where conditions permit' was removed and the scope extended to include recent migrants as well as those who had long become established in China's cities. In a further development, *Opinions of the State Council* proposed to include both 'qualified' rural migrants and those in stable employment into housing security and funding systems, and to include rural migrants alongside the locally registered population within the scope of housing security rights.

Third, various measures have been implemented to improve housing rights and security. Construction of publicly owned rental housing or collective dormitories was encouraged in various announcements focused on the provision of public rented accommodation for rural migrants with stable occupations. At the same time, industrial zones were to provide a mix of rented accommodation and dormitories in accordance with the principle of intensive land use. The State Council also provided guidance on the provision of residential accommodation alongside office and production space in industrial parks.

In addition, policies have been introduced to help migrants with housing purchases. The State Council proposed to actively support eligible rural migrants to purchase or rent commercial housing, and enjoy preferential deed tax and stamp tax. It advocated the gradual inclusion of migrants with stable occupations within the scope of housing provident funding. The State Council also proposed adjusting and improving the differentiated housing credit policy, developing the individual housing loan insurance business, improving the housing financial service level for middle- and low-income groups such as rural migrants, and encouraging and guiding farmers to purchase houses near small and medium-sized cities.

Moreover, the State Council proposed to accelerate the promotion of rental subsidy systems, and use market and government subsidies to support eligible migrants to rent accommodation through the housing rental market, and to strengthen the environmental renovation and comprehensive management services of urban villages and shantytowns, so as to improve the living conditions of rural migrants.

9.4 Evaluation of Housing Policies

In order to evaluate the effectiveness of these policies, we must first establish the assessment criteria. Various criteria have been put forward by academic institutions, which can be summarised as follows:

- Fairness of policy objectives,
- Synchronisation with legal and other policies,
- Appropriateness of policy,
- Enforceability of policy,
- Actual effect of policy.

We will now use these criteria to evaluate housing policies for rural migrants in China.

9.4.1 The Fairness of Policy Objectives

Housing policies for Chinese rural migrants started from scratch and represented a milestone in the development of social equity. The intensive introduction of housing policies for rural migrants after 2005 shows that the government has paid more attention to improving the living conditions and social security of rural migrants. However, policy objectives remain very general rather than specific, typified by phrases such as 'improving the living conditions of rural migrant workers' (JZF [2007] No. 276), 'significantly improving the living conditions of rural migrant workers' (GBF [2011] No. 45), etc. More detail on specific measures of implementation is needed.

Housing policy for rural migrants still lacks a wider conceptual framework that integrates urban and rural planning. Under the planned economy system, the 'welfare-oriented public housing' of urban residents and the 'homestead' of rural residents were both a specific form of housing security system and guaranteed 'shelter for all' under low productivity levels (Chen 2006). During the process of urban housing system reform, 'welfare-oriented public housing' for urban residents became private property, while the 'rural house site' is still a potential asset under the collective ownership of rural land that cannot be effectively realised. The relationship between the housing security of rural migrants in cities or towns and the 'rural house site'

cannot be ignored. It explains why the rural house site in some areas can exchange as urban real estate. This shows that the objectives of existing housing policies for rural migrants in China lack an overarching planning framework spanning urban and rural areas.

9.4.2 Synchronisation with Legal and Other Policies

There is currently no basic legal guarantee for the existing housing policies for rural migrants, and there are contradictions between the solutions put forward to resolve migrant accommodation issues current land policies. The formulation of a more comprehensive legal system is key to resolving housing problems. Most of China's housing policies are in the form of 'Guidance Opinions' and 'Notices' from government departments at various levels and have not been consolidated in law. Old practices from the Maoist era, such as 'one case one meeting' and 'handle special cases with special methods', still persist, and some policies even have obvious conflicts with current land policies (Lv et al. 2007).

The practice of using rural collective land to build rural migrant workers' apartments contradicts the *Land Administration Law of the People's Republic of China*. Article 63 of *Land Administration Law* (2004 Revision) which clearly stipulates that 'The right to use land collectively owned by farmers shall not be sold, transferred or leased for non-agricultural construction.' Apartments for rural migrant workers clearly belong to the category of non-agricultural construction. The conversion of redundant factories, libraries and other public facilities into migrant accommodation and the transfer of land in industrial parks for migrant apartments are likely to change the use of state-owned land. Suppose land was originally designated for industrial and mining use rather than residential purposes. In that case, the construction of rural migrant workers' housing on this land violates the provisions of *Land Administration Law*. Current legislation ensures that development can only take place on state-owned land in accordance with the rights and conditions that originally applied. The use of redundant factory buildings or land released from bankrupt or closed enterprises for migrant accommodation may conflict with the local government's land acquisition and reservation policies.

9.4.3 The Appropriateness of Policy

The appropriateness of housing policies for rural migrants in China can be evaluated from the perspectives of housing security coverage, security methods and standards. Rural migrants are included within China's urban housing security system, and housing security has also been diversified. Although there have been great strides in China's housing policies for rural migrants, housing security standards have yet to be improved.

There are substantial regional differences in rental and spatial policies. The prevailing guidance on rent for publicly owned rental housing is that it should be, 'reasonably determined according to the principle of slightly lower than the market rent' (GBF [2011] No. 45). The spatial standard for public rental housing first requires that the single floor area shall be strictly controlled below 60 square metres (JB[2010] No. 87), and then stipulates that small apartments with a single floor area of about 40 square metres should be the dominant form (GBF [2011] No. 45). Can super-low rents be sustainable? Will rural migrants actually be able to rent houses at rates slightly below the market standard? And are the standards for suitable dormitory areas incompatible with the trend for family members of rural migrants to move with them to the city? These questions all need to be answered.

9.4.4 The Enforceability of Policy

Capital investment issues mainly arise during the implementation of existing housing policies for rural migrants, when responsibilities are divided between central and local governments. The GBF [2011] No. 45 Document proposed that provincial government should take overall responsibility for affordable housing projects in their region. Municipal and county people's governments would be responsible for implementing specific preliminary work, construction funds, land supply, quality control, rental and sales management and supervision of affordable housing. The central government would continue to increase funding subsidies while local government should prioritise affordable housing projects in their budgetary arrangements and increase financial investment. It can be seen that local governments are mainly responsible for raising funds for affordable housing, and the local government's financial expenditure is often under great pressure. From 2009 to 2018, the national fiscal expenditure for housing security increased from RMB 180.34 billion to RMB 680.637 billion, an average annual increase of 30.82%. Local government fiscal expenditure has stood higher than 90% since 2011, and central government expenditure remains below 10%.

However, for local governments with a long-standing gap between revenue and expenditure, housing security exerts a double pressure, incurring both a decrease in revenue and an increase in expenditure. Local governments can consequently be passive about providing housing security, but they have positive power to increase income by selling land, stimulating economic growth through real estate and maintaining high house prices. In the new round of local government housing construction plans over recent years, the scope of government housing security is often smaller than that determined by the central government (Dong 2011). This shows that there is a difference between the central and local governments in demand for housing security. In this context, it is more difficult to implement housing policies for rural migrants.

9.4.5 The Actual Effect of Policy

Work is still in progress in devising policy solutions for migrant housing problems, and the practical effect is limited. In 2018, less than 3% of urban–rural migrants purchased affordable housing or rented publicly owned accommodation. The proportion of rural migrants who enjoy urban housing security is still very low. At the same time, there are continuing housing issues facing locally registered residents, which remain a priority for local governments. Local policies that aim to address migrant accommodation problems leave issues relating to the local urban registered population unresolved. As a result, the practical role of these policies to resolve migrant housing problems remains limited.

9.5 Policy Implications

Improving housing regulations and policies is essential to the process of 'new urbanisation' and the urbanisation goal of 'three 100 million people'. As well as steering population migration by employment, it is also necessary to improve housing regulations and policies to reduce obstacles to migration. We now explore these policy implications in more detail.

9.5.1 Coordination of Urban–Rural Land and Housing Systems

The trend for rural–urban migration is likely to continue for some time. In the long run, land and housing system reforms are necessary for the overall planning of urban and rural development. To formulate housing policies for rural migrants, it is necessary to first establish the long-term goal and concept of overall urban and rural planning. There is a major contradiction between the dual housing consumption of rural migrants in urban and rural areas. While rural migrants living in the city 'consume' housing there, they also typically have a home in rural areas. This has led to a disconnect between migrant housing patterns across urban and rural areas, which leads to the phenomenon described as, 'no one lives in rural housing and people have no houses in the cities where they work.' Rural migrants live in the city most of the time, and their income mainly flows into those cities rather than back to their rural homelands. On the other hand, there are many rural migrants who plan to build or purchase houses in their hometown, while few intend to purchase houses in the city. Given the housing difficulties facing rural migrants flowing into urban areas and redundant rural homesteads and houses, the establishment of an overall, integrated

urban–rural land and housing system should be a long-term policy goal. The key is to promote systematic rural land reform, speeding up the establishment of a free market for homesteads and rural houses. That way the families of rural migrants who plan to settle in urban areas can have channels to realise their rural assets so as to increase their ability to afford housing stock in towns and cities. Once they have realised their rural assets, such families could obtain urban housing through market transactions. Those currently unable to afford urban housing could then enjoy the same housing security as other urban residents. Even if rural migrants' families are not willing to realise these rural assets, as long as the free trade market for rural land is established, the value of such assets can be evaluated against the market transaction price and included into their total household assets. If they meet the access qualifications for an overall urban–rural housing security system, they can also enjoy the same housing security as other urban residents. By setting integrated planning for urban and rural land and housing systems as a long-term goal it will become possible to improve policy development and delivery.

9.5.2 Housing Laws, Regulations and Security Systems

Market and government are the two channels that allocate housing resources. Affordable housing provides the dividing line between market allocation and housing security. Those able to purchase or rent houses can do so through the open market, while families with insufficient collateral require housing security provided by the government. The majority of migrant families have insufficient resources to afford to buy houses in the city and must rely on government intervention. The urban housing market erects barriers to resolving housing problems. It is both unrealistic and impossible to solve migrant housing problems without considering the issues facing other urban low-income groups. China's rural migrants make up a significant proportion of such groups, but they are by no means alone. Any solution to migrant housing issues should be carried out under a wider framework of tackling urban inequality as a whole. Equally, the level of housing security for rural migrants depends on the overall context across the city as a whole. China's urban housing security systems still have many problems and lack sound legal guarantees. From international experience, the establishment of a comprehensive legal system is an important factor in resolving housing problems. For example, Japan's *Public Housing Law*, *Residential Corporation Act*, *Basic Residential Law*, etc. clearly defined the housing construction objectives, capital sources and other policy safeguards in a legal form. In China, specific measures to resolve migrant housing problems may not integrate or even conflict with legal and other policies. The development and revision of appropriate regulations are required to improve China's housing security system to benefit rural migrants. This will take a long time, so it is appropriate to design policies as a long-term strategy for improving these systems.

9.5.3 Affordable Housing

Poor housing conditions and the inability to afford urban property militate against the integration and settling of rural–urban populations. The key to solve housing problems is not the right to own property so much as the ability to obtain safe, healthy and stable housing. Issues of both supply and demand require attention. Supply-side measures may mainly include: combining the reconstruction of shantytowns (Chap. 7) and urban villages (Chap. 6) with the elimination of inferior housing that falls below health and safety requirements. Alongside these measures should be the provision of affordable homes for rural migrants and their families. Ways to extend housing property rights to rural migrants could be explored both for rented and purchased accommodation. Low-cost housing purchase opportunities could run alongside the encouragement to vacate vacant housing land in rural areas. On the demand side, measures could focus on improving access to affordable housing, and expanding the proportion of monetary subsidies to remove barriers and ensure the reasonable flow of population.

There are clear regional differences in the ability of migrants to afford property, so it is necessary to formulate regional housing policies. Government contributions to housing security should be greater in eastern provinces than in central and western regions, with the focus on improving the ability of migrants to obtain property rights. In the central region, the market can chiefly meet the housing needs of rural migrants. Housing security should improve the ability to rent or purchase houses by combining low-cost purchase opportunities with encouragement to vacate vacant rural housing land. The western region could adopt policies similar to those in the central region, but with stronger government intervention, and more emphasis on the improvement of housing conditions.

9.5.4 Land Reform

Land system reforms are closely connected with the reform of the household registration system. The main barrier to permanent urban settlement for rural migrants derives from land issues in their rural homelands, especially those around the rural homestead'.[9] There is currently an urgent demand for rural land system reform. Failure to address this has slowed the urbanisation process. The focus for rural land system reform lies in the reform of the rural house site system. Land reform is necessary to facilitate rural–urban migration. The land rights and interests of rural migrants mainly comprise contractual land management rights and rights to homestead use. The first is the right to own agricultural land, and the second is the right to own sites set aside for house building as collective construction land.

[9] The rural house site is the land occupied by the peasant family as the residential base, and its ownership belongs to the members of the rural peasant collective.

There are three key points in the reform of contractual land management rights. One is to stabilise the contractual relationship and clarify specific long-term provisions. The second is to grant household certificates and to grant collective property rights to individual members of collective economic organisations. The third is to promote the orderly transfer and mortgage of land management rights and realise their potential value.

The reform of homestead rights can be promoted from three aspects. The first would be to establish an integrated urban and rural construction land market. Under the present land system framework, urban land is owned by the state—the state occupies land on behalf of all the people. Rural land, however, is collectively owned. Both systems are concrete manifestations of socialist public ownership. China's urban–rural division within the construction land market cannot be sustained indefinitely. The establishment of an integrated market for construction land across rural and urban areas can only be achieved by transferring collective rural construction land into state-ownership. The specific means to achieve this needs to be considered thoroughly and comprehensively. The second measure would be to explore feasible routes for urban residents to purchase homesteads and commercial houses. Taxation and other fiscal systems could be designed to enable urban residents to purchase homesteads and market-value houses, enabling rural populations to realise their assets and improve the utilisation and efficiency of rural land and houses. The third would be to improve mechanisms and management for balancing land index differentials between urban and rural development sites. To establish an integrated urban and rural land market, we need to take account of fluctuating land use quotas set by the government, which determine the amount of land that can be used for conversion and development, the construction of new villages, and the refurbishment of new villages dilapidated rural housing. These quotas need to be better coordinated between rural and urban areas. Proceeds from construction land index trading could then be used for land consolidation and reclamation in order to transfer subsidies to migrant populations. The increase in urban construction land could then link with the number of rural migrants coming into the city.

9.5.5 Urban Housing Management

The rental market appeared relatively late in Chinese cities. As urbanisation gathered momentum an influx of foreign nationals created rapid development in the rental market. In sharp contrast, the government's management of the housing rental market is yet to be implemented. The result is an often chaotic rental market. China should formulate the industry standard for managing rented housing. It should institutionalise control of this market from the perspective of market access, only allowing the provision of accommodation that provides appropriate living standards for rural migrants. Specialised departments are needed to supervise the management of the housing rental industry. At the same time, the government could introduce a series of policies to benefit the people, such as providing low-cost rental housing for rural

migrants via government channels, and building an open and transparent rental information circulation system, etc., to allow rural migrants easier access to information on appropriate rental options.

There is also a need to strengthen the management of temporary housing. Many rural migrants are engaged in construction, logistics and other relatively low-end manual labour-intensive industries. In order to save housing costs, they usually live in temporary sheds or densely populated dormitories provided by employers. Adequate living standards within such temporary housing are not always guaranteed. The government could therefore regulate living conditions to ensure they are maintained to a safe and adequate standard. In addition, the government could encourage employers to build employee dormitories to provide safe and comfortable housing for rural migrants through land concessions, tax relief and other measures.

Overall, the goal should be to bring rural migrants fully within the scope of urban housing security. This has been a major Chinese aspiration for more than a decade. It is, however, difficult to achieve this goal under current conditions, and therefore, a number of changes are needed. Rural migrants need to be guaranteed access to the housing provident fund.[10] Where rural migrants hold stable occupations in cities, the government could allow them to use grants or loans to pay their rent and improve their living conditions. A low-rent housing system for rural migrants would then be gradually improved. Current low-rent or affordable housing provision mostly caters for low-income urban groups. To resolve urban housing problems facing rural migrants, the workers themselves would be among the beneficiaries of low-rent housing systems. Only when rural migrants have their own houses in the city, can the permanent transfer of rural population and the urbanisation of China be fully realised.

9.6 Conclusion

The mass migration of rural workers to the cities has posed major challenges for the housing system in China. Ambitious policy goals have been proposed, but they have been vague and disjointed, and as a result, they have failed to impact the living standards of rural migrants significantly. In order for China to achieve its vision of 'new urbanisation', there needs to be a coordinated approach to housing policy that is grounded in a broader strategic approach to urban planning. Fundamental housing and land reforms are needed to bring about system-wide coherence and lasting change. An essential complement to such reforms is a more comprehensive and coherent housing safety net to protect the most vulnerable rural migrants. The private renting and homeownership sectors also need to be reformed in the light of best practices observed in countries with more established housing market institutions and regulations.

[10] The housing provident fund is a form of long-term housing savings that both employers and employers pay into, with equal contributions form each.

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Part III
Future Directions for Research and Policy

Chapter 10
Multi-scale Inequality and Segregation: Theory and Estimation

Gwilym Owen, David Manley, Ron Johnston, Tim Birabi, Hui Song, and Bifeng Wang

Abstract This chapter explores multi-scale estimation methods as an important future direction for segregation research in China. We explain how these recently developed methods help address many longstanding problems in traditional index-based segregation research and open up new avenues of research on Chinese cities. We explain the conceptual framework underpinning multilevel analysis in the form of a series of propositions that capture the theoretical basis and outline why a multilevel approach to segregation is advantageous. We then illustrate how this approach can be applied to China using census data on Shijiazhuang, the capital city of Hebei Province. We use the model to consider segregation of different ethnic groups and of migrants versus non-migrants. We conclude with a discussion of our findings and our thoughts on future directions for research and the implications for policy.

Keywords Segregation measurement · Index of dissimilarity · Segregation theory · Intersectionality · Multilevel segregation · Shijiazhuang, China

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10.1 Introduction

Much of the academic research on segregation has focused on the degree to which residents from different socioeconomic, ethnic or cultural backgrounds live separately from each other. Because this separation has the potential to exacerbate the mistrust and antipathy between groups (Allport et al. 1954), it is something that societies need to measure, monitor and often seek to mitigate. While segregation is often measured in residential locations, it can take many forms beyond including segregation in the workplace, education, travel patterns, leisure activities, and friendship groups (see Chap. 2). However, many of these alternative places are nevertheless affected by, or at least correlated with, where and how people live.

However, segregation is of interest for reasons beyond its effect on inter-group contact. From an economic perspective, segregation also charts the spatial expression of inequality within modern society. Recent work has demonstrated that there is a linkage between the extent to which a country's urban areas are segregated and the intensity of more general inequality within that society (van Ham et al. 2015; Jones et al. 2018a, b). Against this backdrop, a large literature reports the often negative associations against which segregation is judged. Nevertheless, there may also be important positive aspects to segregation with the provision of culturally specific services, access to specific facilities, and strengthening in-group identities, as noted in the work by Merry (2016) and Merry and colleagues (2016).

In seeking to better understand how we should conceptualise segregation, Massey and Denton (1988) proposed five dimensions along which segregation had been be measured—evenness, exposure, concentration, centralisation, and clustering. These dimensions have been extensively explored in the literature and form the basis for much of the current discussion, debate and analysis. However, despite the fact that we have long had these five dimensions to measure segregation, there has been much debate—but little clarity—about how to operationalise them. Indeed, there has been substantial disagreement about which indices to use and how they should be reported. This is well-trodden ground, and we have no wish to rehearse these extensive debates. Rather, we note that the index of dissimilarity (Duncan and Duncan 1955) has been the most commonly used. Therefore, it represents a common standard against which the other indices and any new interpretations are judged. As we discuss below, there remain issues with reporting the index of dissimilarity, although some authors have explored adaptions to consider how to derive more information from the measure (Allen et al. 2015; Harris 2018). These become problematic when we set out our conceptual approach to segregation.

In this chapter, we explore some of the conceptual issues that have driven the recent wave of segregation research, drawing on multilevel modelling methods, to capture the multi-scale nature of segregation and to separate out the degree to which different population attributes (e.g. ethnicity and occupation) are the drivers of residential separation. So far, all of the studies that have used our multilevel modelling method for measuring multi-scale segregation have focused on cities in the USA, Europe, Australia, and New Zealand. There has been very little work of any kind measuring

segregation at multiple scales in China. We argue that by adopting this approach and exploring China, we can gain important insights to help enrich segregation research within the Chinese context, and also inform policy responses. The development of Chinese cities has been faster and more extensive than in Western cities, necessitating context-specific work to understand the scale at which segregation occurs, where it occurs and for whom it is greatest. In doing so, we can enable researchers to understand urban development in China better and equip policy makers with insights to target their policies better.

We start by setting out our conceptual framework in the form of a series of propositions that capture the various theoretical reasons why a multilevel approach to segregation is advantageous. We then illustrate how this approach can be applied to China using census data on Shijiazhuang, the capital city of Hebei Province. We use the model to consider segregation at multiple spatial scales for different population groups. We conclude with a discussion of our findings and our thoughts on future directions for research.

10.2 Conceptual Framework

Until recently, segregation studies have, in general, proceeded with a clear set of well formulated, but often implicitly placed, assumptions which it is necessary to explore in detail. Against this background lies a set of assumptions we wish to scutinise. We start by exploring ideas of scale (Propositions 10.1 and 10.2) and then consider how to explore segregation in highly diverse and complex modern urban environments (Propositions 10.3–10.5).

Proposition 11.1 *Segregation is not always greater at finer spatial scales: how traditional measures of segregation conflate segregation at different spatial scales.*

It has long been concluded within the segregation literature that a city divided into finer spatial scales (that is, smaller neighbourhoods) will have a greater level of segregation than those with larger neighbourhoods. For instance, Logan et al. (2015) noted in a study on the emergence of ghettos in New York from 1880 to 1940 that the purpose of their work was 'not to demonstrate that segregation is higher at a finer spatial scale, which is already well known' (p. 1077). However, this apparent conclusion may not be a result of the spatial organisation of individuals within modern urban society but the consequence of a methodological choice. A long time ago, Duncan et al. (1961, p. 84) observed '[i]f one system of areal[1] units is derived by subdivision of the units of another system, the index computed for the former can be no smaller than the index for the latter.' They go on to state that '[…] the index

[1] In this chapter we refer to areal units and neighbourhoods interchangeably to refer to part of the town or city which has been grouped together. Although we also acknowledge that neighbourhoods have multiple meanings depending on the context in which they are being used (see for instance Talen 2018).

of concentration on a county basis will exceed the index on a state basis, because the county index takes into account intrastate concentration'. Therefore, the inherent rule that the finer the scale, the greater the segregation is, in fact, a rule of index calculation and not related to the distribution (i.e. the segregation) of people across space.

This methodological issue has been written about extensively elsewhere within the quantitative social sciences (see, for instance, Kish 1954; Johnston et al. 2016a, b). Tranmer and Steel (2001) identified that when processes are occurring at multiple scales it is crucial to incorporate all these levels into the analysis. If a level is omitted, then the variation[2] related to that level ends up in the lowest level included in the study. Therefore, if this finding is applied directly to the segregation literature and, for instance, there is higher-level segregation in the urban environment which is not included in the analysis, then all the segregation from higher processes is shown in the index for the lowest level included. The implication of this is that low level (micro-scale) segregation will often be over inflated, in turn leading to the belief that the finer the scale, the greater the segregation. In other words, if segregation is measured at the micro, meso and macro scales then the resulting segregation should report only micro segregation at the micro level, only measure meso segregation at the meso level, and so on (see, for instance, Jones et al. 2015; Manley et al. 2019). When using the standard descriptive indices, this is not what happens because, as Duncan et al. made clear and Tranmer and Steel further exemplified, the values at one scale are conflated with the values at other scales.

More broadly, there is a strong theoretical case for including multiple spatial scales. We suggest that it is highly likely that in any given urban space segregation processes are likely to be occurring at multiple spatial scales. Individuals (or households) sort themselves into different parts of the city based on various sets of criteria and availability. It might be that some groups (ethnic, occupational, cultural, and so on) associate themselves with regions or large areas within the city, and then smaller or more compact neighbourhoods within that wider area (Harris 2018). These smaller neighbourhoods may or may not be contiguous depending on the characteristics and diversity of the urban landscape and the transitions between locations (Dean et al. 2019). Uncovering these spatial processes is critical to an understanding of the urban environment and the structure of the influences on the data, leading to a multitude of methodological challenges and outcomes (see Manley et al. 2006; Jones et al. 2018b).

Once we have included multiple spatial scales, we must also have the means to separate out the relative contribution of each scale to the overall level of segregation. Being able to do so is useful for two reasons: Firstly, it is useful from a process point of view: to understand what causes segregation it is necessary to know at which scale

[2] It is useful to note at this stage that we regard variance as a measure of segregation. Within a city constructed out of many neighbourhoods each neighbourhood will deviate in population composition away from the overall city composition. This deviation can be measured in modelling by calculating the variance. It is, therefore, possible to assert the greater the variance the greater the segregation, because the greater the variance the more different a given neighbourhood will be compared to the city overall.

it is at its most intense. Secondly, even if the focus is on the impact of segregation on residents' decisions, a knowledge of the source of segregation may be instructive for policies used to ameliorate those effects. The way in which policy would tackle genuinely high micro segregation, which pertains to a particular street, differs from the interventions needed to reduce segregation from higher-level structures such as full suburbs, towns or even labour markets.

Previously, Harris (2017) has demonstrated this with a decomposition of the index of dissimilarity on aggregated data, and what we present below offers a modelled approach. More explicitly, a multilevel model makes it possible to explicitly identify the amount of variance (that is segregation) located at each scale while ensuring that the variances at the other scales present in the model do not contaminate it. Without the modelling framework, it is not possible to identify the *net* contributions from each scale and establish whether segregation is 'necessarily' greater at micro-scales.

Proposition 11.2 *Aggregation of areas reduces segregation, but that does not mean higher-level segregation is lower!*

The idea of investigating geographical phenomena across many scales is not a new idea—it has appeared in the literature for many years (for recent examples see Reardon et al 2008; Östh et al. 2015). Often the data used for this work is derived from Population Censuses (in the UK and US at least).[3] For issues of privacy, these data are routinely aggregated from individuals into progressively larger areal units, from the smallest basic spatial units, through meso geographies, into larger, more regional (macro) scale units. The increasing size in terms of spatial extent and population count can be problematic for segregation measurement because the aggregation process fundamentally alters the objects being studied (see Fig. 10.1).

King (1996) notes that this demonstrates that scale (in terms of the modifiable areal unit problem: see Manley 2014 for details) is a theoretical and conceptual issue rather than an empirical one: scale changes, so the meaning of these changes units alters. At the individual level (or scale of the smallest areal unit), there will be sharper differences between areal units. In the case of a smaller population, it does not require a substantial change in population to alter the composition of an area dramatically, or for adjacent areas to be dramatically different in their composition. All other things being equal, at smaller scales, internal homogeneity will be higher across many variables than at higher scales.

As the areal units become larger, the population becomes more heterogeneous. It is likely that there will be the outcomes of multiple processes contained within a unit (see Manley et al. 2006). Moreover, the changes in population required to make any meaningful change to the composition of the area will need to be bigger compared with the smaller areas, and small clusters will be lost. Ultimately, as the units approach the same spatial scale as the total study area, so the composition of

[3] Even when using data held in individual level population registers as is the case in The Netherlands or the Scandinavian countries, the aggregation process used to combine individuals into neighbourhoods (areas) is similar.

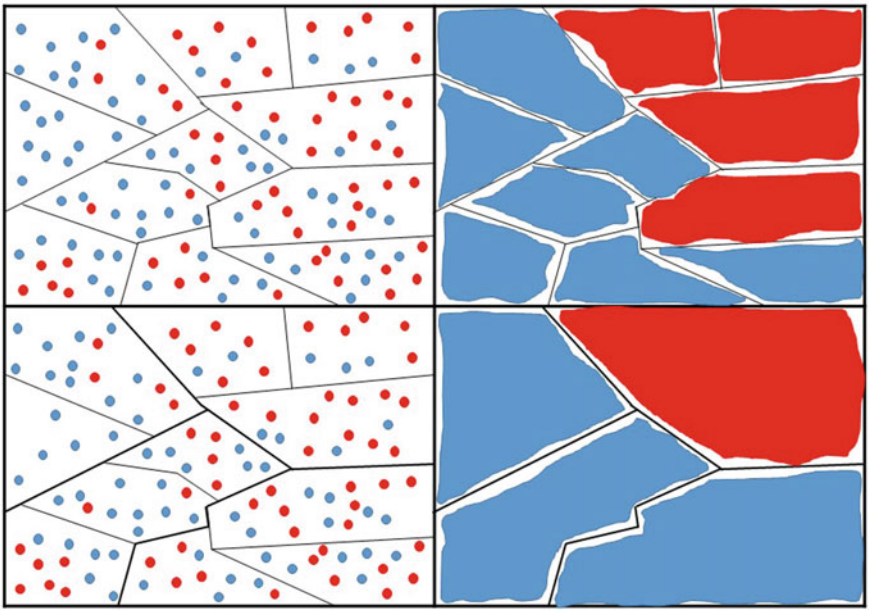

Fig. 10.1 The hierarchical nature of segregation: members of two ethnic groups are shown by red and blue dots respectively. On the left hand side, the resolution is preserved with the addition of neighbourhood areas from small units (top) to higher-level units (bottom). By contrast, on the right hand side the population appears much more segregated when mapping by the dominant ethnic group at the same two scales

the unit(s) will also reflect the totality of the study area: the population of the areal units and the city will be the same (see Olteanu et al 2019).

Therefore, combining the smaller units together 'smooths' the differences in the data towards the overall mean of the study space. As segregation is the uneven distribution of individuals across space such 'smoothing' will in turn reduce the potential for segregation because the potential for uneven distributions is also reduced. This will again contribute to the apparent reduction in segregation with higher spatial scales.

How should multiple scales be incorporated into the study of segregation in urban areas? We suggest that one objective should be the preservation of the individual-level data as far as possible, or if data is not available at an individual level, then the smallest areal unit scale. To achieve that, we move away from aggregating data to different and alternative spatial scales and treat scale as a series of 'hierarchical loops' around individuals in the survey areas. As such, we explicitly recognise that the investigation of segregation in urban areas is about the organisation of individuals over space and within bounded areas, but not the aggregated proportions of those structures. In doing so, the initial resolution of the data is preserved. Any changes in magnitude result from segregation processes and not a product of the statistical process(es) used when constructing the dataset.

Proposition 11.3 *Measures of segregation need to be able to deal with the multi-group complexities of modern urban environments, and determine if differences are meaningful.*

One of the main problems with traditional measures of segregation, such as the index of dissimilarity, is that they limit the number of groups that can be compared to just two. If there are many groups we want to compare, and we can only compare two at a time, we end up with an enormously cumbersome set of statistics that are very difficult to interpret. For example, if we want to compare the segregation of all 23 ethnic groups in the UK, and we can only consider two at a time, we end up with over 500 measures of segregation. These pairwise approaches to measuring segregation made sense in the originally developed context, namely Black-White segregation in the USA (Park et al. 1925; Duncan and Duncan 1955). However, their usefulness is much more limited in the diverse cities of the twenty-first century.

Once we are able to determine more clearly the relationships for many groups (for instance, ethnic, occupational or educational) within the urban environment, we then need to be able to examine whether or not the differences between the distributions are meaningful. One of the major issues within the segregation literature is that even relatively small alterations in the distribution of individuals result in different values on many of the indices, especially with data at micro-spatial scales. If we measure segregation by modelling the data (rather than reporting descriptive values), we can also estimate the uncertainty associated with our estimate by testing statistical significance.[4] We can calculate, for example, how likely it is that changes to our measure of segregation occurred by chance, rather than as the result of a genuine socio-demographic process. There is an argument that significance testing is not relevant because we are using full population data or the inherent problems in using arbitrary significance values (Wasserstein and Lazar 2016). However, in the context of segregation modelling significance testing remains useful for exploring uncertainty and to depict similarities between distributions. Using significance (or Bayesian Credible Intervals) firstly allows the investigation of substantial differences in levels of segregation between populations, and secondly reveals if there are such differences across (multiple) groups. Even when it is clear that the data include the full population, the distribution of individuals across urban space is only one example of the potential distribution 'universes' that they could take. So there remains the question of whether the particular spatial pattern of segregation we observe at a particular point in time is the result of random population churn or the outcome of a systematic 'sorting' process (such as homophily or White Flight—see Chaps. 2, 4, 12 and 15). As a result, testing the robustness of the distribution, and the likelihood that our estimate is random, is a useful addition to the information about segregated outcomes.

[4] Note, however, that modelling techniques can also be applied to traditional measures, such as the Index of Dissimilarity (see Lee, Minton and Pryce 2015) and the Relative Centralisation Index (see Kavanagh, Lee and Pryce 2016).

Proposition 11.4 *Intersectionality matters: individuals do not have single group identities.*

Our discussion has so far assumed that when investigating segregation, we are only interested in a single dimension—perhaps between ethnic groups or occupational status. Suppose we reduce our analysis of ethnic segregation to a simple majority/minority dichotomy, and leave out highly relevant dimensions such as class, occupation or age. In that case, we restrict our understanding of the urban social environment. As a practical example, a criticism levelled at research into residential ethnic segregation is that it tends to identify exclusion based on social class and income rather than any 'genuine' ethnic basis. The housing market sorts people by income levels and so if particular ethnic groups have significantly lower income levels than others they will inevitably be priced out of more expensive areas. It is, of course, possible to calculate indices of segregation for multiple dimensions and report the findings alongside each other. However, as with the issue of scale discussed above, they are conflated when calculating these indices separately. So how do we know, from conventional measures, the extent to which we are gauging the degree of income segregation rather than ethnic segregation? When attempting to understand both the state of the urban environment and the drivers of segregation, the ability to unpick the entanglement of multiple influences is critical to further our understanding. We can approach segregation from an intersectional viewpoint where multiple sites of discrimination are identified (Crenshaw 1990; Jones et al. 2018a, b). This observation takes us to our next proposition:

Proposition 11.5 *Segregation occurs across many different domains, both daily and across the course of a lifetime.*

Space matters! The location of groups and individuals within the urban fabric matters. Many standard descriptive measures of segregation do not take account of space. For example, the index of dissimilarity does not consider the proximity of areas with similar residential composition. This means that clusters of neighbourhoods with similar population characteristics will go unnoticed by the index. More generally, it means that if the areal units that comprise a city were completely reorganised (hypothetically), the same segregation result could be achieved even though the pattern had been altered (this is known in the segregation literature as the checkerboard problem: see Wong 2004). This can occur when the measure excludes the importance of space and works under the assumption that proximity of areas with similar or contrasting features is of no consequence. This is clearly an unrealistic assumption. The clustering of neighbourhoods with high levels of deprivation (Chap. 14) can severely inhibit life chances (see the work of Galster and Sharkey 2017 summarised in Chap. 15). Note also the emerging literature on the impacts of 'social frontiers' which arise when highly contrasting neighbourhoods are contiguous (see Chap. 13 and Dean et al. 2019).

We therefore need to ensure that the measure of segregation we use includes at least some form of spatial dependency. However, this insufficient it itself, because as

well as taking account of the spatial structure of the urban environment we need to understand the detail of the group locations. For instance, in a city with many ethnic groups, we want to know if they are segregated from the majority population and if they are segregated from each other—that is, if they are co-located or antagonistically located. It is possible to discern similar levels of segregation or spatial dependency, but still not report information on co-location. The ability to explore this aspect is crucial, given that the potential for contact has long been identified as a critical issue in the development and maintenance of group acceptance (see Allport et al. 1954).

10.3 Exemplifying Multilevel Segregation—Shijiazhuang, China

So far, all the studies that have used our multilevel modelling method to measure multi-scale segregation have focused on cities in the Global North and Australasia. In fact, there has been very little work of any kind to measure segregation at multiple scales in China. In the absence of such work there is clearly an important lacuna in the literature and our understanding of socio-spatial segregation in Chinese cities. To illustrate how our multilevel modelling method can be useful for increasing understanding of the multi-scale patterns of segregation in a Chinese city, we use data from the Chinese census for the city of Shijiazhuang to answer two research questions. Firstly, we ask how residentially segregated the different ethnic groups are in Shijiazhuang? Secondly, we investigate the degree of segregation among Chinese migrants into Shijiazhuang and how this is changing over time. Shijiazhuang is an industrial city, which has experienced rapid population growth over the past 30 years. It is situated on the North China plain (see Fig. 10.2), around 300 km southwest of Beijing, and is the largest city and capital of Hebei Province with a total population of around 11 million across the prefecture (by the end of 2019).

Measuring the multi-scale nature of segregation requires accessible multi-scale data. The lack of (scalar) data may therefore limit the uptake of this approach especially in countries with data infrastructures that are not as rich spatially nor as detailed demographically as in the Global North. In China, however, such data exists, although, as we discuss, with the important caveat that it is not always accessible to researchers.

Figure 10.3 shows China's six-tier administrative structure, which also provides the levels at which census data is compiled. Large urban areas which generally are of the most interest to segregation researchers are typically either prefecture-level cities or centrally administered municipalities. However, it is important to be aware that these administrative divisions usually contain more expansive surrounding rural hinterlands as well as a city's urban core and that the size of these rural areas varies across China. Consequently, researchers who wish to study residential segregation within a particular city, may need to produce an urban boundary that differs from the administrative boundary.

Fig. 10.2 Study area of Shijiazhuang (shaded black) within Shijiazhuang prefecture within Hebei Province

There are three scales within a large urban area—the district, the sub-district, and the residential community. In the past, these have been likened to size to the UK spatial units of local authority, Ward and Lower Super Output Areas (LSOAs), respectively (Wu et al. 2014). However, such comparisons are unhelpful because the conceptual and spatial meaning behind the units are somewhat different. Any study that takes them as equivalents to make scalar comparisons between British and Chinese cities would be misleading.

In our example, we select the five districts (Chang'an, Qiaodong, Qiaoxi, Xinhua and Yuhua) that broadly correspond to the urban area of the wider city. We used satellite imagery combined with local knowledge to decide the boundaries, reducing the prefecture population of 10 million to a core of 2.7 million inhabitants. As five units are insufficient for reliable multilevel modelling, we do not include this level in

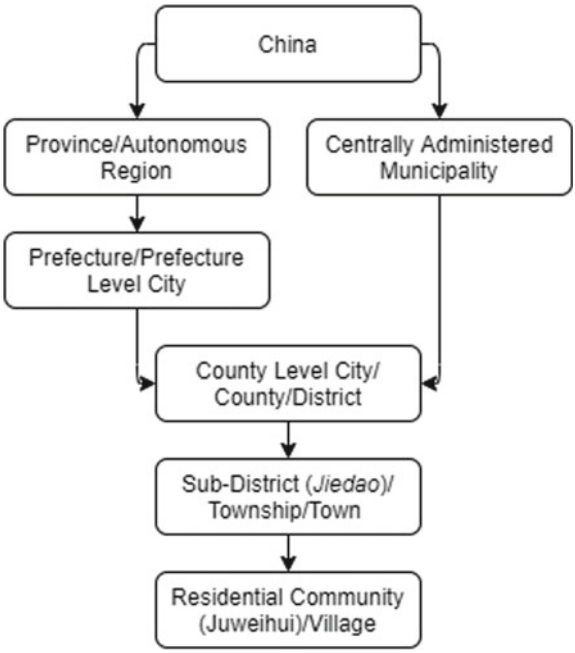

Fig. 10.3 Administrative Structure of China (adapted from Wu et al. 2014)

our analysis of Shijiazhuang. Even with two levels (the sub-district and the residential community) the evidence we present still provides an improvement on the single scale literature which generally implements either the community or the sub-district scale (Wu et al. 2014).[5] Within these five districts there are 49 sub-districts and within these are 450 residential communities. The size of each unit varies both between and within cities/regions, but in our data each district has an average of around 675,000 inhabitants, each sub-district 45,000 and each residential community 6,000.

One of the main reasons researchers have used the sub-district as the unit of analysis in segregation studies, particularly when comparing multiple Chinese cities (e.g. Monkkonen et al. 2017), is obtaining data at the residential community level can be difficult, even within China. For the 2000 and 2010 censuses, the sub-district is the lowest level at which the National Bureau of Statistics has released official census data, while data on residential communities is often only available unofficially from local organisations. This is clearly a barrier to the uptake of the multilevel modelling method and segregation studies generally, as when used alone, sub-district data is too coarse to learn anything detailed about the magnitude of segregation for different groups in the city.

The inclusion of additional data from the smaller residential community scale has much to contribute to segregation studies in Chinese cities, for this very reason.

[5] The district level could be included in analyses of the largest Chinese cities, though researchers should consider possible bias to variance parameters associated with small sample sizes (McNeish and Stapleton 2016; McNeish 2019).

Such representation of Chinese communities also offers an advantage over census collection units such as those in the UK and other European countries, in that they are units of local administration and, in many cases, units at which important aspects of social life are organised (Chen, Lu and Yang 2007). Adopting this scale allows us to implement the study at the level of a spatial process that is beneficial in terms of understanding segregation (see Manley et al. 2006; Jones et al. 2008). Furthermore, many communities are gated, creating a clear physical boundary (Xu and Yang 2009). In many urban areas, due to high population densities in high-rise buildings, the geographical space in which 6,000 people live is more compact than in many urban areas many Western cities. This is not to say that these communities are necessarily the perfect unit of analysis for a segregation study. Through urban renewal, housing estates are gradually replacing the work unit residential areas and traditional housing on which the residential communities are based. The newer housing estates across Chinese cities may provide a more appropriate setting for the study of concepts like community and neighbourhood and are often smaller than the administrative residential communities.

10.4 Ethnic Residential Segregation

While the residential segregation of ethnic groups is the focus of many segregation studies in Europe and North America, this issue has received less attention in China. This is predominantly because in most large cities, despite the existence of 56 officially recognised minority groups, the proportion from ethnic minorities is low (see Table 10.1 for the ethnic population in Shijiazhuang). In cases where there have been low numbers from ethnic minorities, it has been argued that there is insufficient difference to create distinct social areas within the city, and therefore, ethnic residential segregation is not traditionally considered a problem (Li and Wu 2008). However, even when numbers are small, understanding how different minorities locate within a city at different scales can help ascertain the level of integration across different ethnic groups and whether certain groups may be disadvantaged. An income gap

Table 10.1 Ethnic Population of Shijiuzhaung, 2000 Census

Group	Population
Manchu	22,384
Hui	18,651
Mongolian	3,235
Tujia	1,147
Miao	740
Zhuang	736
Tibetan	519
Yi	449

exists between the minority and majority populations, and the importance of the inclusion of minorities in China's economic reforms has been highlighted as a key challenge for the country's future development (Cao 2010).

Of course, segregation, particularly at small scales, may offer certain benefits for ethnic minorities. This could be, for example, through enabling them to maintain their cultural heritage, providing social community support or access to specific services relevant to the group. Nevertheless, other aspects of segregation are negative, particularly if a group is clustered in deprived areas or distant from employment and education opportunities. Segregation at different scales may well bring varying advantages and disadvantages for different ethnic groups. Therefore, it is important to find methods to measure segregation at more than one scale within the city.

Previous studies of the segregation of ethnic minorities within China have tended to consider very coarse spatial scales and focused on how ethnic groups are distributed throughout a province or even throughout the whole of China, rather than within a specific city (e.g. Wong 2002; Cao 2010). Those that focused on particular cities, have looked at ethnic enclaves of foreigners such as Africans, rather than segregation of Chinese ethnic minorities (e.g. Zhang 2008).

We have already highlighted a set of propositions relating to the study of segregation. The multilevel modelling method we adopt here allows us to address each of these propositions, within the constraints of the data we are using. For this example, we build on the work of Jones et al. (2015; see also Manley et al. 2015; Johnston et al. 2018) and use multilevel modelling to explore the segregation of Chinese ethnic minorities within a Chinese city at the finest spatial scale, the residential community, while also considering a larger spatial scale, the sub-district. Our models can handle multiple groups within a single model without the need for a reference category, and produce correlations at each scale between the different groups.

To measure segregation, we calculate MRRs or Median Rate Ratios. These are transformations of the variance estimated at each spatial scale in the multilevel models and are useful as they provide standardised rates with which to make comparisons. The MRR is defined as 'the increased rate, (on average; hence, the median) if one compares the rates of two [residential communities] chosen at random from the distribution with the estimated variance' (Jones et al. 2015, p. 2001). If there was no segregation the MRR would be equal to one and the higher the MRR the greater the segregation. To aid interpretation, we use the MRRs as analogous to odds ratios and adopt the heuristic proposed by Cohen (1988). Values below 1.5 are considered low, between 1.5 and 2.5 are medium, between 2.5 and 4.3 represent high and above 4.3 is considered very high.

Results

Table 10.2 reports the MRRs and associated Bayesian Credible Intervals for segregation by ethnicity at both the sub-district and residential community level. While ethnic residential segregation exists at both scales, two exceptions are greater at the residential community level. This is the case for nine out of the ten ethnic groups and for five of these groups the MRR is more than 50% greater at this smallest scale. The results are visualised in Figs. 10.4 and 10.5 to highlight the range of credible

Table 10.2 MRRs and 95% Bayesian Credible Intervals for the nine ethnic groups and the Han majority

	Sub-district		Residential community	
	MRR	95% Credible interval	MRR	95% Credible interval
Manchu	1.69	1.50–1.94	2.19	2.05–2.35
Hui	2.53	2.11–3.11	2.21	2.05–2.38
Mongolian	1.48	1.33–1.68	2.25	2.06–2.27
Tujia	1.49	1.30–1.74	3.27	2.82–3.84
Miao	1.59	1.33–1.98	4.18	3.41–5.21
Zhuang	1.71	1.39–2.17	3.82	3.13–4.74
Korean	1.87	1.50–2.38	3.64	2.96–4.50
Tibetan	2.08	1.46–3.15	7.28	5.03–11.12
Yi	1.75	1.37–2.37	7.76	5.50–11.44
Han (Majority)	1.14	1.11–1.17	1.05	1.05–1.06

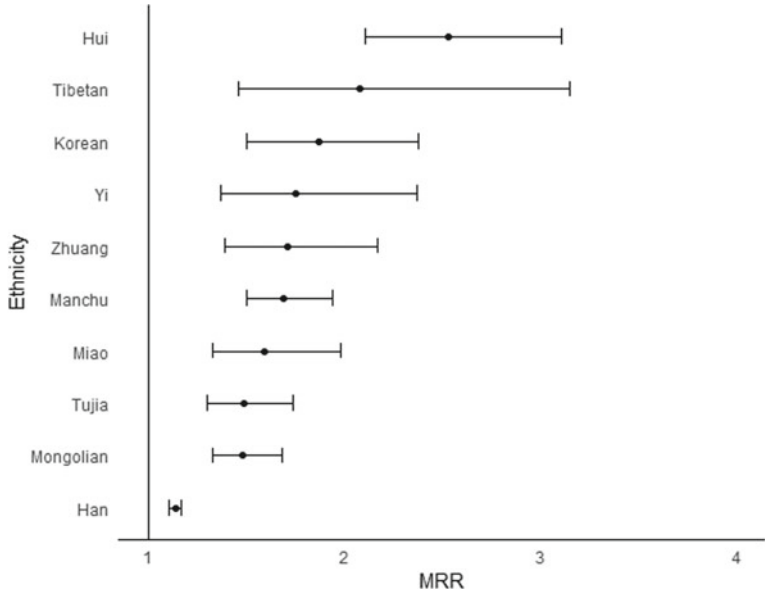

Fig. 10.4 Graphical Distribution of the MRRs at the Sub-district level

intervals and demonstrate that at the Sub-District level there is little difference in the values (with the overlapping bars). At the residential community level, however, there are three clear groups. The Mongolian, Hui and Manchu—along with the majority Han—are the least segregated, while the Tujia, Korean, Zhuang and Miao are more segregated, and the Yi and Tibetan are the most segregated.

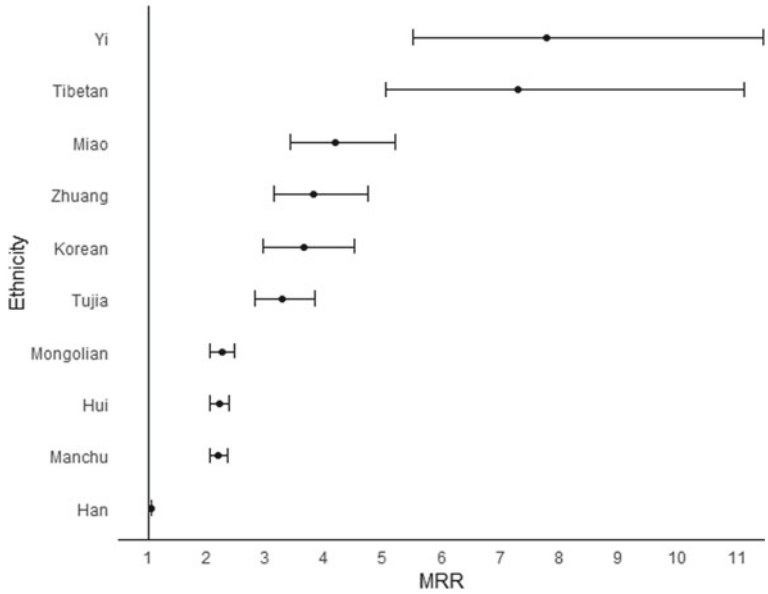

Fig. 10.5 Graphical distribution of the MRRs at the residential community level

At this residential community scale, the results show substantial segregation. All the ethnic minorities have an MRR greater than two meaning that if two residential communities were picked at random, the rate for the higher residential community would, on average, be at least twice that of the lower community for all ethnic groups. There is also large variation in the MRRs at the residential community level between the ethnic minority groups, ranging from the Manchu with an MRR of 2.19 to the Yi (MRR = 7.76). In particular, the larger ethnic minority groups, such as the Manchu and Hui (MRR = 2.21), of whom there are more than 15,000 individuals, are much less segregated than the smaller ethnic groups such as Yi and Tibetan (MRR = 7.28) of whom there are less than a thousand. Indeed, the correlation between size of ethnic group and level of segregation at the residential community level is 0.7.

At the township level (sub-district), segregation is lower and the range of MRRs is much smaller ranging from 1.49 (Tujia) to 2.53 (Hui). The Hui ethnic group appears to be an exception to the general rule. The segregation of this group is higher at the sub-district scale than at the residential community scale, although not significantly statistically. In fact, the Hui appear to exhibit a completely different pattern of segregation, being the second least segregated at the residential community level but the most segregated at the sub-district level. This may reflect the fact, that the Hui are different from other ethnic groups in that their unique identity is based around their Muslim religion rather than local customs and language. Additionally, compared to the other ethnic groups, which have highly localised distributions within China, the Hui are much more widely spread out across the country (Wong 2002), and therefore possibly more heterogeneous in their cultural background. Because of

these factors, the key drivers of where they locate within a city may well be different, with, for example, the location of mosques within the city, likely to play an important role.

Using the MRRs as the only measure of segregation, one would conclude that the segregation of ethnic minorities in Shijiazhuang was very high. It is important to remember, however that ethnic minorities are extremely rare in the population. In fact, the numbers are so low that despite this large unevenness in their distribution, there are no residential communities at all where more than 10% of the population are ethnic minorities of any kind.

The multilevel modelling method treats segregation as deviation from a theoretical evenness of the population. However, another way of measuring segregation is by exposure—defined as the degree of residential contact with majority groups (see Massey and Denton 1988, and as noted in the introduction). In contrast to the evenness measure, if we had measured segregation using the concept of exposure, we would likely have concluded that ethnic minorities are not particularly segregated. These different dimensions of segregation are important to consider when thinking about the societal implications that may result. While the numbers are very low for Shijiazhuang, this is not actually true for all cities in China. For example, in Beijing there are over half a million inhabitants from the ethnic minorities (National Bureau of Statistics 2005).

Table 10.3 shows the correlations between the ethnic groups at both spatial scales. These allow us to see which groups tend to co-locate and if there are any groups that are separated geographically. The main message from these correlations is that,

Table 10.3 Correlations between pairs of ethnic groups at the Residential Community level (below the diagonal) and for the sub-districts above the diagonal). Correlations greater than 0.4 in bold. Correlations where the credible interval includes 0 in italics

Community	Manchu	Hui	Mongolian	Tujia	Miao	Zhuang	Korean	Tibetan	Yi
Manchu		**0.68**	**0.73**	***0.42***	*– 0.07*	**0.47**	**0.66**	**0.57**	*0.21*
Hui	**0.64**		**0.55**	0.28	*– 0.14*	0.21	**0.48**	0.24	*– 0.03*
Mongolian	**0.81**	**0.52**		**0.44**	*0.04*	*0.26*	**0.52**	**0.50**	*0.18*
Tujia	0.21	*– 0.10*	0.38		*0.05*	*0.13*	*0.33*	*0.37*	*0.12*
Miao	*0.06*	*– 0.14*	0.22	**0.48**		*0.26*	*– 0.12*	*0.07*	*0.28*
Zhuang	**0.47**	0.21	**0.43**	0.31	**0.41**		*0.02*	*0.08*	**0.41**
Korean	**0.55**	0.33	**0.40**	0.35	*0.19*	**0.43**		**0.56**	*– 0.00*
Tibetan	**0.42**	0.24	**0.42**	0.34	0.30	**0.52**	0.24		*0.11*
Yi	0.21	*– 0.03*	0.27	**0.42**	0.39	**0.43**	0.27	**0.51**	

generally, ethnic minorities locate in both the same districts and the same communities as other ethnic minorities. Out of 36 possible pairs of ethnic groups at each level, only three are negatively correlated at the residential community level and only four at the sub-district level.

The strongest correlations at both levels are between Mongolians and Manchus with the correlation between these groups as high as 0.8 at the residential community level. Interestingly, as both these ethnic groups are also moderately to strongly correlated with the Hui, it seems that it is the largest minority groups that tend to locate together more. To understand more about the possible implications of this, further research could investigate other characteristics of the communities where multiple minority groups are found. For example, it would be useful to know if the different minorities are choosing to live in these communities because they have desirable characteristics for minorities, or whether, instead, they live there by default, perhaps for reasons of poverty, lack of opportunity or discrimination. Furthermore, although not all ethnic minorities are migrants, the segregation of minorities may be linked with the segregation of migrants which is the focus of the second research question.

10.5 Segregation of Migrants

In recent decades, many Chinese cities have grown rapidly, in large part due to high numbers of migrants arriving from rural areas. Past research has suggested that these migrants are often segregated within their host cities from the local population, both geographically and socially, in terms of the activities in which they partake in their daily lives (Zhu et al. 2017; Zhao and Wang 2018). Many rural migrants arrive in cities with low levels of education and skills and can be further disadvantaged by institutional factors such as lack of local registration status or *hukou*. Of particular relevance to segregation is that in some cities, the lack of local *hukou* status has meant restricted access to local services, including housing (Wang and Zuo 1999; Chan 2010). This is important as past research has shown that settlement patterns significantly determine the future socioeconomic standing of migrants (Wu 2014).

Past studies have attempted to quantify the segregation between migrants and local populations in Chinese cities (e.g. Li and Wu 2008, 2016); however, there is little research into the scales at which this segregation exists and how the extent and patterns of segregation exist have changed over time. Migrants are likely to be a highly mobile group both within cities and between cities and rural areas (Wu 2006). Over time more arrive, some return to their place of origin while others who have stayed a long time potentially become more integrated into the city. It is therefore likely that the segregation of migrants within cities is constantly in flux due to a multitude of processes. By measuring whether the spatial separation of migrants and locals is widening or decreasing, and at what scales this is happening, we can contribute to wider research around the extent to which migrants are excluded from the social benefits of China's rapid economic development (Li 2005; Li and Rose 2017).

In this example, we model the segregation of migrants compared to local Shijiazhuang residents at both the Residential Community and the Sub-District scale at two time points, 2000 and 2010, to explore changes over time. One important challenge in doing so is that there is no official definition of whether an individual is a migrant or not in the Chinese census. To overcome this, we therefore identify whether an individual's *hukou* registration status is in the sub-district in which they live. Although this is an imperfect definition of migrants (as it includes those who have *hukou* status in nearby sub-districts who would probably not usually be considered as migrants) it is a definition which has been previously employed in segregation studies and is the best available given the data (Li and Wu 2008). It is also important to note that migrants are also likely to be a highly heterogeneous group. As well as the rural migrants we have discussed, there will also be highly educated migrants from other urban areas who have moved for specific economic or social reasons.

As well as the obvious advantage of enabling the study of multi-scale segregation, our modelling method offers an additional benefit. Because we model segregation rather than create a descriptive index, we can measure the uncertainty around our segregation estimates. This allows us to assess whether or not any changes from 2000 to 2010 are systematic changes in segregation levels or if they are simply a random variation. Conducting this research in a medium-sized city such as Shijiazhuang is also of interest as most studies into the segregation of migrants have assessed megacities such as Beijing and Shanghai. It is likely that some of the drivers of segregation are stronger in these megacities as competition for land is higher and the importance of the *hukou* system in terms of access to housing has historically been stronger (Monkkonen et al. 2017).

The results (Table 10.4) highlight that although there is segregation at both the Residential Community and the Sub-District, it is greater at the lower residential community scale. In 2000 and in 2010, the MRR at this scale is approximately two indicating no change over time (especially as the credible intervals overlap). However, at the sub-district level, there is a change with the MRR increasing from 1.40 to

Table 10.4 MRRs for migrants and non-migrants at both scales for both years

		MRR	95% bayesian credible interval
Migrants			
2000	Residential community	2.03	1.93–2.14
	Sub-district	1.43	1.31–1.58
2010	Residential community	1.98	1.89–2.08
	Sub-district	1.70	1.52–1.92
Non-migrants			
2000	Residential community	1.45	1.42–1.49
	Sub-district	1.25	1.16–1.35
2010	Residential community	1.37	1.34–1.40
	Sub-district	1.20	1.14–1.26

1.70. Unlike the residential community results, this reflects a non-trivial amount of change—the difference between the sub-district and residential community level MRRs has halved. These results show that while the evenness of the distribution of migrants across residential communities is unchanged, the residential communities with more migrants are now more likely to be found clustered in the same larger areas (sub-districts) of the city. This pattern holds for the non-migrants as well, although the MMRs for this group is lower than for the migrants indicating less segregation. Moreover, the differences between the groups are significant, demonstrated by the lack of overlap in the credible intervals.

10.6 Discussion

Our empirical application has investigated the segregation of different ethnic groups and of migrants versus non-migrants. These two examples show how our multilevel modelling method can be used to increase understanding of segregation in a Chinese city. Both demonstrate how we can measure and report segregation at multiple scales. The ethnic minority example looks at how the method is easily adaptable to multiple groups and the migrant example shows how it is useful for analysing change over time. The results reveal that in Shijiazhuang segregation is highest at the smallest scale but is also present at higher scales. As we have only studied a single city, future work in other cities is necessary to explore whether these patterns are typical. In particular, comparisons with megacities such as Beijing would be fruitful to explore if Sassen's Global City framework (Sassen 2001) applies in the Chinese context. More longitudinal[6] work would also extend our knowledge.

The method can clearly be used to study other aspects of segregation in China. Socioeconomic segregation based on occupation and education levels is also prevalent in Chinese cities and could easily be studied with this method (Li and Wu 2008; Wu et al. 2014). It would also be possible to take our approach further by looking at the intersection between different types of segregation, as Jones et al. (2018a, b) have done in Sydney, Australia. Our method also makes it possible to answer questions around whether migrant status or socioeconomic status has a greater influence on segregation levels or whether segregation is greater for poor migrants or rich migrants. This can contribute greatly to our understanding of socio-spatial inequalities within cities.

A deeper understanding of segregation in Chinese cities is critical for policy developments. China has urbanised rapidly: in the 20 years up to 1990 the proportion of the population living in cities rose from 17.9% to 26.4% (Wei 1994) while figures from the end of 2017 suggest it has reached almost 60% (see Xiao et al. 2018). The speed and scale of urbanisation presents theoretical and empirical challenges

[6] Longitudinal research is based on repeated observations over time on a sample of individuals or geographical areas, as opposed to cross-sectional research which is based on data collected at a single time point.

and it is likely that current theories of urban development will not fit or explain the process or their rapidity sufficiently. Elsewhere in this volume (Chaps. 2, 3 and 15) the issue of marketisation as a driver of segregation has been identified: when households have the ability to select their neighbourhoods and homes or when housing markets become increasingly differentiated so that selective sorting into neighbourhoods occurs. As these neighbourhoods contain similar households and have amenities and characteristics reflecting residents' desired lifestyle status (see Schelling 1969; Clark 1991), they increase segregation. Moreover, marketisation often brings with it problems of affordability and access and an understanding of how these issues occur in Chinese cities, will aid our understanding of segregation. However, within the literature of wider urban geography, relatively little is known about the organisation of Chinese cities compared to the voluminous research on US, European and other Western cities. Consequently, we know relatively little about which spatial scales are the most important for measuring and addressing residential segregation.. It is well known from the research literature worldwide that the size and scale of urban development is an important factor in the composition and structure of urban neighbourhoods (see Petrovic et al. 2018). As Chinese cities are often far greater in size than those in the West, then spatial structures are likely to extend over larger areas. However, we do not know what the impacts are on life outcomes of different scales of segregation. Recent advances in the neighbourhood effects[7] literature will potentially make this possible in future (e.g. Manley et al. 2020).

In the context of rapid urbanisation and increasing urban expansion, it is essential to identify scalar segregation at local levels in order to gain useful policy insights. It might be that the implications of segregation—in terms of potential harm to well-being, education or social functions—occur irrespective of scale, in which case this questions the necessity for detailed local analysis. Successful policy interventions rely on the identification of the scale where they are likely to be most effective. If segregation is greatest at the micro-scale, for instance—a scale which often relates to specific dwelling choices rather than to larger neighbourhoods—then successful interventions are likely to be more targeted. As a case in point, the Hui are the only ethnic group in China that identify as Muslims and therefore, it is likely that they will locate near mosques. Other ethnic groups will show preferences for co- or close location with other specific services and facilities. Such micro segregation would be missed if the analysis is only undertaken at a macro level. Larger scale segregation, in contrast, may derive from restricted access to the housing market, either in relation to their migrant status (*hukou*) or because the type and cost of housing are prohibitive in those parts of the city.

Unfortunately, while these possibilities are exciting, there are also limitations, primarily in relation to data access. As discussed, data at the residential community

[7] 'Neighbourhood effects' is the name given to broad range of impacts on life outcomes caused by a person's residential environment. Various features of the neighbourhood (housing, transport, exposure to crime and pollution, access to employment, amenities, health care, etc.) have been shown to affect childhood development, educational attainment, employment prospects and long-term health. See Chap. 15 for further discussion. See also reviews by van Ham et al. (2012), Galster and Sharkey (2017) and Graham (2018).

level is often difficult to obtain and cross tabulations are likely to be even more difficult for researchers to obtain. For instance, data on both the number of migrants in a community and the number of people working in different occupations were available in our example, but not the number of migrants working within specific occupational groups. The sub-district level is the lowest at which we have cross tabulations. In this case, we can still use the multilevel modelling technique to look at whether migrants are more likely to be located in communities and sub-districts of high or low socioeconomic status. We cannot say, however, whether this is because the migrants themselves have high or low SES or whether they are simply likely to locate in the same areas. It may also be, as discussed above, that our community and residential scales are not the most appropriate for future work. In many Chinese cities, new housing estates are more appropriate subjects for studying concepts of community and neighbourhood. As these are typically smaller than the residential committee administrative areas we studies, they may represent a scale at which it will be even harder to obtain data.

Although there remain considerable challenges in the deployment of comparable data, the adoption of a modelling approach can also improve comparisons of segregation between countries. Past research has tried to do this with mixed results. One study suggested that segregation is much lower in China than in cities in Europe and North America (Li and Wu 2008), while another study (Monkkonen et al. 2017) using data from the same point in time, concluded the opposite, reporting that several of the largest Chinese cities are now more socioeconomically segregated than the most segregated American cities. Trying to make such comparisons is problematic, due to differences in how segregation is measured and differences between the countries studied. As an area spatial unit, the Chinese residential community is not necessarily comparable with any geographical unit elsewhere. Although multi-scale segregation methods do not necessarily solve these problems, they are helpful in a couple of ways. Firstly, they help us think critically about any comparisons with segregation indices in Europe and beyond by explicitly bringing attention to scale impact. Secondly, they can help us build up a more detailed multi-scale profile of segregation in a city which can at least be qualitatively compared with profiles in cities in other countries.

Studies using the multilevel method in London, UK and Sydney, Australia have shown, in general, greater segregation at micro and macro scales with little segregation present in the in-between meso scales (Jones et al. 2015; Johnston et al. 2016a, b). In Shijiazhuang we only have two scales and have shown that segregation is greater at the lower level. Drawing comparative conclusions is difficult. The smallest scale in the Chinese data we use is akin to the meso scales used in the UK and Australian studies. Suppose we map scales across national contexts using population size as our comparison measure. In that case, segregation is higher at the meso scale in Shijiazhuang than it is in London or Sydney. By contrast, it is lower at the macro scale. There is no smallest scale comparison possible because such data does not exist in China. Our results, therefore, do not allow us to make firm conclusions on whether segregation is greater or less in Shijiazhuang than in London or Sydney, but they do suggest that the nature of the segregation may be different.

Ultimately, the multilevel modelling method combined with the right data allows us to consider multi-scale segregation in Chinese cities for the first time. This approach is a range of quantitative approaches that can allow researchers to understand how different socioeconomic groups segregate within cities in China and beyond.

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Chapter 11
Characterising Social Integration Between Rural Migrants and Local Residents in Urban China: An Exploratory Social Network Analysis of Care Workers in Shanghai

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Abstract Recent decades have witnessed large migration flows from rural to urban China. This chapter explores the potential of social network analysis (SNA) for assessing and understanding social integration in contemporary Chinese cities. We begin by presenting the background and the complex, multi-dimensional and inter-connected factors that typically affect segregation and inequality within urban China. SNA is introduced as a potential analytical approach for characterising and examining the ongoing dynamic social integration process. We discuss some initial findings based upon an exploratory case study in Shanghai on multi-dimensional segregation in the social care sector. We also identify the limitations of SNA as a relatively innovative method for researching social integration and call for a mixed-methods approach towards its application in examining the intricacy and complexity of social integration in contemporary urban China.

Keywords Migrants · Social network analysis · Integration · Urban China · Care

11.1 Introduction

Social integration involves the co-existence of individuals or groups in a society and the connectedness and interactions between them. There have been many academic discussions about the definition and measurement of integration, including social attraction bonds between individuals and exchange processes in groups (Blau 1960); social connectedness and linkage with families and friends (Fischer 2011); connectedness between people from different neighbourhoods (Ndofor-Tah et al.

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2019) and barriers to integration within a society (Phillips et al. 2019). The multi-dimensional term encompasses factors like social roles, participation in various activities, perceived beliefs (Brissette et al. 2000); social control (Umberson 1987); access to resources and opportunities and social mixing (Ndofor-Tah et al. 2019). These different definitions naturally entail different approaches to the measurement of social integration.

The benefits of harmonious social integration are readily apparent. Social integration has proven associations with better health outcomes (Seeman 1996), increased social capital, civic participation, trust and solidarity within neighbourhoods and society (Putnam 2000; Brissette et al. 2000), as well as lower violent crime and conflict (Sampson et al. 1997; Putnam 2000; Phillips et al. 2019). Although social integration is an essential feature of cosmopolitan urban life worldwide (Musterd and Ostendorf 1998), there is still a need to analyse how societies are integrated in relation to each particular context and timeframe (Phillips et al. 2019). The achievement of socially integrated, inclusive and connected urban development is a current trend in Chinese megacities such as Beijing, Shanghai and Guangzhou. All have witnessed exponential immigration from the Chinese countryside since the early 1980s. The result is a dynamic, but sometimes daunting, process of social integration between rural migrants and local residents in urban China (Zhao and Wang 2018).

The spatial and social separation of population groups by religion, race, ethnicity, country of birth, income or class (Piekut et al. 2019; Yao et al. 2019; see Chaps. 2, 4, 10 and 15), and the underlying problems of inequality (Chap. 15), are often covert, complex, and mingled with a myriad of local socio-economic factors. Compared to Anglo-American studies, current research on social segregation in urban China is arguably insensitive to these cross-cultural subtleties. In the UK and the USA, the word ‘segregation’ often connotes racial apartheid and/or discrimination (Zhao and Wang 2018). Therefore, it is necessary to characterise social segregation within a specific urban Chinese context, consciously reconstructing the meaning of ‘segregation’ through applied empirical research. This chapter aims to set out the intellectual framework for such inquiries.

As explored in earlier chapters (particularly Chaps. 4, 8, and 9), rural migrants face inequality in different settings in urban China, where there are barriers and challenges for the assessment and reporting of segregation and exclusion. The rapid rural-urban migration flow has accelerated both heterogeneity and disparities in urban China. This introduces different forms of segregation and inequality, which have been insufficiently considered so far. This chapter aims to explore how cutting-edge techniques can be employed to understand segregation in Chinese cities. It pays particular attention to how problems of exclusion and inequality emerged and developed and offers a comprehensive perspective. It examines the potential use of the social network analysis (SNA) approach to assess these problems and further develops the analytical methods, especially in understanding social integration and segregation in different urban settings.

Social network analysis originated from the sociology literature and presented itself as an analytical approach to examining complex social relationships (Scott

1988). Since the early 1930s, SNA has evolved in three main ways: (i) the development of sociometric analysis—it was used initially by sociologists as a way of coding and visualising social connections; (ii) mathematical analysis—the development of sophisticated and powerful analytical tools for modelling the structure, formation and dynamics of social networks; and (iii) anthropological analysis—researchers at the University of Manchester used SNA to construct a detailed understanding of the structure of community relations (see a historical overview by Fredericks and Durland 2005). These developments coalesced to form contemporary SNA during the 1960s and 1970s and have subsequently been further developed with the advancement of computer-based analysis techniques (Kilduff and Tsai 2003; Fredericks and Durland 2005). The origins of this approach also explain the key methodological procedures and techniques of current SNA, including the analysis of sociometric data using matrix techniques, providing mathematical models of group structures, and using graph theory methods.

In this chapter, we intend to demonstrate an explorative application of SNA within an urban Chinese context, and reflect on the merits and limitations of current methods. We begin by examining segregation between rural migrants and urban residents in China, with an in-depth analysis of the historical background, previous analysis and the complex, multi-dimensional and inter-connected factors driving segregation and inequality in urban China (Chap. 15). The second section introduces the application of SNA to understand different facets of segregation. It identifies the limitations of the methods, gives examples of the application of SNA in the social care field, and explores adjustments to the traditional approach. The third section comprises a case study on the application of SNA to understand the segregation of rural migrant care workers in residential care homes in Shanghai. The case study highlights the importance of exploring multi-dimensional aspects of inequality and intersectionality—where multiple layers of disadvantaged identities interact with each other (see Chap. 11)—among rural migrants in urban China. This chapter also examines the ways SNA could be refined or developed to understand the relationships between individuals and groups. The final section summarises the strengths and limitations of these methods and suggests the potential of a mixed methods approach integrating the application of SNA and in-depth qualitative inquiries to investigate social integration between rural migrants and urban residents in contemporary China.

11.2 Segregation Between Rural Migrants and Urban Residents in China

The migration of rural labour to urban areas has been a major factor in demographic change throughout China's recent socio-economic reforms (see Chap. 5). Significant disparities between rural and urban areas and the gradual loosening of migration regulations have contributed to increasing internal migration. Most internal migration is from poorer, less developed areas, and this has led to an increasing eastward and

urban concentration (Wang 2000). Migration to urban areas has become the most common way for rural residents to obtain non-agricultural jobs since the 1990s (Connelly et al. 2018). Temporary rural migrants have no official local household registration (*hukou*) but are engaged in economic and other activities in urban areas (Gu 1992; Sun 2000).

Over 288 million rural residents have migrated to urban areas in search of better income (National Bureau of Statistics of China 2019). Contemporary Chinese urban life is characterised by rural migrants and urban residents operating in different settings, for activities such as work and education. Although links and interaction between rural migrants and urban residents are increasing significantly, there remain general and specific segregation and integration issues. The integration of rural migrants into urban settings is now a key focus of Chinese social policy (Wang et al. 2016). Researchers have also raised awareness of the levels of integration or segregation of migrants in urban China, for example, social interaction at the neighbourhood level (Wang et al. 2016), segregation in everyday activities (Zhao and Wang 2018), and occupational segregation and earnings (Zhang and Wu 2017).

Fan (2002) analysed the population composition of urban China based on human capital attributes, mobility resources, labour market entry and shifts in employment patterns. She identified a hierarchy that includes temporary migrants (without local *hukou*) at the bottom, non-migrant locals in between, and permanent migrants as the 'elite' at the top. The assimilation of migrants into urban society is not guaranteed (Chen and Liu 2018). It occurs based largely on education, labour market entry, upward social mobility, family socio-economic background, and interactions with local friends and neighbours. Only a small number could achieve permanent citizenship (*hukou*) and become 'elite' migrants. Such a hierarchy based on migration and *hukou* status illustrates the disparities in economic success among residents and distinct differences between migrants and locals and within migrant groups themselves (Chap. 8).

Based on a study on the variation of interaction between locals and migrants in Nanjing, Wang et al. (2016) argue that *hukou* status does not seem to play an important role in social interactions with neighbours. However, such social interactions cannot reveal the full extent of meaningful interactions between rural migrants and urban residents. Rural migrants commonly live in migrant-dominant neighbourhoods such as urban villages (Wang et al. 2009). Due to high population density and condensed dwelling patterns, segregation in urban China is much more finely-grained on a spatial scale than geographical segregation tends to be in western countries (Zhao and Wang 2018). It is not uncommon to find poorer residential blocks alongside wealthier neighbourhoods. Rural migrants and local indigenous residents may nevertheless lack meaningful social interactions even when they live in neighbouring blocks.

Survey results from Wang et al. (2016)'s study suggest that rural migrants are 1.8 times more likely to communicate with locals than the other way around. Migrants are also 1.8 times more likely to help or receive help from local residents than vice versa. This reveals the problem of low-level social ties between these groups and the difficulties for further integration of rural migrants into urban society. A further

study from Zhao and Wang from 2018 suggested that the locals have stronger internal bonds and links compared to their connections with rural migrants.

Consequently, the assessment of such segregation and raising awareness of its impact become vital issues for policy-makers and researchers. Assessment can be conducted across multiple areas such as housing, neighbourhood, occupation, education, ethnicity and gender. In many cases, traditional assessment methods that focus on investigating residential segregation would fail to show the fine-grained segregation that exists across Chinese cities. Many inner-city neighbourhoods have an extremely high housing density, which can lead to the under-estimation of segregation at a neighbourhood level (Zhao and Wang 2018).

Furthermore, the segregation of rural migrants segments even further into individual levels of marginalisation or disadvantage, for example, gender, age, and ethnicity. What is required is an 'intersectional' approach that highlights the way that these multi-layered identities interact. The concept of intersectionality originates from critical race studies in the late 1980s and is now a primary theoretical tool for feminist and anti-racist scholars (Nash 2008). It emphasises the need to go beyond single analytical categories, such as gender, in the case of feminist researchers (Grabham et al. 2008). The concept of intersectionality means that each individual is constituted by interrelating axes of age, race, gender, class, sexuality and other identities. Intersectionality is an important analytical framework for understanding questions of inequality and injustice (Chap. 10; Hancock 2016). Such an approach explores relationships, social context, power relations, complexity, social justice and inequalities rather than a single vector of inequality or differences between separate analytical methods (McBride et al. 2014; Hopkins 2017). For instance, intersectionality can be used to analyse how gender and ethnicity interact to shape the multiple dimensions of female migrants' experiences of working in science, technology, engineering, and mathematics (STEM) fields.

From the perspective of multi-faceted axes of intersectionality, exclusion and segregation in urban China can be experienced by people who belong to multiple disadvantaged social identities. It can be based on gender, disability, age and *hukou*. It goes beyond the single aspect of differences in institutionalised household registration (*hukou)* and between geographical residential areas. For example, the experience of rural female migrant workers and older migrants may be different and varied. Figure 11.1 shows the intersectionality of multiple identities at the individual level, including *hukou*, ethnicity, language, occupation, education, age, sex and so on.

Multi-dimensional and intersectional segregation makes it harder to understand and assess segregation across urban China. Exclusion can increase stress and impact on the mental health and wellbeing of minority groups. This is especially true for rural migrants who are subject to multi-layered levels of interaction and segregation. Therefore, it is imperative for policy-makers, practitioners and researchers to raise awareness of how the intersectional needs of disadvantaged groups inter-connect. Existing literature overlooks these important factors. An intersectional perspective is necessary both to understand interactions between rural migrants and urban residents and the risks of segregation based on multi-layered identities of sources of disadvantage.

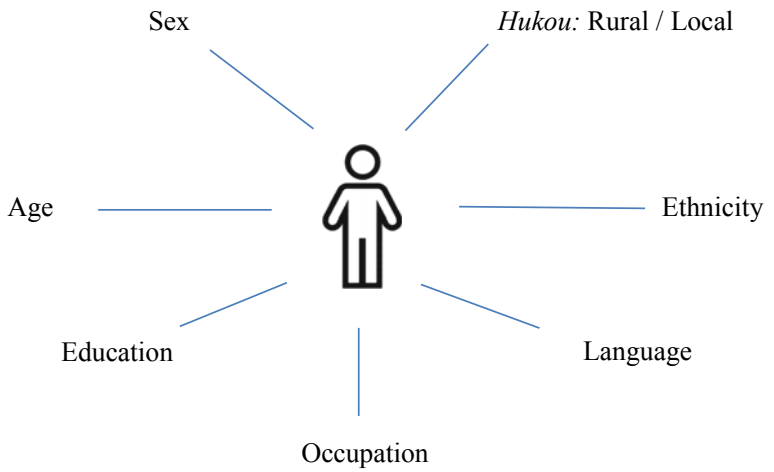

Fig. 11.1 Intersectionality of different identities at the individual level

Segregation and inequality at an individual level are often accompanied by varied forms of segregation among other groups in close relationship with rural migrants. A range of segregated groups may have strong intra-group interactions, contributing to complex multi-dimensional segregation and inequality in one geographical or organisational unit. The case study in this chapter examines the interactions between migrant care workers and older local residents in care homes in urban China. Figure 11.2 is a simplified diagram showing disadvantaged identities for both care workers, mainly low-paid female rural migrants and service users, such as older disabled people in urban care homes.

To explore how cutting-edge techniques might be employed to understand segregation in Chinese cities, we now explore the potential for SNA applications with critical reflections on the merits and limitations of the methods. In the following sections, we advocate the merits of social SNA in understanding segregation from

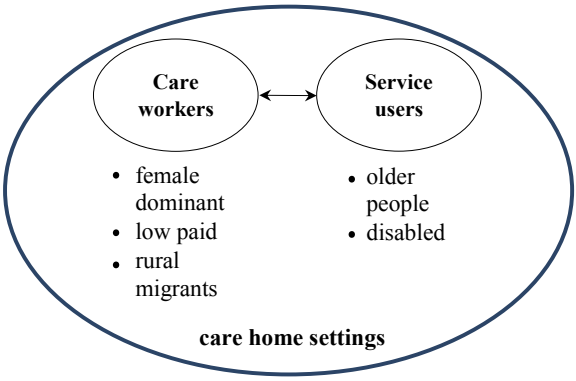

Fig. 11.2 Interactions of groups with different disadvantaged identities in care home settings

different perspectives. We identify the limitations of these methods in assessing segregation in urban China, illustrate the application of SNA in social care, and explore how to adjust the traditional SNA approach.

11.3 Social Network Analysis in Understanding Segregation

Social network analysis (SNA) is a quantitative approach that investigates network formation and relationships. It involves a matrix representation of the structures and patterns underlying social interactions, which is often depicted in graphical form using a 'sociogram' such as the one in Fig. 11.3 (Hanneman and Riddle 2005; Eiler et al. 2017). The SNA approach asserts that social life is rooted in the structure of social positions and relations between individuals. This necessitates an analysis of the way status and positions are distributed across social networks within groups and societies (Cott 1997). The basic form of SNA includes two elements: components (nodes) and interactions (ties) (Eiler et al. 2017; Wölfer and Hewstone 2017). Specifically, nodes are relevant subjects, which can include individuals or organisations, within a network, while ties are the interactions between those nodes in a social network. The SNA approach can be used to map and expose communication channels and information flow between individuals/groups within an organisation/network (Bae et al. 2015; Sabot 2017).

The application of SNA has been developed to illustrate social interactions between individuals or organisations, including organisational structure (Cross et al. 2013), healthcare systems (Bae et al. 2015; Eiler et al. 2017), occupational mobility

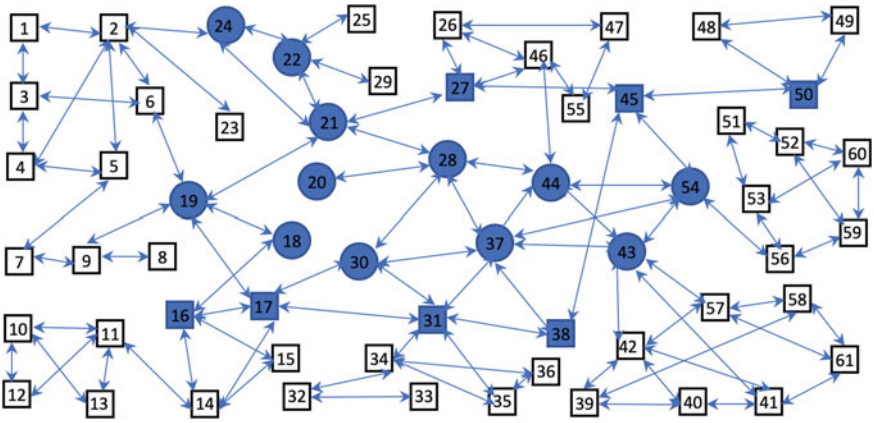

Fig. 11.3 The social network in Sunshine Care Home. *Note* white boxes: rural migrant care workers; blue boxes: urban care workers; blue circles: urban managers; lines: social ties; arrows: direct work relationships or friendships

(Demchenko 2011; Zhang and Wu 2017), and segregation within everyday activities (Zhao and Wang 2018). SNA helps identify nodes and the ties between individuals and groups and further illustrates interaction levels between individuals and/or organisations in specific settings. Figure 11.3 illustrates the social network estimated for our case study care home (further details on our approach below) where the boxes represent nodes/components (rural migrants and urban residents in different colours) and lines represent interactions (ties) between the nodes. This hypothesised social network figure could be used to explain the social interactions in an organisation or neighbourhood. The arrows represent connections between individuals: single arrows for one-way connections and double arrows for two-way connections. We focus on both types of connections between individuals and indirect connections through a mediator, such as #2 links the indirect connections between #1 and #23 in Fig. 11.3.

SNA is a useful tool for analysing social interactions between different groups in various settings. The structure of a social network includes relevant components and the patterns of interactions between these components. Analysis of the components and how they interact across the network can provide insight into how they relate to the broader community context, such as healthcare systems (Eiler et al. 2017). SNA can also investigate intergroup contact across social structures and explore means to promote social integration. It is an especially suitable 'fit' for research on segregation in Chinese cities.

SNA can help analyse how participants extend contact beyond direct connections by identifying internal connections and intergroup contacts. By analysing extended contact we can reflect indirect experience or establish the potential for intergroup contact. In Fig. 11.3, we can see that rural migrant #1 and #3 have no direct intergroup connection, but their mutually connected migrant #2 has ties linking with an urban resident #24. This allows #1 and #3 the indirect connection or potential for intergroup contacts argued by Wölfer and Hewstone (2017). The identification of direct and extended connections both within and between groups can provide contextual information across the entire social network. SNA has a particular strength as it identifies both direct and indirect links between network members, which could be used to analyse contextual information, potential relationships and integration.

A series of key Social Network Indicators have been deployed to measure social networks, such as homophily, density and closeness. The homophily principle highlights the importance of similarity in encouraging social network connections, which results in homogeneous personal networks in relation to a variety of demographic, socio-economic, behavioural, and intrapersonal characteristics (McPherson et al. 2001). Homophily suggests the contacts between dissimilar individuals and groups occur at a lower rate and dissolves at a higher rate than among groups of people with shared or similar characteristics (McPherson et al. 2001). Scholars have proposed a number of ways to measure the degree of homophily, such as the Pearson correlation coefficient of the degrees of adjacent nodes proposed by Newman (2002) as the 'simplest and most flexible' measure (Watts 2004; Dean and Pryce 2017). The density is measured with the ratio of m (edges observed) and m_1 (the number of edges of all nodes in the network) (White and Harary 2001; Dean and Pryce 2017).

Network closeness measures each node's proximity to all other nodes within the network by calculating the average shortest path to every other node (Okamoto et al. 2008).

Conventional applications of the SNA approach leave some questions unanswered around the underlying social mechanisms of segregation in increasingly diverse societies (Wölfer and Hewstone 2017). Current applications are dominated arguably by research on internet-based virtual space, although they seem to be less engaged with the actual urban built environment (Zhao and Wang 2018). While commonly used to examine residential segregation, SNA could also be applied to investigate social interactions in other non-residential settings. Zhao and Wang (2018) propose an integrated spatio-social network analysis approach to assess segregation in urban China, demonstrating a methodological shift beyond exclusively location-based measurements. They identified the limitations of segregation assessments based only on individualised domains such as housing or the workplace (see also discussion of domain segregation in Chap. 2). Their study also investigated social interactions between rural migrants and local residents in terms of everyday activities such as shopping and eating out in particular venues like restaurants, barber shops and pubs.

A more refined spatio-social network analysis tends to focus on the quantification of 'presence' or 'co-presence' of different groups at specific locations, but it still reveals few 'meaningful interactions' between those involved. Wölfer and Hewstone (2017) argue that propinquity (befriending with others who are physically close) is more influential than homophily (befriending those who share similar individual characteristics). However, proximity-based availability and presence do not necessarily contribute to higher degrees of integration between different groups. For example, local residents and rural migrants might go for lunch at the same restaurant without conversations or other forms of encounter. Within healthcare settings, Bae et al. (2015) argue that while many studies investigate social networks, structure and development, little has been done to investigate system effectiveness or care processes and patient outcomes. To provide a better understanding of segregation and inequality, it is imperative for SNA research to investigate more meaningful interactions and outcomes.

Also important is to consider alternative methods that can overcome the limitations of SNA and apply SNA analysis in a way that helps us acquire an in-depth understanding based on qualitative exploration. Future research could involve improved analysis of interactions between rural migrants and urban residents to better understand segregation in urban China. We propose two main ways to achieve this:

I. To refine traditional SNA by including more social interaction analysis. Wölfer and Hewstone (2017) suggest that network ties be assessed with qualitative data from observations, interviews and documents in studies other than large-scale census analysis.
II. To employ quantification via SNA alongside other research methods to gain a more robust understanding of the interactions between different groups and subsequent outcomes in terms of segregation and inequality.

Notwithstanding the potential richness and theoretical depth that SNA can bring to the research of intergroup connections and transfers, SNA has remained surprisingly underused in research on social segregation, particularly in China. Although Chinese scholars have adopted SNA in other fields, such as economic integration (Hou et al. 2009), supply chain (Borgatti and Li 2009) and organisation management (Li et al. 2011), the conceptual and methodological advantages of SNA remain largely unknown to researchers in segregation or integration studies (Wölfer and Hewstone 2017). At the same time, there is also room for improvement in terms of the level of technical sophistication as reflected in current studies on social segregation in China. By following recommendations on SNA use in health care studies proposed by Bae et al. (2015), future studies in segregation in Chinese cities could enhance the sophistication of research design, analysis, and assessments. Our case study on the segregation of rural migrant care workers in residential care homes in Shanghai, is intended to showcase how the SNA approach can be extended and triangulated with other methods. It is intended to demonstrate how different dimensions can be interwoven in practice, including age, gender migrants/locals segregation, and how cutting-edge techniques may help resolve complex multi-dimensional problems.

11.4 The Case of Migrant Care Workers in Shanghai

Care provision for older people is traditionally a primary responsibility of families in China (Qi and Dong 2018). Just like rural-urban disparities in other fields, care provision and finance for older people are provided differently in urban and rural areas in China. With dramatic demographic changes such as ageing, a decreasing fertility rate and internal migration, fewer adult children are available to provide care for their parents. The extended family still takes the main responsibility for care provision in both urban and rural China (Chen and Yang 2012). However, in developed urban areas, direct care is gradually changing to a combination of care by family members and paid care workers, mostly migrants from rural areas.

The domestic services market has grown rapidly in China since the mid-1990s (Connelly et al. 2018). The care labour market has also expanded since the 2000s in developed urban areas (Zhang 2018). With better economic outcomes and significant income growth, Chinese families have access to more resources to pay for care services (Connelly et al. 2018). This is especially true for urban dwellers. Paid care workers are increasingly employed in both residential care homes and at older people's own homes in urban China. In this context, care workers' employment becomes an alternative or supplement to familial care provision in urban China (Zhang 2018).

Due to significant differences in the economic background of urban and rural residents, two-tier welfare systems, and rural-urban migration, rural migrants comprise the majority of the care labour force in large Chinese cities. The majority of care workers in urban areas come from underdeveloped Western and Central Chinese provinces, such as Gansu, Hebei, Sichuan, Henan, Hubei, Guangxi (Wang

2012). In the care home in Guangzhou where Wang is the manager, only five of 60 care workers are local residents with *hukou* in Guangdong Province. This percentage represents the common composition for care labour in many Chinese cities. According to Connelly et al. (2018), around 15–20 million domestic service workers, mostly female rural migrants, take up paid domestic work in urban families, including cleaning, cooking, caring for children, older people, and patients.

11.4.1 Case Study Location and Data Collection

Shanghai, a typical metropolis with a relatively advanced care system, was selected as the case field for our research. In the context of a significantly ageing population and a developed economy, Shanghai has relatively advanced residential care homes and welfare institutions for older people. According to the Shanghai Civil Affairs Bureau (2018), there were 703 care homes with over 140,000 beds across the city in 2017. Rural migrant workers have increasingly taken up various service jobs in Shanghai, including care provision. Urban areas like Shanghai attract large numbers of migrant workers to maintain and develop care provision for older people.

Two public and one private care home were involved in this study. We collected secondary data such as administrative records from care homes to establish the composition of social networks among care workers at selected institutions. We used observational data and semi-structured interviews to explore the experiences and viewpoints of care home managers and migrant care workers. The aim was to monitor and evaluate interactions between migrant workers and their employers in order to guage inequality and social integration levels.

To establish the characteristics of the social networks involved, we collected administrative data from three residential care homes about the management hierarchy, lines of staff accountability at different positions, demographic information, employment records, education and work experiences. We then conducted qualitative observational research in each care home to evaluate how staff at different levels interact with each other. Finally, three care home managers and eight migrant care workers took part in semi-structured interviews between 40 minutes and an hour and a half in length. Interviews focused on exploring experiences and viewpoints of geriatric care services, interactions between local and rural staff in the workplace, and the migrant care workers' daily routine and everyday life activities.

According to the administrative data, the majority (over 70%) of care workers from the three care homes were in their late 40s and 50s. Only five of 139 (3.6%) care workers were male. In each care home, we recruited one manager and three migrant care workers for interviews. All the interviewed migrant care workers were female, with ages ranging from 32 to 53. The interviews were conducted between April and July 2013. The authors translated extracts from respondents' narratives into English for the purpose of anonymised quotations. The names of organisations and interviewees in this chapter are pseudonyms.

11.4.2 Mixing SNA and Qualitative Methods in Examining Social Segregation

Using the SNA approach, this study classified managers and staff based on their occupational positions and *hukou*, to distinguish between locals and migrants. The process comprised a trial to combine a quantitative SNA approach with qualitative data from observation and interviews. The application of SNA gives the opportunity to show the macro picture of all relationships in the network. The in-depth interview data supported an understanding of the rationale behind the ties between individuals in the network and the differences in their relationships.

The network in our example consists of two sub-groups—rural migrants and urban residents. According to the administrative and observational data, there are 61 employees overall in Sunshine Care Home, with 19 locals (12 managers and seven care workers) and 42 rural migrant care workers. By identifying the job positions in the network, the study further classifies managers and care workers in the group of urban residents (blue nodes). As all rural migrants employed in the sampled care homes were care workers, there is no sub-category under the migrant nodes.

As shown in Fig. 11.3, collaboration and teamwork are occurring within the sample care homes, but the type and degree of these interactions differ between managers and care workers, and between urban citizens and rural migrants. Referring to key indicators of the measurement of social networks, the interactions between employees in the care homes show the importance of the homophily principle based on characteristics in *hukou* (i.e. contacts are at a higher rate within each group of migrants or locals than between two groups). This case study suggests that work relationships or collaboration within Shanghai care homes differ between rural migrants and local citizens with in-depth qualitative data. The main factor is the level of job position and division of labour. This finding echoes a 1997 study of a geriatric care facility in Toronto (Cott 1997). Cott used SNA research across long-term care multidisciplinary teams and identified segregation and differences in teamwork between decision-makers and practitioners. In a similar pattern to that found in Toronto, collaborative teamwork among Shanghai care workers was limited to management-level professionals. Care workers' teamwork only consisted of assisting each other with work tasks with little team outputs. More importantly, the structure of the collaboration patterns and underlying interactions between each group will lead to a recurring circle that might trap migrant care workers at the caregiving level and not allow promotion to management positions.

The SNA approach could also be applied to interactions beyond the workplace, including migrant workers' daily activities in the community. In the selected Shanghai care homes, most rural migrant care workers lived in on-site accommodation provided by care homes. Most of them spent leisure time eating out and shopping with other migrant workers close to the care homes. Many care workers also helped older residents with shopping, as the nature of the job requires. These activities involve interactions with local residents or migrants working in other sectors beyond the isolated

care settings. It is recommended that SNA be applied beyond work-based measurement on the basis of the spatio-social network analysis focused on interactions at particular venues (Zhao and Wang 2018).

More importantly, rural migrant care workers experienced extended interactions with their own families and other connections in their hometown and interactions with residents of the care homes and their families. In this situation, rural migrant care workers mediate connections between urban and rural areas. Although these connections are very different for each individual, we cannot underestimate the potential for interaction and exchanges in the wider context. For example, Li, a female rural migrant in her 50s, managed to bring her daughter to study in a school in Shanghai with help from one older resident's son. Li suggested that it was a reward beyond the workplace based on the quality of care she provided to the residents.

Further SNA studies might extend our research to include further social interactions beyond the workplace or residential locations. The example shared by Li is uncommon for rural migrant care workers. Our interview and observational data suggest that interactions with care home residents cannot significantly reduce segregation in urban society. At the same time, there is an evident consensus that local older people living in care homes are also somewhat segregated from mainstream urban life. Their families only visit periodically, whether weekly, monthly or even less frequently. Segregation based on *hukou* and age is intertwined in care homes in Chinese cities.

The findings of our case study suggest that there is very low mobility across occupations for care workers, especially for those who are temporary migrants without local citizenship. There is very high mobility between jobs/institutions for care workers within the care industry as in other countries. Whatever their level of education, all the migrant workers rose no further than the position of basic care workers. The range included a primary school, secondary school, vocational education, and college and university graduates. In Sunshine Care Home, a group of younger migrant care workers from Jiangxi Province, who held college degrees in care management, had been working in the care industry for a few years. However, it was established that their educational level had not made a significant difference in their employment prospects for management positions in relation to the division between urban citizens or rural migrant.

> We (rural migrants) are unable to reach a management level in the care industry in Shanghai. Everyone assumes locals are managers and migrants are care workers… As a rural migrant, I may try to move to a smaller care agency to find my chance to be a manager, but it will still be hard. I can see little chance for me to climb the promotion ladder in the care industry. I can only be a care worker, an experienced care worker, but not a manager.
>
> Mei, rural migrant, 30s, female, with college degree

Segregation and inequality between locals and rural migrants are significant in the care labour market and the social welfare and employment rights of care workers. Care work, especially care for older people, is low paid with low social recognition or status in urban China. As Dong et al. (2017) argued, care workers who provide services to older people in Shanghai earned 20–28% less than those employed in

other service sectors involving similar human capital. Moreover, as the mobility of labour has gradually extended within China, the government has remained cautious about disconnecting welfare provision and *hukou* status (Connelly et al. 2018). This leads to difficulties for migrant workers to get access to welfare benefits and social services in urban areas.

11.5 Conclusion

In this chapter, we have explored the potential of social network analysis (SNA) for assessing and understanding social integration in contemporary Chinese cities. We illustrated this potential with an application to the relationships between care workers in the Sunshine Care Home in Shanghai. The SNA framework usefully revealed the structure of direct and indirect connections among local employees, migrant care workers and local older residents, and revealed how the spatial mix itself does not necessarily demonstrate the level of integration between different groups. Our study identified multi-dimensional segregation in care homes, including between rural migrants and local workers, age for older residents, and gender in care labour employment. These care homes are segregated islands in large Chinese cities, where women and rural migrants make up the majority of the workforce.

Recognising multi-dimensional segregation in the specific setting, this case study shows the importance of exploring age and gender segregation affecting rural migrants in urban settings in China. In Western contexts, age segregation has been discussed in cultural (Gullette 2004) and spatial (Kingman 2016) dimensions. In China, an increasingly large population of older people face the challenge of segregation and isolation from other generations who dominate key activities. Policy-makers and practitioners in China have paid little attention to the embedded problems in age-segregated space. This case study casts light on the investigation of multi-dimensional segregation occurring in real life. It asks for more attention to be given to diverse, vulnerable groups, or groups with multi-faceted vulnerable characteristics such as temporary migrants, female and older workers and older residents.

The SNA approach can be used to understand multi-dimensional segregation and inequality in settings which remain unexplored in China. For example, SNA could bring new insights into the investigation of encounters and interactions within intergenerational space (Jarrott et al. 2011; Vanderbeck et al. 2015). Specifically, further assessments can be built on such social network analysis in order to promote greater social and generational interaction. It could help identify which groups could benefit from these arrangements and how analysis and pilot schemes can be transformed to practice and policies across various settings, including work, communities and neighbourhoods, institutions and social care. At the macro level, an application of SNA that embraces the potential for interconnections between urban and rural areas will provide a more comprehensive understanding of segregation and inequality in China. It will also help identify the opportunities and problems inherent within rapid rural-urban migration.

Our study of the migrant care workers in Shanghai, albeit exploratory and anecdotal, also demonstrated the limitations of SNA. On the one hand, SNA offers a rich and potentially innovative analytical approach to characterise and examine the dynamic social integration process that occurs almost ubiquitously across large Chinese cities. Technically, there are also further opportunities to apply more advanced SNA statistical methods, such as exponential random graph models, which could be used to explain why some nodes in SNA are more likely to be connected than others (see e.g., Robins et al, 2007). On the other hand, there is a limit to how far SNA may fare by itself as just a technical exercise. In our case study of care homes in Shanghai, the intricacy and complexity revealed in the qualitative responses by migrant workers are conceivably beyond the range of what can be captured by SNA.

Indeed, the key intellectual question is perhaps more conceptual than methodological, revolving around the very definition of 'integration' within present-day urban China, a social context which is, in many ways, very different from its Anglo-American counterpart (Zhao and Wang 2018; see also Chaps. 4 and 15). In other words, although SNA can be employed to characterise the *prima facie* structure of social integration, the intellectual strength of SNA may only manifest itself in full when accompanied by theoretical insights generated from qualitative investigation.

In a nutshell, we call for a mixed-methods approach towards applying social network analysis to characterise continuing social integration between rural migrants and urban residents in contemporary China. Our future research will aim to progress in a corresponding direction, especially by focusing on the more informal and 'everyday life' aspects of social interaction (e.g., via shopping or commuting) to inform social policies to encourage more routine exchanges between the locals and the migrants.

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Chapter 12
The Role of Migration Costs in Residential Sorting

Wenquan Liang, Ran Song, and Christopher Timmins

Abstract Economists generally employ two 'revealed preference' approaches to measure households' preferences for non-market amenities—the hedonic and equilibrium sorting models. The conventional hedonic model assumes free mobility across space. Violation of this assumption can bias the estimates of household willingness to pay for local amenities. Mobility constraints are more easily handled by the sorting framework. In this chapter, we examine the role of migration costs in household residential sorting and apply these two models to estimate the willingness to pay for clean air in the USA and China. Our results demonstrate that ignoring mobility costs in spatial sorting will underestimate the implicit value of non-market amenities in both countries. Such a downward bias is larger in developing countries, such as China, where migration costs are higher.

Keywords Migration costs · Discrete choice models · Residential sorting · Willingness to pay · Hedonic valuation · Equilibrium sorting models

12.1 Introduction

In the economics literature, an established way of putting a monetary value on things that affect the quality of life but are not traded in a conventional market, and so have no observable market price, is to infer the implicit value consumers place on things from the choices they make. Consider, for example, housing choices and decisions with respect to residential location. The nature of the housing market means that

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living in an area with a high level of amenities will come at a premium price. This implies trade-offs. Homebuyers and renters alike will both need to sacrifice other forms of consumption in order to afford them. Where we choose to live potentially reveals a lot about our preferences and the trade-offs we are willing to make between housing costs and various features of the local social and physical landscape. This includes our preference for ethnic and social homogeneity (Sethi and Somanathan 2004), a potentially important driver of segregation (Chap. 2). Economists refer to approaches that rely on these trade-offs to value local features as "revealed preference" techniques. These techniques attempt to estimate the value people place on particular goods or services from the actual decisions they make rather than simply asking them—an approach that falls under the category of "stated preference" techniques. The problems with stated preference techniques are that people may have an incentive to overstate or understate how much they value various goods and services (Loomis 2011). It is often not practical or cost-effective to obtain up-to-date large sample survey evidence.

Over the past 40 years, hundreds (perhaps even thousands) of economics papers and reports have used the 'hedonic framework' (Rosen 1974) revealed a preference approach to value local non-marketed amenities from education to crime to air quality. The attraction of the technique is that it uses observed behaviour in housing and labour markets to recover the economic value of non-marketed amenities. Under the standard assumption that households choose the residential locations that maximise their utility, marginal rates of substitution between local amenities and other goods will equal the price ratio. As a result, the marginal willingness to pay (MWTP) for those amenities can be measured by their implicit prices, as reflected in how housing prices and wages vary with amenity values.

In the conventional hedonic framework, households are assumed to have full information, be fully mobile, and make location choices within a discrimination-free environment. These three assumptions are maintained throughout the literature with very few exceptions. Under these assumptions, equilibrium is achieved when every household occupies its utility-maximising location and nobody wants to move, given housing prices, housing characteristics, wages, tax rates, and amenity levels. In this chapter, we discuss the implications of these three conventional assumptions for non-market valuation, move beyond the assumption of free mobility, and focus on the role of migration costs in residential location sorting and hedonic valuation.

If people can move freely among locations when they buy homes and choose jobs, wages and rents must adjust to reflect the implicit prices of local amenities; hence, MWTP for amenities can be inferred from variation in housing prices and income across space. In reality, however, migration is costly; moving to a new city entails both out-of-pocket costs and the psychological costs of leaving behind one's family and cultural roots. Moreover, migration costs are substantially higher in a developing country context, where there are frequently institutional migration costs, such as the *hukou* system in China (see Chap.1 Sect. 1.1, and Sect. 12.5.1 below).

How will migration costs affect estimates of MWTP for non-market amenities? Consider an improvement in air quality in a particular city. In response to the changing demands of the citizenry to live there, we would expect housing prices to rise and

wages to fall until a new equilibrium is reached. If migration is costless, these changes will fully reflect the population's value for cleaner air. But if migration is costly, the benefits people get from moving to the city and enjoying its improved air quality must now compensate them for the higher rents and lower income and the cost of moving. MWTP estimates that ignore these moving costs will be biased.

Equilibrium sorting models provide an alternative revealed preference approach for non-market valuation that can easily incorporate mobility costs. Households' locations were 'sorted' according to income, housing prices, migration costs and their preferences for non-market amenities such as local public services, social characteristics and environmental quality. The location choice decisions of households reflect their tradeoff between income, housing costs, and moving disutility (i.e. the inconvenience of moving house, which incurs a psychological cost that is added to the financial cost of moving) as well as local amenities. Consequently, estimates derived from these decisions can be used to evaluate willingness to pay for local amenities. Recently, Bayer et al. (2009) proposed a solution to control for (i.e., consider) the physical and psychological moving costs associated with migration distance in the equilibrium sorting framework. Freeman et al. (2019) enriched the description of mobility constraints by further accounting for differential institutional migration costs across space in the developing country context.

This chapter discusses the role of migration costs in non-market valuation and estimates willingness-to-pay for air quality improvements in the world's largest developed and developing countries—the USA and China. In the USA context, the MWTP estimated using the hedonic model is positive but increases substantially in magnitude when accounting for moving costs in the residential sorting framework. Even though we typically think that internal migration costs are relatively small in countries such as the USA, overlooking mobility costs in spatial sorting can lead us to understate the implicit value of clean air.

Migration costs are very high in China due to the mobility restrictions imposed by the *hukou* system. The *hukou* acts as an internal passport, without which internal migrants are not entitled to the same rights and benefits as local people. A conventional hedonic model which assumes free mobility recovers a *negative* estimate of the value of cleaner air in China. Given the adverse effects of severe air pollution on health and productivity in developing countries such as China, these estimates are unreasonable. Consistent with intuition, the MWTP for air quality has an expected positive sign when we use an equilibrium sorting model and take migration costs into account.

Our results reveal salient differences between the conclusions of the conventional hedonic framework and those of the residential sorting framework incorporating migration costs. In the United States, although the MWTP estimated by the hedonic model is significantly understated, it still has a positive sign that is consistent with prior expectations. But in China, overlooking mobility costs can yield a 'perverse' negative sign of the MWTP for clean air. This is because the bias problem is more severe in developing countries such as China where migration costs are substantially higher than that in a developed country context.

12.2 Frictions in Spatial Sorting

In the canonical work on hedonic valuation, households are assumed to have complete information, be freely mobile, and make location choices within a discrimination-free environment. In the real world, however, households might only have incomplete information about the characteristics of locations in their choice set, be restricted by physical and institutional mobility costs when moving to other places, and suffer from discrimination (outright or statistical) when making location choices. These frictions in spatial sorting can bias the estimates of the implicit value of non-market amenities.

12.2.1 Incomplete Information

Online resources have made the housing search process easier than ever. Yet households still face uncertainty about the amenities, public services, and job opportunities available when moving to a new location. When peoples' beliefs are not consistent with true values, they might choose a location that does not maximise their utility, which in turn results in welfare losses (Leggett 2002). Researchers lack detailed information about the extent of people's knowledge when they move into new areas. As a result, this aspect of the location decision is generally ignored in the economic models described in this chapter.

12.2.2 Discrimination

In housing markets, discrimination takes the form of significant constraints on individual choices—that is, the options that might have been chosen are unavailable for one reason or another. These constraints may take the form of outright restrictions on a housing purchase. There may also be indirect constraints that make it difficult to obtain a loan or other institutional constraints that might be hard to detect. An estate agent may even neglect to show a house to a potential purchaser based on their perception of their ability to pay, a form of 'statistical' discrimination based on prejudice or assumptions about buyers' preferences. Applied research on residential locations seldom has information on the set of choices available to a potential mover, making it difficult to prove that discrimination has occurred. However, experimental evidence collected in audit studies conducted by the US Department of Housing and Urban Development has shown that minority groups are systematically provided with recommendations for houses in neighbourhoods with higher poverty rates, lower levels of education and skills, and higher levels of pollution compared to their white counterparts (Christensen and Timmins 2018). If discrimination is at play, then we cannot expect all housing units to be freely chosen. A failure to account

for this can present problems of interpretation across the various models we describe later in this chapter.

12.2.3 Moving Costs

'Moving costs' will vary according to location. Within a city, they may involve the cost of renting a truck and spending a day of hard labour to load and unload it or the costs of hiring someone to do that back-breaking work for you. Buying or selling a house requires mortgage applications, inspections, and a closing process with lots of paperwork. Moving to a new city can add psychological costs such as losing social networks and familiarity with one's surroundings. In many developing countries, there can be additional institutional forms of moving costs inherent in the migration policy. For example, in India, state-level entitlement schemes discriminate against migrants from other states and inhibit inter-state mobility (Kone et al. 2018). In China, the *hukou* system limits or even prohibits internal migrants' access to many government-provided benefits (Tombe and Zhu 2019).

In the following sections, we will relax the conventional assumption of free mobility, discuss the role that migration costs play in shaping spatial sorting and incorporate their effects in non-market valuation.

12.3 How Economists Model Residential Choice

Where we choose to live potentially reveals a lot about our preferences and the trade-offs we are willing to make between various features of the social and physical landscape. These may include things such as beautiful views, the avoidance of pollution, and practical considerations such as employment prospects. For many years, economic researchers have used data about residential location decisions to calculate the value of attributes such as these for use in policy-making. For the most part, this work has focused on the USA and Europe, where information on housing markets and migration decisions were readily available (Kuminoff et al. 2013). More recently, these models have been applied to low and middle-income countries, such as China and Brazil. This is valuable from a policy perspective as these are countries where the value of urban amenities (and disamenities) may be particularly relevant for policy-making. Air pollution, for example, is often far worse in lower-income countries.

'Equilibrium sorting' models combine data on housing market fluctuations with information on household behaviour to estimate the parameters and factors behind individual decision-making. Importantly, these parameters summarise how consumers differ from each other as the range and variety of preferences play an important part in the sorting process. For 'large' policies, these models can be used to predict new outcomes in the 'equilibrium' or balance of determining factors. This

may involve changes in equilibrium prices and quantities. It may also involve changes in how local public services, such as education and crime prevention, operate. These models can monitor how these local public services affect decision-making and, in turn, predict how they will be affected by future policies on the supply of or demand for housing. Because they can simulate new distributions of households across neighbourhoods, these models can also be used to determine welfare measures for policies that have yet to be implemented. In this way, such models contrast with simpler empirical methods that compare 'before' and 'after' with actual policies, thereby limiting analysis to those policies already implemented.

We begin by providing a review of the methods used by economists to model residential location decisions and discuss how those models are used to value local amenities. We then describe a particular case in which these methods have been used to value air quality in the USA and introduce the important role of migration costs in that context. We typically think of internal migration costs as being relatively small in countries such as the USA. Equally, external migration costs are also thought to be relatively small between the European Union member states. Nevertheless, once they are included in a model to assess location choice, we see that the values for local characteristics gleaned from individual decisions can change dramatically.

With this as a backdrop, we then move on to consider the role of migration costs in China. An internal system of migration restrictions known as the *hukou* applies across China. Individuals are assigned a *hukou* based on their birth location, and that *hukou* provides them access to the local housing market, labour market, and public services such as education. Obtaining a *hukou* in another location, especially in attractive destinations such as Shanghai and Beijing, can be particularly difficult. The *hukou*, therefore, creates a very real barrier to migration, raising the possibility that simple models of migration behaviour, which ignore migration 'frictions', could yield biased conclusions. After a brief discussion of the details of the *hukou* system, we show how estimates of the value placed on clean air in China can differ not just in magnitude but in perceptions, depending upon whether one takes into account the restrictions imposed by the *hukou* or not. We conclude with observations on other important considerations when applying simple models of migration in China.

12.3.1 The 'Rosen-Roback' Framework

There is a long history in the economics of using residential location decisions to measure the value that individuals place on local public services and amenities. Tiebout (1956) wrote that individuals 'vote with their feet,' revealing their preferences for local taxes and the public goods that those taxes provide by the trade-offs they make in the housing market. Households 'sort' across locations according to their wealth, their particular housing preferences, local public services, social characteristics, employment opportunities, and the implications for commuting. Equilibrium models of 'sorting' based on Tiebout begin with a simple premise: the amount and character of housing and public goods vary across an urban area. Each household

selects its preferred bundle of public and private services given its income the relative prices involved.

The idea of 'voting with one's feet' next appeared in the 'hedonic framework' (Rosen 1974).[1] The simplest hedonic models consider a world in which individuals choose from a set of houses, trading off higher prices for nicer amenities. In an 'equilibrium', where everyone is happy and no longer has an incentive to move, the resulting relationship between house prices and amenities in the market reveals the households' preferences for amenities relative to price. For example, when considering two otherwise identical houses apart from location, if one is in a marginally better location for schools, then the difference in their equilibrium prices will reveal a willingness to pay for school quality. Many economic papers and reports[2] have used this method to value local public services, from education to crime to air quality.

A more complicated model that may be more relevant for studying choices over large geographic spaces (e.g., across metropolitan areas rather than across neighbourhoods in a city) considers households' choices over residential location, recognising that this can affect both where one lives and one's employment opportunities. This model was suggested in work by Rosen (1979) and then formalised by Roback (1982). The 'Rosen-Roback' framework begins with a utility maximisation problem.

Readers unfamiliar with the equations and formulae used in models of this kind may wish to skip to Sect. 4.3.3 at this point. Those familiar with modelling may find the following detailed description useful for understanding how the modelling works.

12.3.2 Technical Discussion

Households, indexed by $i = 1, 2,\ldots, N$, choose among cities indexed by $j = 1, 2,\ldots, J$ that have attributes denoted by a vector X_j—this might include air quality, public safety, school quality, and climate variables. In order to choose a city, households may consider labour market opportunities to determine the level of income ($I_{i,j}$) that they can earn. Because income varies according to varying factors and characteristics, we can write it as a function of X_j, $I_{i,j}(X_j)$.

Households can take that income and spend it on housing services, H_i, and other consumption, C_i. These are broad catch-all categories differentiated primarily because the price of a unit of housing services, P_j, can differ by location, whereas the price of a unit of general consumption is the same everywhere and is normalised to one for convenience. For this discussion, a unit of housing services could be thought

[1] The implied relationship between property values, housing characteristics, and local public goods can be described by a hedonic price function. While the hedonic price function had appeared in several earlier papers, Rosen (1974) developed the microeconomic foundations of the method, arguing that the hedonic price function can be interpreted as describing an equilibrium relationship as a continuous array of differentiated varieties of a product at a single point in time.

[2] At the time of writing, a search on Google Scholar for the term 'property value hedonics' yielded 22,800 hits. For summaries of the hedonic literature, see Champ et al. (2003) and Palmquist (2005).

of as a square foot of living space.[3] Because the price of a unit of housing services can differ by location, we can also write it as a function of X_j, $P_j(X_j)$.

The last modelling component that we require is a mathematical representation of household preferences for location attributes (X_j), housing (H_i) and other consumption (C_i). Economists refer to that as a utility function, and it is denoted here by $U(C_i, H_i, X_j)$. One can spend many hours studying the properties of utility functions in a microeconomics class, but the key feature is that utility, or happiness, increases with the consumption of things such as better schools (e.g. C_i, H_i, and elements of X_j.) and decreases with the prevalence of detrimental factors such as air pollution (e.g. elements of X_j).

Following the standard practice, we model the household's behaviour by assuming that it chooses location j and C_i and H_i levels with a mathematical optimisation. Equation (12.1) expresses this as a maximisation problem: each consumer i chooses a location j that maximises overall satisfaction represented by the utility function $U_{i,j}$ which, as noted above, is assumed to be determined other consumption, housing, and location attributes: $U_{i,j} = U_{i,j}\ (C_i, H_i, X_j)$. However, in choosing the location that maximises overall satisfaction, households are constrained by their income $I_{i,j}$. So the consumer maximises $U_{i,j}$ subject to their income which is assumed to be spent either on housing H or other consumption C,

$$\max_{C_i, H_i, X_j} U_{i,j}\left(C_i, H_i, X_j\right) s.t. C_i + P_j\left(X_j\right) H_i = I_{i,j}\left(X_j\right) \tag{12.1}$$

where,

max maximise

s.t subject to a constraint

C_i individual i's consumption of the numeraire composite commodity[4]

H_i individual i's consumption of housing services

X_j amenity vector in location j

P_j price of housing services in location j

$I_{i,j}$ income that individual i would earn in location j

This optimisation problem can be re-written in the form of a constrained objective function known as a Lagrangian.[5] This combines the utility objective with the budget

[3] In practice, a more complicated index of housing services is typically used where, for example, 10 square feet of low-quality housing stock might provide similar housing services as 5 square feet of high-quality housing stock.

[4] A numeraire composite good is an abstraction that represents all but one of the goods in the relevant budget, which acts as a benchmark in comparing the value of other products or services.

[5] The Lagrangian function is a mathematical expression that combines the function being optimised with functions describing the constraint or constraints into a single equation. Solving the Lagrangian function allows you to optimize the variable you choose, subject to the constraints you cannot change.

constraint in a single expression, where δ_i represents the 'shadow value' of the budget constraint:

$$\max_{C_i, H_i, X_j} \mathcal{L} = U_{i,j}\left(C_i, H_i, X_j\right) + \delta_i\left(I_{i,j}\left(X_j\right) - C_i - P_j\left(X_j\right)H_i\right) \tag{12.2}$$

Taking the partial derivatives of the Lagrangian with respect to X_j, C_i and H_i, and setting them equal to zero optimises the objective function. Thus, the constrained optimisation problem yields the following first-order conditions:

$$\frac{\partial U_{i,j}}{\partial X_j} + \delta_i\left(\frac{\partial I_{i,j}}{\partial X_j} - H_i\frac{\partial P_j\left(X_j\right)}{\partial X_j}\right) = 0 \tag{12.3}$$

$$\frac{\partial U_{i,j}}{\partial C_i} - \delta_i = 0 \tag{12.4}$$

$$\frac{\partial U_{i,j}}{\partial H_i} - \delta_i P_j\left(X_j\right) = 0 \tag{12.5}$$

Economists regularly talk about 'marginal willingness to pay' for a local attribute X_j as the amount of other consumption (C_i) that a household would be willing to give up in exchange for a small increase in X_j, holding the household's utility fixed. This is a concept based in trade-offs.

It is useful because it avoids direct comparisons of levels of happiness measured in 'utils' (i.e., units of utility, which can differ in ways that we cannot observe), opting instead to measure welfare in terms of other units of consumption. This idea depends on how much 'other consumption' the individual is willing to give up in order to obtain greater access to amenities such as clean air. The concept is a staple of work in public economics, underlies countless regulatory studies, and determines how government funds are allocated.

To consider how first-order conditions might be used to measure willingness to pay for X_j, we calculate the change in consumption (C_i) given a change in X_j while holding utility at a fixed point. Mathematically, this is found by taking the total derivative of the utility function with respect to X_j and C_i while holding utility fixed at $\overline{U}$ and then rearranging the expression:

$$\overline{U} = U_{i,j}\left(C_i, H_i, X_j\right) \tag{12.6}$$

$$d\overline{U} = 0 = \frac{\partial U_{i,j}}{\partial C_i}dC_i + \frac{\partial U_{i,j}}{\partial X_j}dX_j \tag{12.7}$$

$$\left.\frac{dC_i}{dX_j}\right|_{d\overline{U}} = -\frac{\partial U_{i,j}/\partial X_j}{\partial U_{i,j}/\partial C_i} \tag{12.8}$$

Equation (12.6) represents the fixed utility jointly determined by consumption, housing services and amenity X_j. Taking the derivative of Eq. (12.6) with respect to consumption C_i and amenity X_j yields Eq. (12.7), which represents the tradeoff between consumption and amenity. Rearranging Eq. (12.7) yields Eq. (12.8). $\frac{dC_i}{dX_j}$ represents the amount of consumption that household i would sacrifice for a one-unit improvement in amenity X_j while holding utility fixed at $\overline{U}$, which we define as the marginal willingness to pay (MWTP) for X_j. Equation (12.8) indicates the MWTP for X_j is the opposite of the ratio between the marginal utility of the amenity and the marginal utility of consumption C_i.

Using the first-order conditions from the constrained optimisation problem, we can develop an equation to measure the marginal willingness to pay for X_j:

$$MWTP_X = \frac{\partial U_{i,j}/\partial X_j}{\partial U_{i,j}/\partial C_i} = H_i \frac{\partial P_j}{\partial X_j} - \frac{\partial I_{i,j}}{\partial X_j} \tag{12.9}$$

Noting that H_i may not be readily observable, we can modify this expression to make it easier to work with. In particular, multiply each term by $\frac{1}{I_{i,j}}$ and multiply and divide the first term by P_j. The resulting equation is:

$$\frac{MWTP_X}{I_{i,j}} = H_i \frac{\partial P_j}{\partial X_j} \frac{P_j}{P_j} \frac{1}{I_{i,j}} - \frac{\partial I_{i,j}}{\partial X_j} \frac{1}{I_{i,j}} \tag{12.10}$$

It describes the marginal willingness to pay for X_j as a share of income. By rearranging terms, this can be re-written as a function of the income share of housing expenditures ($s_{i,j}$) and the derivatives of the log of price and income:

$$\frac{MWTP_X}{I_{i,j}} = \underbrace{\frac{P_j H_i}{I_{i,j}}}_{s_{i,j}} \frac{\partial ln P_j}{\partial X_j} - \frac{\partial ln I_{i,j}}{\partial X_j} \tag{12.11}$$

where $\frac{\partial ln P_j}{\partial X_j} = \frac{\partial P_j}{\partial X_j} \frac{1}{P_j}$ and $\frac{\partial ln I_{i,j}}{\partial X_j} = \frac{\partial I_{i,j}}{\partial X_j} \frac{1}{I_{i,j}}$. Equation (12.11) indicates that the fraction of the marginal willingness to pay for X_j in household income is equal to the income share of housing expenditure multiplied by the derivative of log housing price with respect to X_j minus the derivative of log income with respect to X_j. In particular, the Rosen-Roback framework suggests recovering $\frac{\partial ln P_j}{\partial X_j}$ and $\frac{\partial ln I_{i,j}}{\partial X_j}$ by linear regression:

$$ln P_j = X_j^{'} \beta + \varepsilon_j \tag{12.12}$$

$$ln I_{i,j} = X_j^{'} \theta + Z_i^{'} \gamma + u_j \tag{12.13}$$

where X_j is a vector of local amenities and Z_i is a vector of individual attributes there might be an effect on earnings based on characteristics such as education, age, and gender.

12.3.3 *Reflecting on the Assumptions Implicit in Modelling Sorting Behaviour*

Suppose we pull back from the mathematical derivations in the previous section. We can see that a measure of the value placed on some local attribute—such as air quality—can be found from the sum of two different partial derivatives—such as the way that housing service costs and incomes vary across cities with that local attribute. While the value assigned to that attribute will vary, other local attributes are kept fixed. In other words, desirable attributes will be found where houses cost more and people are paid less to do the same job, all other factors being equal. The model reflects two different margins over which individuals may make trade-offs, but is based on a number of simplifying assumptions.

Economists are sometimes maligned for the assumptions they make when describing human behaviour.[6] This is certainly the case in their treatment of residential location decisions. An underlying assumption behind the canonical hedonic model is that everyone knows everything about every housing unit available in every city in the nation. Households are also assumed to have accurate and complete information about things such as air quality or average daily rainfall. Until recently, this was an especially dubious assumption in a place such as China, where official government reports did not describe the full extent of air pollution. On the modelling side, everyone is assumed to have the same preferences and to face no costs when deciding to pack up and move. Until very recently (Bayer et al. 2016), all households in such models were treated as though they rented property, whether this was the case or not. As a consequence, capital gains were not taken into account in models that charted housing decisions. Finally, households are assumed to face no discrimination that might directly limit the options available to them, and everyone is assumed to face the same set of prices in the housing market. Recent research has found this to also be an over-simplification (Christensen and Timmins 2018; Christensen et al. 2020).

In the remainder of this chapter, we will maintain these assumptions for the purposes of simplicity, but we will modify one in particular. The traditional economic modelling of decisions around residential location assumes free mobility. This assumption is tenuous, especially in the context of developing countries, and it will bias conclusions in the traditional hedonic model where moving costs are correlated

[6] The old story goes that a physicist, a chemist, and an economist are stranded on a desert island with no implements and a can of food. The physicist and the chemist each devise an ingenious mechanism for opening the can. The economist merely says, 'assume we have a can opener…' (Boulding 1970). 'Assuming the can opener' has become shorthand for economists' tendency to assume away important parts of the discussion.

with the availability of preferred amenities. The greater the cost of moving in relation to the marginal benefits of an improvement in the amenity, the greater the bias will be.

12.3.4 Reconsidering Moving Costs

In the context of our economic model, individuals may have idiosyncratic preferences for locations. These might arise from a preference for one's hometown, or simply a financial or psychological cost associated with moving away from one's current residence, wherever that may be. Either way, this creates an important form of moving cost that makes the individual's starting point relevant to the analysis.

Consider a simple example of what this implies for the Rosen-Roback framework. All households simultaneously choose their location along with consumption of a composite commodity C and housing service H. Each location j is characterised by a quantity X_j of a location-specific amenity. In addition, there is a moving cost M_j associated with settling in city j. We treat M_j as a long-run migration cost (i.e. the cost incurred by adults choosing where to live relative to their birthplace). As such, these costs are primarily psychological and do not appear in the budget constraint. In order to simplify things enough to put them in that framework, suppose that everyone starts from the same original location so that M_j (i.e. migration cost to location j) can be treated as a location attribute just such as the elements of X_j.

$$\max_{C_i, H_i, X_j} U_{i,j}\left(C_i, H_i, X_j, M_j\right) s.t. C_i + P_j\left(X_j\right) H_i = I_{i,j} \tag{12.14}$$

After incorporating migration costs into utility function, and the MWTP for amenity is expressed as Eq. (12.15):

$$MWTP_X = H_i \frac{\partial P_j}{\partial X_j} - \frac{\partial I_{i,j}}{\partial X_j} - \frac{\partial U_{i,j} / \partial M_j}{\partial U_{i,j} / \partial C_i} \cdot \frac{dM_j}{dX_j} \tag{12.15}$$

If mobility had no utility cost (i.e. $\frac{\partial U_{i,j}}{\partial M_j} = 0$) or migration costs did not vary systematically with the amenity being valued (i.e., $\frac{dM_j}{dX_j} = 0$), this would not be a concern. Suppose, however, that $\frac{\partial U_{i,j}}{\partial X_j} < 0$ and $\frac{dM_j}{dX_j} > 0$ (i.e. people do not like to move, and preferable locations are further away from where everyone is starting out). The traditional Rosen-Roback hedonic model would subsequently understate $MWTP_X$ by an amount equal to the final term in the expression above. Important for policy purposes, an understatement of $MWTP_X$ in relative terms would prove dramatic for local attributes where the true willingness to pay is small relative to the size of mobility costs. For example, households may be very likely to move from their starting point to a different city in order to access better schools for their children,

but may be unlikely to make a similar move in order to get cleaner air. The bias from ignoring moving constraints will therefore be greater for the latter.

12.4 The Sorting Model Framework with an Application to the Value of Particulate Matter Reductions in the USA

Migration costs in the USA are surprisingly high, although relatively low in comparison with China. Table 12.1, taken from Bayer et al. (2009), reports the probability that the head of a household under the age of 35 is living in each of the nine US census divisions in the 2000 Census, given that they were born in each of those nine divisions. Notice that the diagonal elements of the matrix, which represent the frequency of 'stayers', comes close to 80% in the case of the South Atlantic division and only fall to 58% in the West North Central division.

What do these migration costs imply for non-market valuation using the Rosen-Roback model? We used US Census data from 1990 and 2000 that described the location decisions of households (household heads aged 25–35) to measure the marginal willingness to pay for reductions in air pollution.[7] Specifically, we used a measure of particulates denoted as PM10—particles measured 10 microns or less in size. These small particles, fine solids, and aerosols—typically1/7th the diameter of a human hair or smaller—can come from fossil fuel combustion, unpaved roads, construction and demolition, agriculture, mining, and a variety of chemical processes. Particulate matter is known to be one of the most dangerous forms of air pollution, leading to lung cancer, heart attacks and strokes, asthma (particularly in the young and elderly), and even various heritable diseases. A growing body of literature demonstrates the effects of particulate matter pollution on life expectancy (Pope et al. 2009), especially on infant mortality (Arceo et al. 2016; Chay and Greenstone 2003; Knittel et al. 2016), cognitive ability and school performance (Lavy et al. 2014; Suglia et al. 2008), crime (Herrnstadt et al. 2018; Heyes and Saberian 2015), and labour market outcomes (Chang et al. 2019).

Why might migration costs matter for the valuation of particulate matter? Suppose people were more likely to be born in places with currently high levels of pollution (i.e., Northeast, Rust-Belt) and are then reluctant to leave. The wage-hedonic model would interpret their immobility as evidence that air pollution is not very disagreeable. Overcoming this complication requires that we extend the modelling strategy back to the location decision itself, recovering estimates of the disutility of migration as part of the process of estimating MWTP. However, we cannot easily extend the Rosen-Roback model to include migration costs when people have *idiosyncratic* starting points so that the migration cost associated with a particular destination will

[7] Specifically, we use 1% and 5% micro data samples from the 1990 and 2000 US Censuses (www.ipums.org). Data are collected for 242 MSA's, representing 86% of the metro US population.

Table 12.1 Regional mobility patterns: % birth region by residence region household heads under 35 years of age, 2000 US census data

	New England	Mid-Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
New England	65.02	5.87	2.35	0.94	12.68	0.47	1.88	3.05	7.75
Mid-Atlantic	4.03	63.34	4.55	1.03	18.04	0.22	2.13	2.49	4.18
East North Central	0.59	1.60	73.42	2.83	9.84	2.09	2.78	2.94	3.90
West North Central	0.36	1.77	7.80	57.62	7.27	1.24	5.85	8.51	9.57
South Atlantic	0.99	3.59	4.50	0.84	79.47	2.82	2.67	1.60	3.51
East South Central	1.72	1.29	7.08	0.86	15.45	63.73	4.94	1.29	3.65
West South Central	0.47	1.54	2.13	1.42	6.51	2.49	77.75	3.31	4.38
Mountain	0.89	1.11	3.54	2.43	3.54	1.11	5.09	69.03	13.27
Pacific	0.86	1.61	3.42	1.52	5.13	1.14	2.75	7.69	75.88

differ by individual. The sorting model framework, however, allows us to address this problem directly.

Rather than working from a pair of derivatives that describe the equilibrium of the sorting process, we base sorting models explicitly on the individual's utility maximisation problem. Committing to a particular functional form for utility[8]:

$$\max_{C_i, H_i, X_j} C_i^{\beta_C} H_i^{\beta_H} X_j^{\beta_X} EXP\left\{M_{i,j} + \xi_j + \eta_{i,j}\right\} s.t. C_i + P_j H_i = I_{i,j} \tag{12.16}$$

where

$M_{i,j}$ long-run (dis)utility of migration associated with moving from individual i's birth location to destination j (defined below)

ξ_j unobserved attribute of location j.

$\eta_{i,j}$ idiosyncratic utility enjoyed by individual i in location j.

Considering the choice of optimal housing services conditional upon having chosen location j:

$$\max_{\{H_i\}} lnU_{i,j} = \beta_C \ln(I_{i,j} - P_j H_i) + \beta_H \ln H_i + M_{i,j} + \beta_X \ln X_j + \xi_j + \eta_{i,j} \tag{12.17}$$

First-order conditions with respect to H_i yield the optimal demand for housing services as a function of where individual i chooses to live.

$$-\frac{\beta_C P_j}{I_{i,j} - P_j H_i} + \frac{\beta_H}{H_i} = 0 \tag{12.18}$$

$$H_i^* = \frac{\beta_H}{\beta_H + \beta_C} \frac{I_{i,j}}{P_j} \tag{12.19}$$

Inserting this expression for optimal housing services back into the utility function, we arrive at indirect utility—that is utility with the choice of housing optimised out:

$$lnV_{i,j} = \beta_I I_{i,j} + M_{i,j} + \theta_j + \eta_{i,j} \tag{12.20}$$

where,

$$\theta_j = B_0 - \beta_H \ln P_j + \beta_X \ln X_j + \xi_j$$

[8] The functional form refers to the specific mathematical formulation used to describe utility. The Cobb–Douglas utility function, used here, is common in the literature. It says that utility is the product of consumption, housing services, and other amenities each raised to a power that is estimated with data.

$$B_0 = ln\beta_0 + \beta_C ln\beta_C + \beta_H ln\beta_H - (\beta_C + \beta_H) ln(\beta_C + \beta_H)$$

$$\beta_I = \beta_C + \beta_H$$

Here, θ_j represents city-specific mean utility that is common to the households in city j and captures all the utility-relevant characteristics of the city, and ξ_j captures the unobservable component of θ_j. B_0 is a constant that does not vary with location choice. The household's problem now comes down to choosing the location j that maximises $lnV_{i,j}$, taking as a given that it will choose the optimal H_i^* once it gets there.

$M_{i,j}$ is written as a function of migration distance, with increasing costs associated with leaving one's birth state, census division, or census region,[9]

$$M_{i,j} = \varphi_1 D_{1,i,j} + \varphi_2 D_{2,i,j} + \varphi_3 D_{3,i,j} \tag{12.21}$$

where,

$D_{1,i,j}$ 1 if moving to location j requires that individual i leaves their birth state (= 0 otherwise).

$D_{2,i,j}$ 1 if moving to location j requires that individual i leaves their census division of birth (= 0 otherwise).

$D_{3,i,j}$ 1 if moving to location j requires that individual i leaves their census region of birth (= 0 otherwise).

This assumes that $\eta_{i,j} \sim$ Type I Extreme Value provides a convenient closed form for the probability that individual i will choose each location j. An econometric procedure is used to recover the vector of parameters that maximise the combined probability of seeing all households choose the locations that they actually did choose. In addition, the model deals with two endogeneity problems—one related to pollution and the other related to housing prices. First, an instrumental variables strategy is used to deal with the fact that pollution is likely to be higher in larger, more economically active cities. People like to live in such cities, and without controlling explicitly for all factors that make a city economically active, the model might mistakenly attribute these desirable features to pollution. We do not go into detail here about how this is addressed, keeping our focus on the role of migration costs. The model also deals with the endogeneity of housing prices—in particular, prices will be higher in cities with desirable amenities that attract people who can move there—that is high demand drives up prices. Without accounting explicitly for all of these amenities, the model is likely to conclude that people prefer high prices. There are strategies to deal with

[9] US Census divisions are listed in Table 12.1. The US Census regions are Northeast, South, Mid-West, and West.

Table 12.2 Utility function parameter estimates (USA)

	Estimate	t-statistic
ln ($I_{i,j}$)	0.673	48.36
ln (*PM10*)	−0.34	2.27
Migration Cost		
– State	−4.31	−32.69
– Census Division	−1.27	−17.13
– Census Region	−0.878	−18.61
MSA Covariates	Yes	
Regional dummies	Yes	

Table 12.3 Median marginal willingness to pay for a 1 $\mu g/m^3$ reduction in PM10

Rosen-Roback hedonic model	Residential sorting model
$55.20	$148.70

problems of this kind, but for the purposes of this chapter, we will keep the focus on the role of migration costs.

The results of the sorting model follow below. We begin with the migration cost parameters in Table 12.2. Costs increase with the distance of a move but do so at a diminishing rate. This is sensible if fixed costs are associated with initiating a move, but once the decision to move is made, it is not that much more costly to move cross-country than it is to move outside of one's census division.

We next compare the willingness to pay measures across the two methods in Table 12.3. The Rosen-Roback method ignores migration costs, and the sorting model includes them. The MWTP to avoid a one-unit (i.e., micro-gram per cubic metre) increase in PM10 from the hedonic method is $55.20, while it rises to $148.70 when we account for moving costs. Indeed, the naïve model mistakenly interprets the behaviour of many of those who chose not to leave their polluted hometowns as a reduced distaste for pollution. Including mobility costs in a residential sorting model yields estimates of MWTP that are more than three times as large as estimates from a conventional hedonic approach, even in a US application where we would consider mobility costs to be relatively low.

12.5 Sorting Under High Mobility Costs: China

12.5.1 Migration Costs in China

High costs of migration in many developing countries are driven by institutional migration restrictions. The *hukou* system in China is a good example of such an institutional restriction. Chan (2009) provides a detailed discussion of China's *hukou*

policy, and we summarise its key features here. In 1958, China's highest legislative body, the National People's Congress, formally instituted a comprehensive and far-reaching system called the *hukou* to control internal migration.[10] The institution required that each person be classified as rural or urban and assigned a locality of *hukou* registration; this would typically be the person's birth location. *Hukou* registration then determines the ability to pursue many activities and eligibility for state-provided goods and services in a specific place. Because of this, all internal migration becomes subject to approvals from local authorities at the destination. Migrants who do not hold a local *hukou* have limited or no access to many government-provided benefits, including public education for children and medical care. The red *hukou* book consequently plays a critical role as an internal passport that gives Chinese people rights to reside and work in a particular location.

Since China's economic reforms in the 1980s, the mobility restrictions imposed by the *hukou* system have been somewhat relaxed. People are now allowed to move to places that are different from their registration localities, but migrants without a local *hukou* are still not entitled to the same rights and benefits as locals. According to the 2019 Urbanisation Plan, China will further relax the *hukou* restrictions on residence in small and medium-sized cities in order to increase labour mobility and encourage urbanisation. In the large cities, which are still the main magnets for migrant workers, the *hukou* policy will continue to impose restrictions.

In China , *hukou* regulation is determined by the local government with the goal of controlling the growth of urban populations. Therefore, the hukou restriction is more stringent in large and first-tier cities that face an influx of migrants. However, these cities also offer desirable migrant-specific amenities—such as strong migrant networks, relatively equal economic opportunities and a Mandarin-speaking (rather than local dialect) environment.[11] Figures 12.1 and 12.2 illustrate that the share of immigrants and the share of workers using Mandarin as their working language are both higher for higher-tier cities. The overall migration cost associated with a given location will therefore combine the utility loss owing to the *hukou* restriction and utility gain from migrant-specific amenities.

The difficulty of acquiring a local *hukou* varies across cities and is correlated with the population size and city tier. Figure 12.3 illustrates this tendency, revealing a strong positive association between city population and the *hukou* index. The *hukou* index measures the stringency for internal migrants to obtain a local *hukou* across Chinese cities. There are five channels through which internal migrants could apply for local *hukou*: investment, employment, family reunion, a special contribution to local society and other channels specified by local government. Only a very small number of migrants can obtain a local *hukou* through the channel of their special contribution to local society and other channels specified by the local government.

[10] See Chap. 1 Sect. 1.1 and https://www.npc.gov.cn/wxzl/gongbao/2000-12/10/content_5004332.htm for more background information, and Chaps. 4 to 9 for the various impacts of hukou.

[11] Mandarin is the only official language in China, but local dialects are widely used as oral language and even working language in many small and medium Chinese cities. It is hard for migrants to assimilate in local society and compete with local workers in the labour market in a dialect-speaking environment.

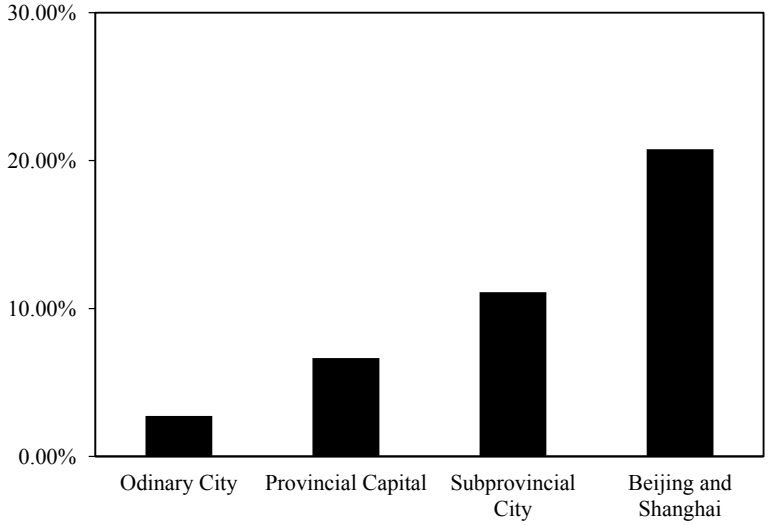

Fig. 12.1 Average share of migrants for cities of different tiers. *Notes* We assign Tianjin and Chongqing to the group of subprovincial city. *Data Source* 2005 One-Percent Population Census of China

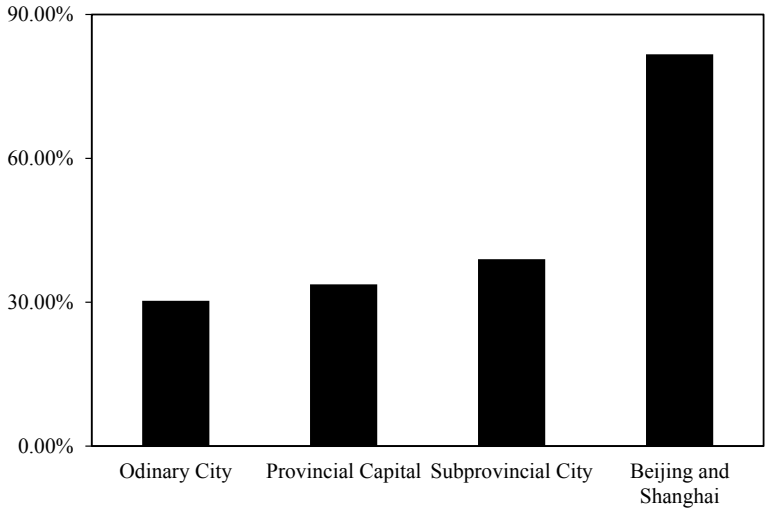

Fig. 12.2 Average share of workers using Mandarin as working languages. *Notes* We assign Tianjin and Chongqing to the group of subprovincial city. *Data Source* China Labour Dynamic Survey 2014

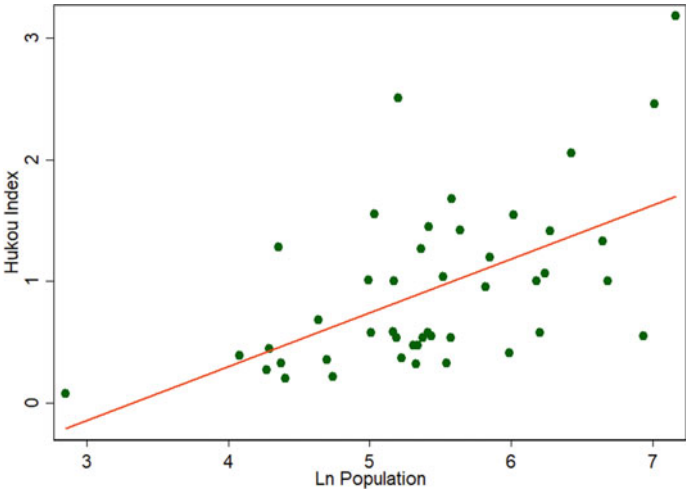

Fig. 12.3 City population and *hukou* index. *Data Source Hukou* index data are drawn from Wu and Zhang (2010), city population data are drawn from China city statistical yearbook

The *hukou* policy associated with family reunion is implemented by the central government and has no variation across Chinese cities. The spatial stratification of *hukou* regulation is mainly driven by variations in local *hukou* policy associated with investment and employment. The *hukou* regulation based on employment includes the regularity of employment (e.g. years working in a given city, requirements on lowest education attainment) and levels of education and training (e.g. advanced degree, professional qualification, prestigious university graduates). The policy based on investment consists of home purchase and other investments such as founding a company in a given city. Wu and Zhang (2010) construct a *hukou* index for 45 Chinese cities to measure the difficulty of local *hukou* qualification based on the four channels for migrants to get a local *hukou* investment, home purchase, regular employment and talent programme. Zhang et al. (2019) collect data from recent local government documents and employ a similar approach to Wu and Zhang (2010) to further construct *hukou* index for 120 Chinese cities.

Figure 12.4 shows that the *hukou* index is highest for Beijing and Shanghai, followed by sub-provincial cities, and then by provincial capitals in descending order. Therefore, in China today, it is very easy for immigrants to apply for a local *hukou* in small and medium-sized cities, but it is still very hard in large and first-tier cities.

Another prominent feature of the *hukou* system is that it is strongly biased towards higher education and skills (Liang and Lu 2017). Table 12.4 presents the points associated with education attainments and professional qualifications required in the application for local *hukou* in four first-tier Chinese cites. It indicates that migrant workers with a higher degrees or advanced professional qualifications can much more

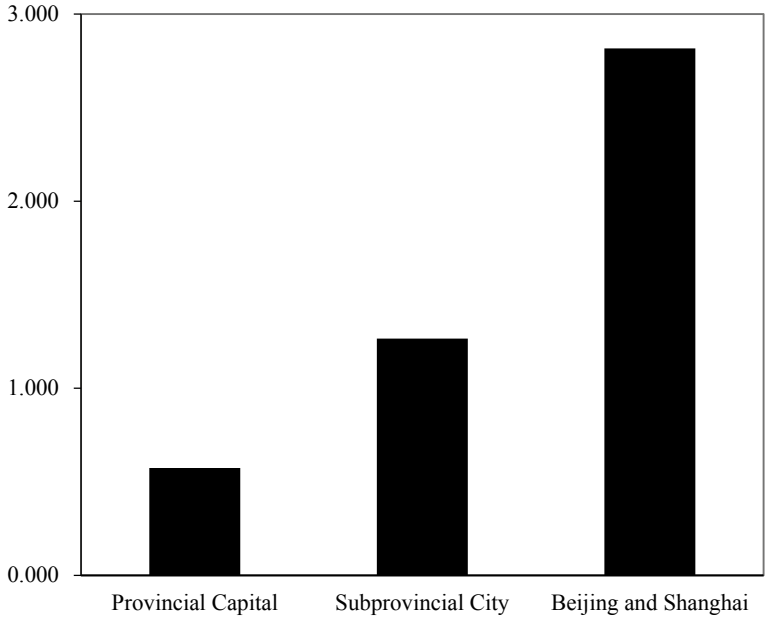

Fig. 12.4 Average *hukou* index for cities of different hierarchies. *Notes* We assign Tianjin and Chongqing to the group of subprovincial city. *Data Source* Wu and Zhang (2010)

easily get the local *hukou* compared to those with less education or fewer professional skills.

What are the impacts of the *hukou* system on migration in China? In Table 12.5, we calculate the simple share of household heads between the age of 25 and 35 that stay in their *hukou* provinces. This corresponds to the figures in the diagonal elements of the matrix in Table 12.1. The mean value is about 90%—much larger than that in the USA and implies that moving costs will play a larger role in China. In order to determine just what the impacts of those migration costs are, we apply the Chinese data in Freeman et al. (2019) to a model similar to that used above to describe US migration. The raw data on household location sorting in Freeman et al. (2019) are from the One-Percent Population Census of China collected by the National Bureau of Statistics of China.

12.5.2 A Model of Residential Location Choice in China and Implications for WTP Measurements

Following the analysis in Freeman et al. (2019), we first classify Chinese cities into four categories: Beijing and Shanghai, sub-provincial cities along with Tianjin and Chongqing, provincial capitals, and ordinary cities. It is hardest for migrants to obtain

Table 12.4 The comparison of points-based *hukou* policy across Chinese metropolitans

City	Total points required to obtain local *hukou*	Education	Skills
Beijing	Depends on the population policy	Doctoral degree: 37 points Master degree: 26 points Bachelor degree: 15 points Some college: 10.5 points	
Shanghai	72	Doctoral degree: 27 points Master degrees: 24 points Bachelor degree: 21 points	College English Test Band 6 or 8: 8 points College English Test Band 4: 7 points
Guangzhou	60	College degree & above: 60 points Some college: 40 points High school: 40 points	Junior workers: 10 points Middle-level workers: 30 points High-level workers: 50 points
Shenzhen	100	Junior workers: 10 points Middle-level workers: 30 points High-level workers: 50 points	Junior workers: 20 points Middle-level workers: 40 points High-level workers: 70 points Senior technical worker: 100points Junior-level professional skill: 70 points middle-level professional skill: 90 points high-level professional skill: 100 points

Data source The official government website of Beijing, Shanghai, Guangzhou and Shenzhen

a local *hukou* in Beijing and Shanghai, followed by sub-provincial cities, provincial capitals and ordinary cities. The pattern is entirely different for migrant-specific amenities—large cities like Beijing and Shanghai offer much better conditions and facilities for migrants than small cities. These include economic opportunities that are more similar to those offered to locals, improved social ties, and a Mandarin-speaking environment. We use the following equation to model the overall migrant costs due to *hukou* regulation and migrant-specific amenities with a series of dummy variables:

$$M_{i,j,s} = \sum_{k=1}^{3} \mu_{k,s} D_{k,ij} + \sum_{k=4}^{6} \mu_{k,s} D_{1,ij} D_{k,ij} \tag{12.22}$$

Table 12.5 The share of household heads age 25–35 staying within their *hukou* province

Province name	Province code	Share (%)
Beijing	11	97.212
Tianjin	12	99.390
Hebei	13	89.587
Shanxi	14	97.841
Neimenggu	15	94.941
Liaoning	21	95.221
Jilin	22	95.114
Heilongjiang	23	91.179
Shanghai	31	98.802
Jiangsu	32	79.796
Zhejiang	33	85.892
Anhui	34	65.586
Fujian	35	88.005
Jiangsu	36	71.499
Shandong	37	93.301
Heinan	41	76.275
Hubei	42	79.925
Hunan	43	72.785
Guangdong	44	99.089
Guagnxi	45	82.703
Hainan	46	97.638
Chongqing	50	75.272
Sichuan	51	66.255
Guizhou	52	86.092
Yunnan	53	99.083
Shan'xi	61	94.437
Gansu	62	94.897
Qinghai	63	98.612
Ningxia	64	97.869
Xinjiang	65	98.618

Data Source 2005 One-Percent Population Census of China
Notes We only use the household sample whose age lie in Knittel et al. (2016), Palmquist (2005)

$D_{1,ij}$ 1 *if location* j *is outside of worker* i *'s hukou city* (= *0 otherwise*).

$D_{2,ij}$ 1 *if location* j*is outside of worker* i*'s hukou province* (= *0 otherwise*).

$D_{3,ij}$ 1 *if location j is outside of worker i's hukou macro-regions*[12] (= *0 otherwise*).

$D_{4,ij}$ 1 *if location j is Beijing/Shanghai* (= *0 otherwise*).

$D_{5,ij}$ 1 *if location j is a sub-provincial city/Tianjin/Chongqing* (= *0 otherwise*).

$D_{6,ij}$ 1 *if location j is a provincial capital* (= *0 otherwise*).

The first three 'dummies'—binary variables used to measure categorical factors—measure the disutility with respect to the physical and psychological costs of leaving one's *hukou* city.[13] The interactions between the 'outside of *hukou* city' dummy and the three city group dummies capture the overall net utility effects of the difficulty of obtaining local *hukou* and migrant-specific amenities, which are measured relative to migration costs in ordinary cities.[14]

We first report utility function parameter estimates in Table 12.6. In the first column, we do not account for moving costs, and the estimated coefficient on income in the utility function is negative. High moving costs in China prevent workers from moving to places where they could earn higher wages, so when moving costs are ignored, the model incorrectly interprets their behaviour as expressing a preference for lower wages. Accounting for moving costs is clearly necessary to avoid this. In the second column, we add three dummy variables associated with leaving one's *hukou* city, *hukou* province, and *hukou* macro-region, respectively, to capture the physical and psychological moving costs, along with the costs of losing the benefits that come with having a local *hukou*. The three dummies are all significantly negative, suggesting that these costs are important. Similar to results from the USA, the mobility costs increase as households leave their *hukou* city, province, and then macro-region, but do so at a decreasing rate. Having accounted for moving costs, the coefficient on income in the second column is now positive, as expected.

The simple specification in column (2) cannot capture the variations in moving costs across the destination cities. We therefore add three interaction[15] terms to capture differences in moving costs across Chinese cities of different tiers. These

[12] There are seven macro-regions in China: East China, North China, Central China, South China, Southwest China, Northwest China and Northeast China.

[13] In China, most people's *hukou* city is the same as their birth city. The China Labor-force Dynamics Survey in 2014 provides information on both the *hukou* and birth locations for 14,226 families and 23,594 individuals in 29 provinces of China. Using this data, we find that only 7.08% of people's *hukou* cities are different from their birth cities. It is natural to guess that this number would be even smaller in 2005. Additionally, it usually takes a long time for migrants to obtain a local *hukou*. Some local governments' official documents require that migrants must work in the city for more than three years before applying for local *hukou*. Generally, if a migrant has moved from his hometown and obtained a *hukou* in a second city, he will have had to have worked in that city for a long period. Overall, there are significant barriers for households leaving their *hukou* city.

[14] We assume that migration disutility varies across the four city groups. Ordinary cities are considered as the benchmark group in the empirical specification, therefore we do not add the interaction between 'outside of hukou city' dummy and 'ordinary city' dummy.

[15] An interaction occurs when an independent variable has a different effect on the outcome depending on the values of another independent variable. In the present context, the utility effect of moving to different city depends on the tier of destination cities.

Table 12.6 Utility function parameter estimates (China)

	(1)	(2)	(3)
ln ($I_{i,j}$)	−0.184[c]	1.606[c]	1.621[c]
	(0.028)	(0.064)	(0.065)
ln (*PM2.5*)	−0.836[c]	−1.568[c]	−0.983[a]
	(0.246)	(0.452)	(0.507)
Out of *hukou* city dummy ($D_{1,ij}$)		-6.448[c]	−6.846[c]
		(0.030)	(0.035)
Out of *hukou* province dummy ($D_{2,ij}$)		−1.984[c]	−2.102[c]
		(0.042)	(0.042)
Out of *hukou* macro-region dummy ($D_{3,ij}$)		−1.978[c]	−1.991[c]
		(0.037)	(0.037)
Out of *hukou* city dummy ($D_{1,ij}$) × Beijing/Shanghai dummy ($D_{4,ij}$)			4.558[c]
			(0.183)
Out of *hukou* city dummy ($D_{1,ij}$) × Sub-provincial city dummy ($D_{5,ij}$)			2.364[c]
			(0.068)
Out of *hukou* city dummy ($D_{1,ij}$) × provincial capital dummy ($D_{6,ij}$)			1.587[c]
			(0.086)
City Characteristics	Yes	Yes	Yes

Notes City characteristics include School, Hospital, GDP. capita, Population, Distance. Seaport, Water. Emission, SO_2.emission, and Dust. emission. Pollutant emissions include, ln (Water. Emission), ln (SO_2.emission), and ln (Dust. emission). Standard errors in parentheses

[a] $p < 0.10$

[b] $p < 0.05$

[c] $p < 0.01$

differences are determined by the *hukou* policies and migrant-specific amenities at the destination cities. The coefficients on the three interaction terms are all positive, so the moving cost is reduced for migrants moving to higher-tier cities. Ignoring these three terms could overestimate moving costs in the larger Chinese cities.[16]

The coefficient on the natural log of PM2.5 is significant and negative, but nearly doubles in magnitude when we add in simple controls for migration costs. When we add interaction terms to capture the range in moving costs across a different tier of cities, the effects of particulate matter pollution remains negative and significant—larger than when no controls for moving costs are included, but not as large as when city-level variations are ignored.

Table 12.7 summarises these results and compares them with the results of a Rosen-Roback hedonic model specification, which ignores migration costs. The willingness to pay for a small reduction in particulate pollution estimated with the

[16] These results are in accordance with the geographic distribution of internal migrants in China—the 2005 One-Percent Population Census of China shows that about 31.8% of internal migrants live in the 10 largest cities.

Table 12.7 Estimated MWTP for reduction in PM2.5

	MWTP ($)
Rosen-Roback model	−3.736
Sorting model without incorporating migration disutility	−162.696
Sorting model incorporating migration distance dummies	34.943
Sorting model with full specification of migration costs	21.697

Rosen-Roback model has a negative value—suggesting that people actually enjoy more pollution. A similar result, seen in the second row, is obtained using our sorting model but ignoring moving costs. This arises from the counter-intuitive result on income.[17] Given the adverse effects of severe air pollution on health and productivity in developing countries such as China, these estimates are unreasonable (Chen et al. 2013; Ebenstein et al. 2017). The remaining rows of Table 12.7 report the MWTP estimated from the residential sorting model incorporating moving costs. Estimates have the expected positive sign. MWTP is larger in the model that ignores city-level variations in moving costs, but it remains significant and positive in both specifications.

12.6 Limitations and Future Directions

Before concluding, we discuss two key limitations of the work presented in this chapter and suggest ways forward for future research.

12.6.1 Dual-Location Choice

In the previous sections, we discussed the *hukou* system in China and its potential effects on estimated MWTP for amenities. In this section, we focus on another dimension of residential sorting that can interact with the *hukou* system. In particular, households are made up of many members and their decisions can affect those members differently. A prominent example of the dual-location choice in China is the case of left-behind children. Figure 12.5 describes the correlation between the *hukou* index and the share of migrants who have left their children behind in their original location. The index measures the degree of difficulty for migrants to obtain the local *hukou* in a given city. The positive correlation between them shows that

[17] Willingness to pay, measured from the sorting model, is the ratio of the coefficients on particulate matter and income. In this specification, the coefficient on income has a counterintuitive negative sign. This translates into the counterintuitive result on the overall willingness to pay.

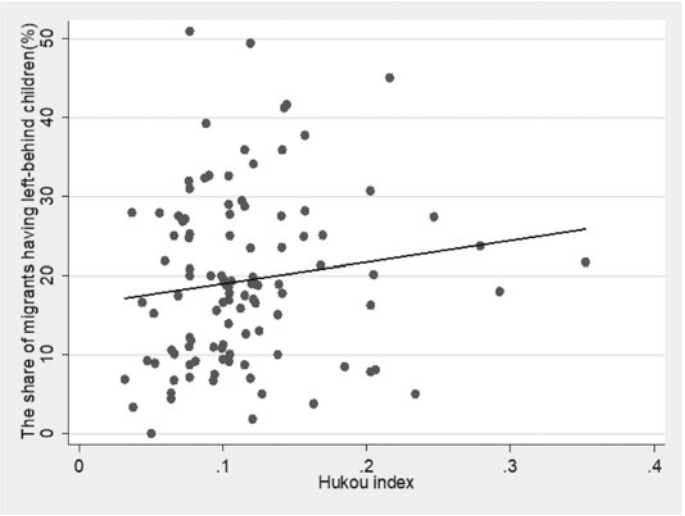

Fig. 12.5 *Hukou* and left-behind children. *Note* The X-axis denotes the city *hukou* index. The Y-axis denotes the share of migrants having left-behind children. *Data Source* China Migrants Dynamic Survey (CMDS) in 2011

migrants who leave their children behind tend to be those who move to cities with more restrictive *hukou* regulation. Using data from the 2011 China Migrants Dynamic Survey (CMDS), we compare the impact of the *hukou* system and air pollution on the left-behind children in Table 12.8. The first two columns show that the *hukou* index

Table 12.8 *Hukou* index, PM 2.5 and left-behind children

Whether have left- behind children (yes = 1, no = 0)	*Hukou* index	PM2.5	*Hukou* index + PM2.5
Hukou index	0.940[c]		0.916[c]
	(0.230)		(0.219)
ln (PM2.5)		0.0558	0.0451
		(0.0517)	(0.0470)
Constant	2.121[c]	1.869[c]	1.954[c]
	(0.199)	(0.274)	(0.258)
R-squared	0.102	0.091	0.103
Observations	38,433	38,433	38,433

Notes The household characteristics include *household income*, *household expenditure*, *the age and education attainment of household head*. Standard errors in parentheses cluster at city-level
[a] $p < 0.10$
[b] $p < 0.05$
[c] $p < 0.01$
Data Source China Labor Migrant Survey (CMDS) in 2011

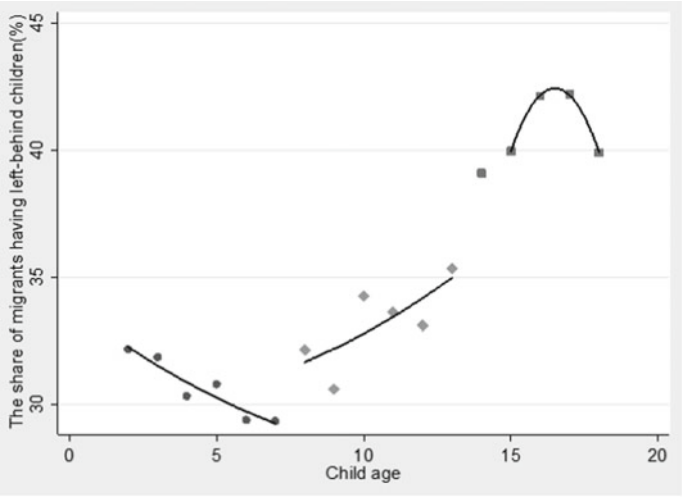

Fig. 12.6 Child age and left-behind children. *Note* The X-axis denotes the age of children and the Y-axis denotes the share of migrants having left-behind children. *Data Source*: China Migrants Dynamic Survey (CMDS) in 2011

significantly affects the left-behind children, but that PM2.5 concentration does not have a significant effect. In column (3), we consider the two factors together, and the results hardly change. The key factor is the availability of public education in the destination cities as children who do not hold a local *hukou* have limited or no access to public education systems in their residential cities. Figure 12.6 shows that the share of migrants that have left-behind children increases sharply when their children are between the ages of 8 to 14—the age in China when children should be enrolled in primary and middle schools.

Figure 12.7 shows a similar positive correlation between the *hukou* index in a destination city and the share of migrant couples who live in different places. Again, as illustrated in Fig. 12.8, we find that the share of migrant couple separation increases sharply when the age of their children is 8 or 14, suggesting one parent is being left behind to care for the child.

12.6.2 Incomplete Information

China provides a unique setting in which to study the impacts of pollution information on residential location sorting. Despite the hazardous level of exposure to pollution, Chinese citizens used to have limited or no access to information about local air quality. In 2000, the ministry of environmental protection of China started to publish air quality data, including an Air Pollution Index (API) and PM10, but only did so for 42 cities. Although fine particles (diameter < 2.5 μm) are more hazardous

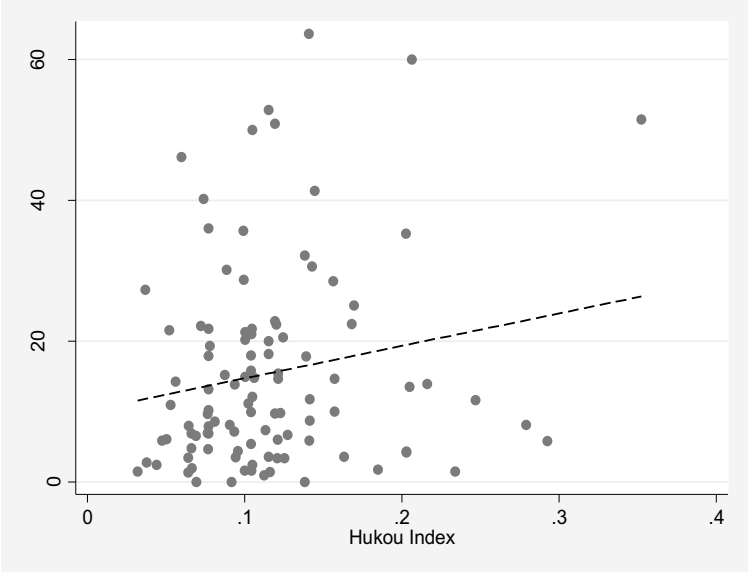

Fig. 12.7 *Hukou* and migration couple separation. *Note* The X-axis denotes the city *hukou* index. The Y-axis denotes the share of migrants couples living apart. *Data Source* China Migrants Dynamic Survey (CMDS) in 2011

than larger particles (2.5 μm < diameter < 10 μm) with respect to mortality and cardiovascular and respiratory problems, PM2.5 was not included in the calculation of API. The number of cities in which API and PM10 were available increased gradually to 120 in 2012. In 2013, in response to the public demand for the publication of PM2.5 data, China launched a nationwide, real-time air quality monitoring and disclosure programme. The Ministry of Environmental Protection started to disclose real-time PM2.5 data in most large and median-sized Chinese cities in January 2013. Information on real-time PM2.5 has been available in all Chinese cities since January 2015. The disclosure of pollution information has an important impact on households' efforts to mitigate the effects of air pollution. As illustrated in Fig. 12.9, the number of indoor air filtration sales increased sharply in response to the release of information in 2013. Future research could study the implications of information disclosure on the residential sorting decisions of households. Estimates derived from these decisions can be used to quantify the monetised value of pollution information.

12.7 Conclusion

Economists generally employ two revealed preference approaches to evaluate household preferences for non-marketed amenities—the hedonic and equilibrium sorting

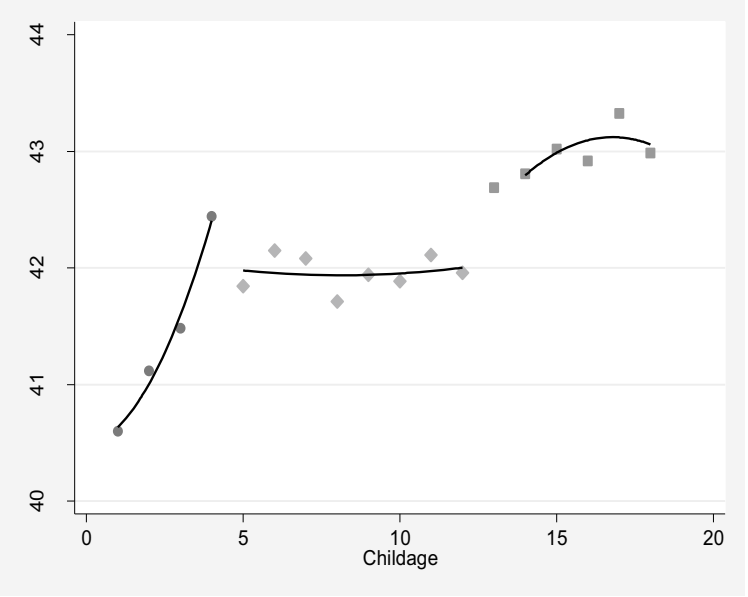

Fig. 12.8 Child age and migration couple separation *Note* The X-axis denotes the age of children and the Y-axis denotes the share of migrants couples living apart. *Data Source* China Migrants Dynamic Survey (CMDS) in 2011

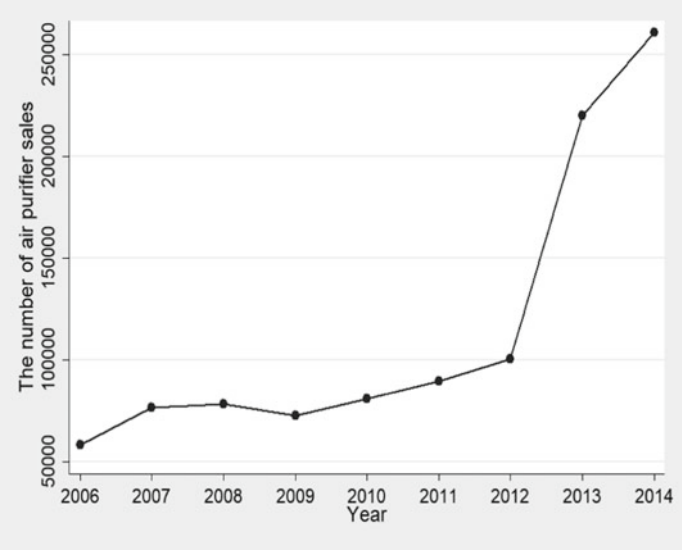

Fig. 12.9 The number of air purifier sales for 85 major Chinese cities from 2006 to 2014. *Data Source* Air purifier sales transaction data collected by a marketing firm in China from January 2006 through December 2014 for 85 cities

models. The conventional hedonic model assumes that households can freely move across space. However, when there are significant migration costs, the benefits that households receive from moving to cities with better amenities must compensate them for lower-income and higher housing prices and these costs. As a result, the simple variation in income and housing costs across locations no longer reflects the economic value of differences in non-market amenities. Mobility constraints hinder the use of conventional wage-hedonic techniques to estimate household MWTP for local amenities such as clean air.

In this chapter, we analysed the role of migration costs in household residential sorting and applied both the hedonic model and the equilibrium sorting model *incorporating mobility costs* to estimate household MWTP for air quality improvement in the USA and China. Our findings highlight the potential importance of incorporating mobility constraints into measuring the value of pollution reductions. Ignoring mobility costs in spatial sorting will result in underestimating the economic value of non-market amenities in both the USA and China, and such downward bias is larger in developing countries such as China where migration costs are substantially higher.

As China moves beyond a narrow focus on the pursuit of economic growth towards the more holistic policy target of improving the quality of life of its citizens, there will be new opportunities for revealed preference approaches to contribute to policy decision-making. Many of the environmental concerns that economic development has generated will have major impacts on human wellbeing and need to be factored into economic targets and strategies. For this to happen, their economic value will need to be quantified and decision support tools for economic policy broadened to incorporate them. Revealed preference approaches, particularly equilibrium sorting models, have a potentially important role to play in providing robust estimates of the economic value of lower pollution, green space, leisure facilities, and the aesthetic attributes of where people live and work. This chapter has hopefully demonstrated both the feasibility of estimating equilibrium sorting models in a Chinese context and the need to tailor these methods to the particular features of that context, particularly with respect to migration costs.

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Chapter 13
Social Frontiers: Estimating the Spatial Boundaries Between Residential Groups and Their Impacts on Crime

Ivana Křížková, Meng Le Zhang, Dan Olner, and Gwilym Pryce

Abstract In this chapter, we highlight the importance of *social frontiers*—sharp spatial divisions in the residential make-up of adjacent communities—as a potentially important form of segregation. The handful of studies estimating the impacts of social frontiers have been based in the USA and the UK, both of which are free-market democracies with a long history of immigration, ethnic mix and segregation. There are currently no studies of social frontiers in former socialist countries, for example, or in countries where immigration and ethnic mix are only a recent phenomenon or non-existent. This chapter aims to address this research gap by estimating the impacts of social frontiers on crime rates in a post-socialist country, Czechia. We demonstrate how a Bayesian spatial conditional autoregressive estimation can be used to detect social frontiers in this setting, and we use a fixed effect quasi-Poisson model to investigate the impact on crime. Our results suggest that in new immigration destinations, social frontiers may not be associated with higher rates of crime, at least in the short run. Moreover, our use of cultural distance measures helps to promote a more nuanced approach to studying the impact of segregation and highlights the role of cultural diversity in understanding the link between immigrant segregation and crime. We reflect on how this approach could contribute to the study of segregation and inequality in the Chinese context.

Keywords Segregation · Crime · Social frontiers · Immigration · Ethnicity · Post-socialist · Bayesian Conditional Autoregressive Estimation

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The Urban Book Series, https://doi.org/10.1007/978-3-030-74544-8_13

13.1 Introduction

In countries with a long history of immigration, the issue of segregation, defined as the degree of spatial separation between different groups,[1] has been a longstanding topic of research and debate among academics, policymakers and the general public. Some view segregation as a symptom of social fragmentation, the inevitable outcome of a flawed vision of multiculturalism (see summary and critique of this perspective in Finney and Simpson 2009; see also Bolt et al. 2008; Phillips 2010). For others, it represents a positive indicator of individual freedom and residential choice (Cheshire 2007), a natural consequence of the human tendency to make friendship connections and find social and emotional support among those most like ourselves (McPherson et al. 2001; Bakens and Pryce 2018). Segregation does not inevitably preclude convivial relations between separate communities (Neal et al. 2013).

Against this backdrop of political discussion and contrasting social visions, a vast and growing academic literature has emerged seeking to quantify the various dimensions of segregation (see Chaps. 2, 4, and 10; Piekut et al. 2019). While huge advances have been made in computing inference for segregation measures (Lee et al. 2015), developing multi-group indicators (Yao et al. 2018: (4) and estimating multi-level measures (Chap. 10; Manley et al. 2018), there are at least four important aspects of segregation that remain under-researched. First, there has been a focus on measuring the overall degree of spatial separation rather than understanding the nature of the interface between different groups (Dean et al. 2018; Legewie 2018). Second, the focus has been on major cities. As a result, we know comparatively little about the nature of segregation in towns and small cities, which are typically neglected in the mainstream segregation literature (Šimon et al. 2021). Third, most publications dealing with segregation come from Western Europe, the US and other established migrant destinations, reflecting the wider Anglo-American hegemony in urban studies and urban geography (Kong and Qian 2017). There are, for example, relatively few robust empirical studies in former socialist countries like Czechia that do not have a long history of immigration, ethnic diversity and segregation. Therefore, there is a need to develop a more rigorous understanding of segregation in regions beyond the usual study areas, where there are nevertheless growing public concerns about these issues (e.g. Dražanová 2018). Fourth, there is a great deal more empirical research estimating the nature and dynamics of segregation than their impacts. As a result, we know relatively little about which types of segregation are problematic, under what circumstances and for whom.

With respect to this fourth point, a notable exception is a work by Maguire et al. (2016: 845) which found that, while the overall level of segregation measured using the dissimilarity index (Massey and Denton 1988; see also Chaps. 2, 4, and 10) had no impact on mental health, the effects of neighbourhood boundaries were very large indeed. Their results indicated that living near 'peacelines' in Belfast—walls erected to keep rival Catholic and Protestant communities apart—increased 'the likelihood of antidepressant medication by 19% and anxiolytic medication by 39%,

[1] E.g. Yao et al. (2018, 1).

even after adjustment for gender, age, conurbation, deprivation and crime'. The study by Maguire et al. (2016) reflects a growing awareness in recent years of how important the spatial interface between different groups can be. It is the overall degree of spatial separation that matters and the nature of transitions between residential communities. For example, Dean et al. (2018) have argued that sharp spatial transitions between two groups rather than gradual blending of residents across neighbourhood boundaries may indicate an aversion to living near members of the other group. This, in turn, may be indicative of social tensions and potential conflict.[2] Dean et al. (2018: 271) coin the term 'social frontiers' to denote these 'places of sharp difference in social/ethnic characteristics between neighbouring communities'. These frontiers can have various consequences, not only on health (Maguire et al. 2016) but also on crime and conflict (Legewie 2018; Legewie and Schaeffer 2016; Dean et al. 2018). In some instances, social frontiers may be places of settled difference where relatively few conflicts occur (Legewie and Schaeffer 2016), while in other cities, they are associated with negative effects for those living in their proximity (Legewie 2018; Dean et al. 2018). Researchers have also explored whether there is a link between social frontiers and xenophobia: Klinger, Müller and Schaeffer (2017) find no significant relationship in Germany where immigration is somewhat more recent.

Perhaps surprisingly, given the vast empirical literature on segregation in Western democracies (Chaps. 2 and 10), research on the impact of social frontiers is relatively recent as the dates of the above studies demonstrate. In Massey and Denton's (1988) much-cited review of segregation analysis, social frontiers are not included in the 'five distinct axes of measurement: evenness, exposure, concentration, centralisation, and clustering'. Two decades later, Kramer (2017, p. 2), concluded that 'empirical research on neighbourhood boundary making is practically non-existent'. Even now, evidence on the impacts of social frontiers remains limited to a handful of studies, all focused on the US and the UK.

Dean et al. (2018) make the theoretical case for broadening the study of social frontiers. They argue that even if social frontiers do not lead to conflict and crime in the short run, over time, the lack of contact between groups will lead to growing potential for misunderstanding and prejudice (Allport 1954). The absence of 'bridge builders'—residents willing to live on the other side of the social frontier and provide links between otherwise isolated social networks—will limit the capacity of those communities to defuse tensions and prevent incidents escalating into cycles of violence and threat (Dean et al. 2018).

The aim of the current chapter is to help fill some of these gaps in the literature by assessing the impacts of social frontiers on crime rates beyond the usual Anglo-American locations that dominate the urban geography literature. Our case study area is in a regional capital city in Czechia, a post-socialist country. This provides us with a

[2] Researching the impact of differences in land use on crime has a long pedigree. See e.g. Song et al. (2017) for an overview of such studies in criminology, based on which they argue that edges in general may be conducive to crime.

very different socio-historical backdrop for our quantitative study of segregation, and one that might be a more relevant comparator for future research on social frontiers in China.

Our central research questions are: (1) *whether social frontiers based on citizenship*[3] *exist in Czechia*, and (2) *whether there is evidence that social frontiers are related to conflicts in a country where immigration is recent?* We are also interested in the impact of social frontiers based on more subtle differences in population, which have not been explicitly researched in the quantitative social frontiers literature. Cultural difference is a potentially important factor in determining immigrant integration into the host country: it has proved to be a reliable predictor of conflicts in countries as dissimilar as the former Yugoslavia and India on the regional level (Lim et al. 2007). In order to investigate this, we use the concept of 'cultural distance' between countries. We examine the relationship between social frontiers—defined by the cultural distance of foreign citizens (immigrants) from the non-migrant population—and neighbourhood conflicts. Our two key datasets give exact geolocations for foreign individuals, and for crimes within our study city. These unique sources allow us to investigate these research questions with a level of precision and spatial resolution not usually possible in the segregation research.

Our case study city is Pardubice, located in Czechia, a Central European country with over 40 years of socialist past. Shortly after opening its borders in 1989, Czechia became the main immigration country in the region (Drbohlav and Valenta 2014). As a result, the country's ethnic mix is slowly growing and moving past the socialist aim for homogeneity (Smith 1996). Growing ethnic diversity represents a challenge to the country's national identity and has the potential to carve fault lines in Czech society. Therefore, the specific national context and the country's unique migration system make Czechia an interesting case study that broadens the current knowledge of the impacts of segregation in a previously unexplored setting. Moreover, as the country is the regional leader in the transition from emigration to immigration (Drbohlav 2012), our observations from Czechia might be indicative of future trends in the wider Central and Eastern European (CEE) region.

The remainder of the chapter is structured as follows. The next section discusses in more depth why a post-socialist country should or should not experience the emergence of social frontiers based on ethnicity and why the latter may have effects on residents living in their proximity. In the third section, we introduce our case study area for which we have access to geocoded data on crime and census variables. We describe our methodology for identifying social frontiers and estimating their impact on conflicts. In the fourth section, we present social frontiers based on culturally closer and culturally distant foreign citizens. We report a permutation test results and a quasi-Poisson regression model to assess the link between social frontiers and conflicts in a Czech regional capital city. In the last section, we discuss the implications of our study for policy and further research.

[3] Due to the short history of contemporary international migration in Czechia, recent migrants (and the children born to a couple of foreign citizens, the number of which remains limited) might be the only source of non-Czech citizens.

13.2 Social Frontiers and Their Impact on a Society After Socialism

In the past CEE socialist countries aimed to achieve an egalitarian society (Smith 1996) through political and economic homogenisation policies including property nationalisation, large-scale housing construction and residential mixing of socio-economic classes. Despite not fully achieving the goal of equality, socio-economic inequalities within post-socialist societies were smaller than those in capitalist cities (Musil 2005). Due to the very limited potential for crossing national boundaries, international migration was non-existent. Together with the Second World War events, which led to massive population movements in Central and Eastern Europe, this resulted in almost absolute ethnic homogeneity in some socialist countries such as Czechia.[4]

The lack of experience with diversity engendered by international migration is possibly one of the reasons why some CEE populations are among the least tolerant towards immigration in Europe (Čermáková and Leontiyeva 2017). Given the rather hostile approach to difference in these countries, ethnic differences in neighbouring areas might constitute a rift in the social-spatial structures of cities. Following from that, we could assume that the more pronounced the cultural difference between immigrants and the majority population, the stronger the barrier between the two would be. Moreover, social frontiers may emerge from ethnic diversity of population and the dissimilar lifestyles of migrant and majority populations related to their respective cultures and time–space behaviour. Similarly, research in Estonia shows that dissimilar activities of Estonian and Russian speakers in time and space limit encounters between the two groups, which restricts social integration of the two language and ethnic groups (Järv et al. 2015).

However, other characteristics of the post-socialist urban context suggest limited potential for social frontiers' emergence. The most salient reason for this is the current proportion of foreign citizens residing in Central European post-socialist countries. Although their presence is becoming more evident, the limited number of immigrants in CEE countries precludes the emergence of large spatial concentrations of these populations compared with established migration destinations (Drbohlav 2012). An exception to this is workers' dormitories, where immigrants may represent a substantial part of the local population (Přidalová and Hasman 2018). However, these concentrations are usually limited to the level of individual buildings. Moreover, as they are often located near industrial sites, they may be spatially separated from the remaining populated areas, thereby impeding conflicts over territory. In addition to this, the authors are not aware of any evidence of foreign citizens living in deprived areas in post-socialist Central Europe. As most immigration to the area is motivated economically and originates in countries with similar cultures or historical experience of socialism (Eröss and Karácsonyi 2014), the characteristics of immigrants seem to prevent potential conflict with other non-migrants.

[4] In contrast, post-Soviet countries like Estonia, Latvia and Lithuania experienced a growth in ethnic heterogeneity due to WW2 and Soviet-induced population movements.

13.2.1 Social Frontiers in a Post-Socialist Society

Despite the demographic factors that limit the scale of social frontiers based on country of birth, current political developments in CEE countries suggest that such boundaries may nevertheless emerge as an important issue (Rupnik 2016). The question remains whether social frontiers are associated with problems such as neighbourhood conflict and crime in the nascent phases of immigration in the CEE context. Even if the social frontiers emerge for benign reasons, such as the need for migrants to be located near family and friends for social, linguistic and economic support, over time, the separation implied by social frontiers may cause prejudice and conflict (Allport 1954; Dean et al. 2018). Moreover, several criminological theories provide reasons to expect crime to occur at the borders between sharply dissimilar residential areas.

First, *social disorganisation theory* holds that residents in transition zones, which are characterised by high residential mobility and ethnic heterogeneity, have fewer networks. This, in turn, weakens social control and increases crime (Sampson and Groves 1989) and can give a cause for concern to neighbouring communities. For instance, the presence of a transient population of students was identified as a factor in weakening social cohesion in post-socialist Budapest (Fabula et al. 2017). Similarly, lesser social cohesion in areas inhabited by a transitory foreign population might produce a greater feeling of insecurity in the neighbouring majority-dominated areas (as shown in Sýkora et al. 2015) and more requests for police activity at community boundaries. This effect may be great in post-socialist countries with rather negative attitudes towards immigrants and a strong tradition of reliance on the power of authorities.

Second, *strain theory* explains that the discrepancy between expected upward social mobility and the actual possibility of such an achievement may lead to demotivation and in turn to social pathology (Pratt and Cullen 2005). If immigrants work as hard as the remaining population and are less rewarded or do not feel welcome, then spaces of interaction between migrants and non-migrants may become places of conflict. A similar mechanism can also be in place for the native population if its members are less rewarded than migrants. Although we are not aware of evidence of conflicts stemming from the perceived competition limiting the majority or migrant group's social mobility known from countries with a more established history of immigration, signs of concerns in the majority population about competition with migrants on the labour market exist in CEE (Cook et al. 2011; Hlinčíková et al. 2014).

Third, criminological research highlights the role of *criminogenic places*: locations that offer opportunities that attract or generate criminal behaviour (Brantingham and Brantingham 1995; Haberman and Ratcliffe 2015). For instance, Šimon and Jíchová (2020) observe a stronger concentration of crime in particular places such as commercial and transit locations in inner city and manufacturing and storage areas in the outer parts of a post-socialist regional city. If these opportunities are located close to social frontiers, it is likely that more crime will occur there.

Nonetheless, social frontiers based on ethnic identity or country of birth need not always be places of heightened social problems. The *rational choice model* of criminal behaviour posits that an individual commits a crime if the gains from carrying out the crime minus the potential punishment outweigh the gains from legitimate economic activity (Clarke and Felson 1993; Kang 2016). Given the overall attitude towards migration in CEE countries and the likelihood of harsh punishment for potential offenders compared to the relatively attractive pay, immigrants in the CEE region (predominantly labour migrants) are presumably less susceptible to committing crimes. On the other hand, despite unwelcoming political and media discourse about immigrants, the authors are not aware of high profile crimes related to ethnicity being reported in the CEE other than hate speech which, however, tends to be overlooked by authorities (Pejchal 2018). Following this, a general tendency to avoid potential conflicts by immigrants in CEE can be expected. Second, Gould's *concept of asymmetric relations* states that conflict occurs when several similar-sized groups compete for their respective rank in society (Gould 2003). This is consistent with crime patterns in New York (Legewie and Schaeffer 2016), but the extent of both immigration and conflicts in CEE countries prevents us from testing the same hypothesis empirically. However, the history of contemporary immigration to post-socialist Central Europe is supposedly too short to trigger competition over territory with natives. Third, social problems tend to concentrate in multiply deprived areas. Post-socialist CEE countries inherited a rather egalitarian socio-economic structure where the differences between the majority population and immigrant groups remain limited (Ouředníček 2016). In combination with an urban structure dissimilar from the Western European one (Šimon and Jíchová 2020), it is unlikely that the population of some areas would be comparatively so disadvantaged as to turn to socially pathological behaviour.

13.3 Methodology

13.3.1 Case Study City

To empirically test the relationship between social frontiers and crime in Czechia, a case study city of Pardubice was selected. The regional capital has a population of around 90 thousand, including some 5% foreign citizens,[5] their proportion in the population being slightly above the national average. Two large assembly plants in the city are the main employers of its immigrant population. While migrants are scattered across the city, a few spatial concentrations are stemming from the temporary work agencies' management of migrant workers (Andrijasevic and Sacchetto

[5] Given the short history of contemporary international migration in Czechia resulting in a significant overlap of the two groups, the terms 'foreign citizens' (or 'foreigners') can be used as equivalent to 'migrants.' With the exception of Roma population, the number of which is unavailable, immigrants constitute the only significant ethnic minority in the city.

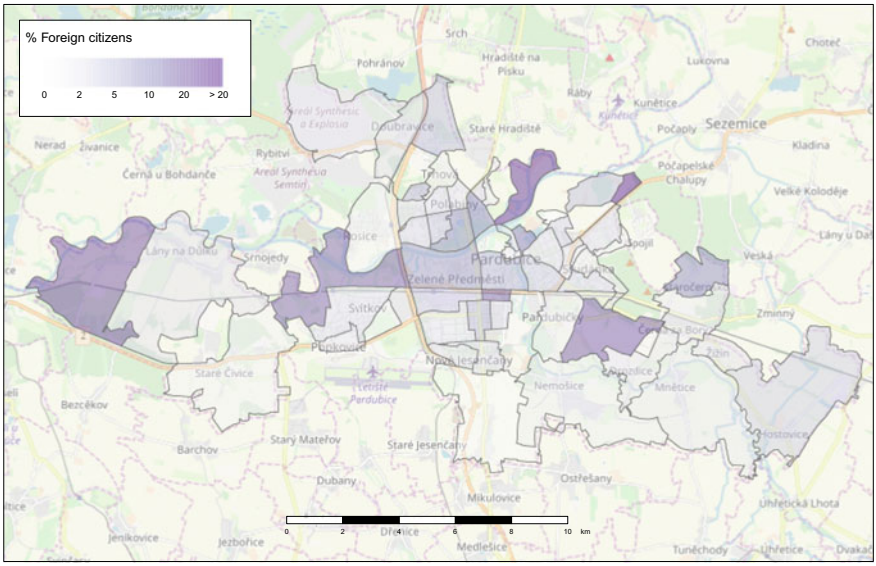

Fig. 13.1 Foreign citizens as percentage of BSU population in 2011. *Source:* Pardubice: OpenStreetMap contributors, 2017

2008). The most pronounced concentration is the former Soviet army barracks which now serves as cheap workers' accommodation located in the North-East of the city (Fig. 13.1). Previous studies in the city have reported on tensions arising from cultural and language barriers between the majority population and some migrant workers (Sýkora et al. 2015). This might also be partly related to the rather negative media coverage of foreign citizens in the country and the city (Šamánek 2008; Zalabáková 2012).

13.3.2 Data

We use two geocoded anonymised datasets made available to the research team. The first dataset includes all foreign citizens registered to reside in Pardubice in 2011.[6] The database contains around 3,500 individual anonymised records, including information about the individuals' country of citizenship. The largest groups residing in the city according to the database originate from Slovakia (28%), Ukraine (25%), Vietnam (15%) and Mongolia (5%). The second dataset represents neighbourhood conflict data which contains all (3,800) so-called minor crimes dealt with by the municipal police of Pardubice in 2014. These included minor crimes against public

[6] The spatial distribution of foreigners in 2011 is very similar to the one in 2014, the data for which we could unfortunately not use.

order (67%, e.g. noise at night, immoral behaviour in public), against property (19%, e.g. damaging others' property), against civic cohabitation (7%, e.g. verbal threatening) and others (7%, e.g. alcohol and drugs abuse).[7] Although the database includes some details, it does not contain some relevant contextual information about individual conflicts, for example whether they involved ethnic or cultural differences in population, nor does it reveal the ethnic identity of the perpetrator or the victim.

As the datasets are unique and have not been used before, it is important to highlight their limitations. Both sources contain geocoded entities registered with the authorities. The database of foreign citizens includes citizens of countries other than the Czech Republic who hold either a temporary or permanent resident permit. The citizens of EU countries are only required to report to the Czech authorities if their stay in the country is to exceed 30 days. Non-registered foreign citizens such as short-term migrants and undocumented migrants are not taken into account. However, it can be assumed that the spatial distribution of foreign citizens with a temporary or permanent resident permit does not differ significantly from those staying short-term and undocumented ones, as all are dependent on similar infrastructure (Engbersen et al. 2006; Medová and Drbohlav 2013). As we operationalise social frontiers based on the difference in the proportion of foreigners in neighbouring areas, this should not impact our analysis. The conflicts database only provides us with cases where police officers were called to resolve or encountered a minor crime during field work. As with most datasets based on crimes recorded by the police, offences unreported to the authorities thus remain unknown in our data. However, we argue that it is largely the perceived importance of the issue that makes residents report the offences in their neighbourhood. Following from this, despite the likelihood of some under-reporting, our data provides a valid picture of neighbourhood conflicts in Pardubice. Despite having these flaws, the geocoded data we employ in this chapter represent the complete sources researchers can use when looking at Czechia. The databases are more detailed and more up-to-date than the traditional data source on foreign population, that is the decennial census.

The variables resulting from the two databases used in the subsequent analyses are the proportion of foreign citizens in the population and the proportion of conflicts per square kilometre, respectively. For further analysis, the individual data were aggregated to 94 Basic Settlement Units (BSU), and the crime data to 100 m by 100 m grid squares (the next section explains this in more detail). However, to avoid distortion of the subsequent analyses by outliers and non-residential areas in data, BSUs with less than ten residents were excluded from the analysis. This left us with a final dataset of 61 BSUs.

[7] The database which was made publicly available by the municipal police of Pardubice for analytic purposes also includes traffic and parking offenses and administrative records. These were cleared from the database prior to our analyses.

13.3.3 Methods

Following Lee and Mitchell (2013) and Dean et al. (2018), we use a Bayesian spatial conditional autoregressive model as a basis for detecting the presence of social frontiers. The aim of the procedure is to detect step changes where the proportion of migrants in a BSU differs significantly from those in an adjacent BSU. The full details of the method can be found in Dean et al. (2018) whose methodology we adapted from English data to our Czech case study.

For each BSU k the total number of foreigners Y_k is a function of the total number of residents in that BSU (N_k) and the probability of a resident being a migrant (p_k). The logit transformation of p_k is a linear function of an unknown parameter 0 and a random effect u_k. The random effect u_k is assumed to be spatially autocorrelated since the proportion of migrants in a zone p_k is likely to be correlated with the proportion of migrants in neighbouring zones due to spatial spillover and shared causal factors. The full Bayesian model is as follows:

$$Y_k \sim Binomial(N_k, p_k); k = 1, \ldots, n$$

$$\ln\left(\frac{p_k}{1-p_k}\right) = \beta_0 + u_k$$

$$u_k | u_{-k}, W, \lambda, \tau^2 \sim N\left(\frac{\sum_{k\sim l} u_l}{1-\lambda+\lambda_{wk+}}, \frac{1}{\tau^2(1-\lambda+\lambda_{wk+})}\right)$$

$$\beta_0 \sim N(0, b)$$

$$\tau^2 \sim gamma\left(e', f'\right)$$

$$logit \sim N(0, 100)$$

where λ is the parameter affecting how the proportion of foreigners in BSUs surrounding BSU k affects the proportion of foreigners in k. W is the n by n spatial weights matrix which determines whether or not the proportion of foreigners in neighbouring zones affects p_k. In standard spatial models, the matrix W is fixed with values of 0 and 1, where 1 indicates that two zones are contiguous and 0 otherwise. However, social frontiers occur between geographically contiguous zones that nonetheless have very different proportions of foreigners (i.e. p_k). Following Dean et al. (2018), we allow W to be another set of parameters to be estimated. Starting from the standard spatial weights matrix, we allow values of 1 to be set to 0. For BSU pairs where this has occurred, this represents a case whereby two contiguous areas have very different proportions of foreigners (i.e. a step change). It is these areas that we identify as social frontiers.

Three types of social frontiers were identified: (i) foreign citizens as a whole, and for subsets of (ii) culturally closer and (iii) culturally more distant foreigners. Cultural distance between the Czech population and the given group was measured using the World Values Survey, specifically its two-dimensional 'cultural map' where survey data has been reduced to two axes using factor analysis (Welzel 2013). The two axes place countries on a scale between protective versus emancipative values on the one hand and sacred versus secular values on the other. Cultural distance is then simply the Euclidean distance between countries on this graph. To get two groups of culturally closer and more distant countries, all countries are ranked by cultural distance to Czechia and split evenly, so each contains approximately the same number of migrants.

The association between social frontiers and conflicts per square kilometre was tested in two steps. First, this was checked at the administrative level of Basic Settlement Units using 1,000 permutations. Second, a more thorough analysis was performed using a fixed effect quasi-Poisson model. The expected number of crimes μ_{ij} in a grid square i within BSU j is conditional upon a BSU fixed effect δ_j, whether a grid square centroid was within 100 m of a BSU boundary x_{ij} and whether the centroid was within 100 m of a social frontier z_{ij}. The parameter β_z indicates the difference in crime counts between grids near BSU boundaries and social frontiers. The inclusion of BSU fixed effect controls for between-BSU differences in factors that might affect crime (e.g. unemployment rates). The quasi-Poisson model includes an additional dispersion parameter to account for the problem of over-dispersion in Poisson models, which can affect standard errors.

$$\ln(\mu_{ij}) = \beta_x x_{ij} + \beta_z z_{ij} + \delta_j$$

13.4 Results

13.4.1 Overview of Social Frontiers

Despite the rather low overall proportion of foreign-born residents compared to cities in established migrant destination countries, our analysis did identify statistically significant social frontiers based on ethnicity in Pardubice. The overall proportion of foreign citizens in the population is mainly driven by the culturally closer group, which also explains why the social frontiers based on all and culturally closer foreigners are almost identical, being located mostly in the less populated outer parts of the city (Fig. 13.2). On the contrary, there is only one pronounced concentration of culturally more distant foreigners in the above-mentioned BSU with the workers dormitory. Apart from that, the culturally more distant population constitutes a similar proportion of population in most parts of the city. As there are fewer

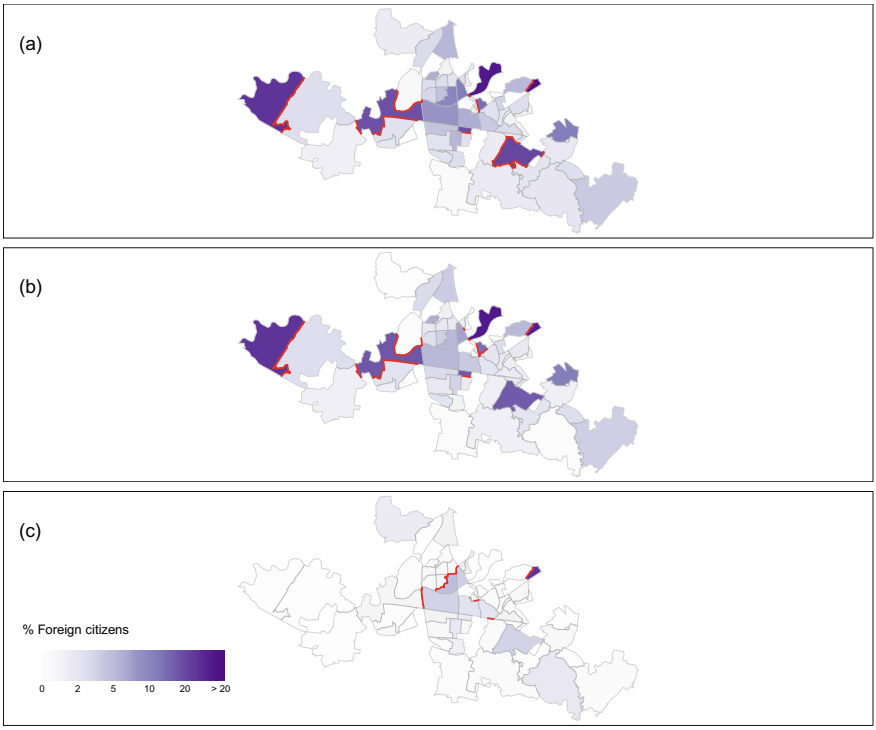

Fig. 13.2 Proportion of all (**a**), culturally closer (**b**), and culturally more distant (**c**) foreign citizens in population with the location of social frontiers (red) in 2011

statistically significant and substantially interesting differences between the culturally distant and remaining populations, there are also fewer borders that qualify as social frontiers.

13.4.2 Social Frontiers and Neighbourhood Conflicts

Having identified boundaries between areal units which could be called social frontiers, we move on to look at their relationship with conflicts, which we measure using police recorded data on crime. At the administrative level of the BSU, we do not observe any statistically significant relationship between crime levels and the concentration of migrants as a whole, nor for those broken down to culturally closer and more distant groups, and neighbourhood conflict (Table 13.1). However, this analysis uses administrative units of different shapes and sizes, which makes it susceptible to a modifiable areal unit problem (MAUP; Openshaw 1983; see also discussion of MAUP in Chap. 2) and which does not allow us to consider the distance of crimes to the frontiers. Therefore, we next perform a more thorough analysis which

Table 13.1 The differences in conflicts per sq km between areas adjacent to social frontiers and areas adjacent to borders

	No. of social frontiers	Mean difference in number of crime incidents between frontier-paired and border-paired BSUs	*p*-value
All foreigners	18	60.32	0.825
Closer cultural groups	16	14.87	0.538
More distant cultural groups	12	−73.49	0.162

looks at conflicts in areas adjacent to the detected frontiers regardless of the shapes of administrative units and consider whether the conflicts occurred within 100 m of the frontier or not.

The quasi-Poisson model with BSU as a fixed effect gives somewhat different results (Table 13.2). A statistically significant negative relationship was found for grids within 100 m of frontiers based on all foreigners, suggesting that there is less conflict nearest to the frontiers. This can be explained by the higher proportion of migrants as a whole in peripheral parts of the city where fewer conflicts are reported. Interestingly, another statistically significant relationship we observe is a positive one for more culturally distant migrants within 100 m of the frontiers. However, fewer of these frontiers and the relationship are likely to be driven by the concentration around the workers' dormitories. Moreover, this relationship may be partly a consequence of some culturally more distant social frontiers detected in the city centre where more conflicts occur in general (Fig. 13.3). This probably derives from the spatial distribution of criminogenic places such as pubs, bars and shops, which predominate in the city centre of Pardubice rather than on the periphery where residential land use prevails.

Table 13.2 Estimations of the effect of proximity to social frontiers on neighbourhood conflicts for all, culturally closer and culturally more distant foreign citizens

	All	Closer	More distant
Estimate	−0.858[c]	0.005	0.316[b]
S.E	(0.245)	(0.200)	(0.146)
Observations	6,644	6,644	6,644

Notes
[a]$p < 0.1$; [b]$p < 0.05$; [c]$p < 0.01$
Dependent variable: total conflicts with a grid within 100 m of the frontier

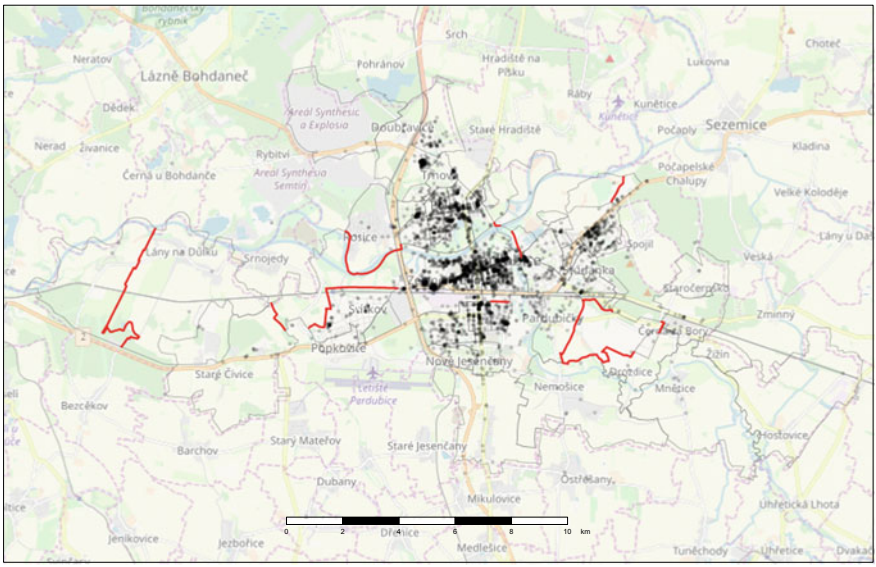

Fig. 13.3 Location of individual conflicts and social frontiers (red) based on all foreign citizens

13.5 Discussion and Conclusion

Although our approach successfully identified a number of social frontiers in the Czech city of Pardubice, the evidence for the relationship between these and neighbourhood crime was mixed. We found no significant link between the spatial distribution of foreign citizens in Pardubice and neighbourhood crime at the BSU level. The evidence for grid squares within 100 m of a social frontier suggests that while frontiers based on the proportion of all foreigners are associated with fewer crimes, the opposite is the case for frontiers based on the proportion of culturally distant foreigners. On the one hand, the statistically insignificant results suggest that social frontiers based on the presence of immigrant population in the Czech context tend to be associated with less conflict or a similar amount to areas not adjacent to social frontiers. This might be due to cultural similarity between migrants and the majority Czech population, which creates less tension between the two groups in spaces where they interact. On the other hand, the positive relationship between culturally distant foreigners and conflicts might be a spurious match between frontier places and existing crime, resulting from immigrant housing and the location of conflicts related to economic opportunity.

Certainly, the estimated impact of social frontiers is much less clear than those observed in established migrant destination countries where similar studies were undertaken. A significant relationship between social frontiers and different types of crime or neighbourhood conflict has been observed in both British and US cities (Dean et al. 2018; Legewie and Schaeffer 2016; Legewie 2018), although to a

different extent when taking into account the 'fuzziness' of the frontier (Legewie and Schaeffer 2016). On the other hand, no significant link between frontiers and xenophobia was observed in Cologne, Germany (Klinger, Müller, and Schaeffer 2017). These differences may be due to our study's national and local context, where the levels of immigration and crime are lower than in Western Europe and Northern America. In Czechia, migrant communities are less established and their segregation generally only exists at the level of individual buildings. Our results suggest that neighbourhood crime in Pardubice results from an interplay of factors that are considered central by theories that expect an opposing effect of social frontiers on crime, thus pointing to the limited ability of these theories to explain crime in a specific geographic context.

A natural question to ask at this point is why we observe such different social frontier effects in Czechia compared to the UK and the USA? At one level, our results could be interpreted as evidence that social frontiers are not always places of heightened social tensions. The stark contrast between our finding of no clear link between social frontiers and crime, and the positive relationship found in established migration countries (Dean et al. 2018; Legewie 2018), may highlight the importance of cultural and historical background in modifying social frontier effects. This is particularly relevant to the current volume, which seeks to apply insights gleaned from European research on segregation to the Chinese context. History matters for the meaning and consequences of segregation, and that includes social frontiers. Given the very different socio-political history of modern China compared with the traditional study areas for segregation (Chap. 4), we should be cautious about assuming the consequences of segregation will be the same.

One specific aspect of the Czech historical context is the novelty of mass immigration there. It may be, therefore, that social frontiers are unlikely to be associated with higher rates of crime when they arise from migrants self-segregating, not out of antipathy towards the native population, but because of practical necessity—the need for local support networks among extended family and friendship connections.

Crucially, however, we should be careful about drawing long-run or generalised conclusions from our results. Our research on Czechia is based on a snapshot in time. Just because social frontiers appear to have no real impact on crime in the present, it may not remain so. Social frontiers greatly reduce the potential contact between migrant and incumbent communities compared with more mixed residential patterns. The implication of Allport's (1954) contact hypothesis and Dean et al.'s (2018) 'absence of bridge-builders' theory is that this lack of contact could eventually lead to greater distrust, prejudice, misunderstanding and ultimately entrenched division if it is not ameliorated.

One implication for future research on China is the need to find ways not only to explore whether social frontiers have different or similar impacts to the UK and the USA, but whether or not their effects will eventually converge towards those observed in the West. While immigration in China remains negligible, at least relative to the size of the population, Wei Houkai and Su Hongjian have documented in Chap. 5 the huge growth in internal migration from rural to urban areas. This has led to growing residential enclaves of rural migrants (Chaps. 4 and 10), particularly in

large cities. There is also evidence of ethnic segregation (see Chap. 10) and growing socio-economic segregation following economic liberalisation (Chap. 4). So it will be interesting to see whether the increasing geographical stratification of Chinese society is associated with negative social outcomes such as crime, anxiety or depression, as per that observed in the UK (Dean et al. 2018; Maguire et al. 2016). As with our Czech results, even if we observe no deleterious impacts at first, the wider European and American experience suggests that prolonged spatial separation of social groups, in the long run, can lead to growing tensions and division.

The Czech context also points to the need for further research on the association between the impact of social frontiers and factors related to the actual size, structure and characteristics of the immigrant population, along with those of the host society. The foreign citizen group in Pardubice might not have yet reached the critical mass needed to engender a sense of threat in the host community, triggering competition over territory and social conflict of the kind reported in countries with long-established ethnic minorities (Legewie and Schaeffer 2016). The immigrant population in our case study typically consists of first-generation labour migrants from culturally close countries, who seem to be less associated with neighbourhood conflict as predicted by rational choice theory. In China, however, the number of rural migrants in many cities is very significant indeed even if external immigration remains low. Moreover, the binary nature of the *hukou* registration system has helped reinforce and entrench social divisions in employment, housing, and social mobility (Chaps. 4, 6, 7, 8, 12 and 15). So there may be much greater potential in the Chinese context for social frontiers to emerge and have significant negative impacts.

Finally, the relatively low level of social inequality in Czechia as compared to countries in Western Europe and the US (Hasman and Novotný 2015) may contribute to a more even spatial distribution of immigrants in the long-run, which may facilitate their integration into the host society by an everyday contact with the out-group, as well as reducing differences across social frontiers, diminishing their impact. So the social frontiers we observed in our study may only represent transient boundaries. However, while the socialist legacy also left low levels of socio-economic inequality in China, the rapid and prolonged pace of economic development there has led to very significant increases in inequality, leaving it with Gini coefficients above most European countries.[8]

Although our findings have identified some conditions which seem to prevent neighbourhood problems occurring near social frontiers, they are not without caveats. First, due to the small number of immigrants holding citizenship of individual countries, we were not able to fully unpack the role of ethnic diversity within the immigrant population and its relationship with crime as suggested by Kubrin et al. (2018). To at least partially overcome this, we used cultural distance to differentiate between two major groups. Second, our approach might be criticised for focusing on (minor)

[8] The Gini-coefficient is a widely used measure of income inequality. Its values range between zero and one, with the higher the value, the greater the inequality. The World Bank estimated China Gini-coefficient to be 38.5 in 2016. This compares with estimates of 24.9 for Czechia, 28.8 for Sweden, 31.6 for France, 31.9 for Germany, 34.8 for the United Kingdom, 35.9 for Italy, and 41.4 for the United States (World Bank 2020).

neighbourhood crime while leaving aside serious crimes such as violent and major property crime. However, major crimes are less concentrated in Czechia (Šimon and Jíchová 2020), which suggests that the inconsistent relationship described above would only become weaker when taking major crimes into account. Third, similarly to previous studies in this field (see e.g. Legewie and Schaeffer 2016), our variables are unable to distinguish between intergroup and intragroup conflict. Despite that, they are rather reliable in assessing the ability of communities to maintain order in their local areas.

Bearing in mind these constraints, we believe this study has several merits. First, from a theoretical point of view, it stresses the importance of opening the debate in urban studies to incorporate local findings from beyond the West to achieve a truly international urban theory of social frontiers. Second, our use of cultural distance measures helps to promote a more nuanced approach to studying the impact of segregation and highlights the role of cultural diversity in understanding the link between immigrant segregation and crime. The third merit of this research is empirical, as it brings forward findings from a previously unexplored context, which has important policy implications. In particular, together with Klinger et al. (2017) study, our findings suggest that smaller social stratification (i.e. more social mix) and less segregation in general are related to fewer neighbourhood conflicts. Promoting social equality and social mixing in space thus seems crucial, as it is likely to bring meaningful contact which is believed to contribute to social cohesion. Finally, our chapter does not find evidence that concerns about the negative impacts of immigration, such as increased crime, are empirically grounded in Czechia. However, this may change with the recent rise in xenophobia in the CEE region, largely due to the media reporting on issues with migrant populations in Western European countries and the refugee movements across South-East Europe. One of the worthwhile avenues of future research would be to look at whether and how the nexus between immigration and crime progresses by following these developments. The present study provides the first piece of empirical evidence from the CEE region that can counter the predominantly negative media claims which are seldom evidence-based.

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Chapter 14
Deprivation Indices in China: Establishing Principles for Application and Interpretation

Gwilym Owen, Yu Chen, Gwilym Pryce, Tim Birabi, Hui Song, and Bifeng Wang

Abstract Indices of Multiple Deprivation (IMDs) aim to measure living standards at the small area level. These indices were originally developed in the United Kingdom, but there is a growing interest in adapting them for use in China. However, due to data limitations, Chinese deprivation indices sometimes diverge considerably in approaches and are not always connected with the underlying concepts within UK analysis. In this paper, we seek to bring direction and conceptual rigour to this nascent literature by establishing a set of core principles for IMD estimation that are relevant and feasible in the Chinese context. These principles are based on specifying deprivation domains from theory, selecting the most appropriate measurements for these domains, and then applying rigorous statistical techniques to combine them into an IMD. We apply these principles to create an IMD for Shijiazhuang, the capital city of Hebei Province. We use this to investigate the spatial patterns of deprivation in Shijiazhuang, focussing on clustering and centralisation of deprivation as well as exploring different deprivation typologies. We highlight two distinct types of deprived areas. One is clustered in industrial areas on the edge of the city, while the second is found more centrally and contains high proportions of low-skilled service workers.

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14.1 Introduction

Indices of Multiple Deprivation (IMDs) are produced by combining a range of relevant economic, social and geographic indicators from different domains. The aim is to measure the range of factors that affect living standards at the small area level. IMDs are useful for policy makers seeking to focus resources where they are most needed. They are also an aid to understanding spatial inequalities in a city, region or country (Rae 2012) and provide the basic data infrastructure needed to research the causes, consequences and possible solutions to poverty.

There is increasing interest in creating IMDs in China in order to better understand the extent and distribution of deprivation (Yuan et al. 2011, 2018; Yuan and Wu 2014; Weng et al. 2017). The interest follows rapidly changing socioeconomic conditions as a result of Chinese market reforms and economic restructuring. The last few decades have seen increasing socioeconomic inequality alongside rapid urban expansion and rising residential mobility, particularly in the form of rural-urban migration (He et al. 2015). This has, in turn, led to new forms of deprivation, particularly in urban areas (Wu 2004; Ouyang et al. 2017). Against this backdrop of social and economic change, a growing political awareness has emerged regarding the importance of quality, rather than simply the quantity of economic growth in China.

The need to shift strategic priorities was acknowledged at the highest level in 2014 when President Xi Jinping announced that the Chinese economy would be entering a new phase which he labelled 'the new normal' (Han et al. 2016, p. 176). This was characterised by a 'slowdown from high speed growth to high-middle-speed growth' and a shift from 'scale extensive growth' towards a focus on 'the quality of economic development' which is determined by the 'quality of living of most people' (ibid). To implement and assess the success of this policy shift will require measuring not only economic performance but also the range of factors that affect human wellbeing, such as housing, health and education.

The spatial distribution of these attributes is also important. Galster and Sharkey's (2017) review of the literature on neighbourhood effects, for example, finds overwhelming evidence that the spatial concentration of poverty itself has a significant negative impact on life outcomes and living standards. The extent to which poverty is geographically central or peripheral within a city may also be important as it has implications for access to employment (Zhang and Pryce 2019) and exposure to air pollution (Bailey et al. 2018).

Two papers by Yuan and colleagues (Yuan and Wu 2014; Yuan et al. 2018) have led the development of deprivation indices in China, focussing on the southern city of Guangzhou and the surrounding area. In these papers, they use two conceptually distinct methods of creating deprivation indices. The first is an Index of Multiple Deprivation, an approach pioneered in England (Noble et al. 2006), based on identifying domains of interest through theory and then combining the domain scores

into a composite Index of Multiple Deprivation. The second is a general index of deprivation, developed by researchers in Canada (Langlois and Kitchen 2001). This is a more data-driven approach, where factor analysis is used to create the different domains of deprivation, which are then combined, giving most of the weight to the most important socioeconomic factor.

While these papers provide useful, practical insights into how indices of multiple deprivations can be computed given the restrictions imposed by existing data, there are a number of significant limitations in the way the analysis is conducted and presented. Firstly, they use the two methods without properly engaging with their respective theoretical backgrounds. This means that they do not adequately reflect on the conceptual differences between them and their implications for finding the best and most policy relevant way of measuring deprivation in China. Secondly and relatedly, they ignore potentially beneficial statistical techniques such as shrinkage estimation that are important for obtaining reliable estimates when dealing with small numbers in the data.

Thirdly, although they map the resulting indices, their exploration of the spatial patterns of deprivation and the implications of these patterns for understanding deprivation in China is limited. For example, the degree of spatial concentration of deprivation, the relationship of deprivation with the city centre, and how combinations of deprivation vary across different areas are overlooked. For all their limitations, such indices can inform urban policy decisions and contribute to wider debates about the urban environment.

Finally, like most of the more general quantitative literature on the socio-spatial structure of Chinese cities (e.g. Zhao 2013; Wu et al. 2014; Yang et al. 2015), they focus on one of the country's largest cities (>8 million). This is not a problem as such, and, understandably, these cities receive the main focus of attention. However, it does overlook the spatial distribution of poverty in smaller but still very large cities, which remains less well understood. Cities between 1 and 8 million people make up a large proportion of the population of urban China, and it seems plausible that different patterns of deprivation may be observed in different sizes of city.

Our overarching aim in this paper is to reconnect deprivation index calculation in China with the founding principles upon which these measures were originally conceived and to establish a set of guidelines for computing deprivation indices. Specifically, we aim to:

1. Draw on the theoretical background of IMD estimation to critically reflect on the different methods used for calculating deprivation indices in China.
2. Propose a set of key principles for measuring deprivation in a Chinese context to achieve the most reliable estimation of multiple deprivation.
3. Illustrate these principles by computing indices of deprivation using data for Shijiazhuang, the capital of Hebei Province and a city with an urban area of between 2 and 4 million people.
4. Use our IMD results for Shijiazhuang to show how the spatial distribution of deprivation can be analysed to draw meaningful interpretation from deprivation results that can contribute to urban policy and planning.

The remaining sections of the paper will follow the above sequence. We will conclude with a discussion of the methods used and the implications of the spatial patterns found in the analysis for our understanding of urban China.

14.2 Theoretical Background to Deprivation Indices

The idea of a deprivation index originated in the UK in the 1980s and many of the first attempts to create one were based there (Townsend and Davidson 1988; Carstairs and Morris 1989). Since then the concept has been applied to other high income countries such as New Zealand (Salmond 1998) and Canada (Pampalon and Raymond 2000; Langlois and Kitchen 2001) and more recently to countries with lower levels of average income such as South Africa (Noble et al. 2010). According to Noble et al. (2006), who developed the method for calculating the Index of Multiple Deprivation in England, the approach for measuring deprivation should be led by theory rather than data or statistical techniques. They stressed the need to first identify a theoretical framework for a model of small area deprivation and then select a combination of statistical techniques and indicators which enable that model to be implemented. This theoretical framework for the English IMD is based around ideas of deprivation developed by Townsend who describes deprived people as those who:

> lack the types of diet, clothing, housing, household facilities and fuel and environmental, educational, working and social conditions, activities and facilities which are customary, or at least widely encouraged and approved, in the societies to which they belong (Townsend 1987, p. 135).

Townsend also adopts the idea of multiple deprivation as the accumulation of different dimensions or domains of deprivation, such as housing, education and health. While most of Townsend's work focussed on individual or household deprivation these concepts are easily extended to the area context. The model that Noble et al. (2006) developed from this theoretical framework comprised a set of unidimensional domains of theoretically relevant aspects of deprivation combined, with appropriate weighting, into a single measure of multiple deprivation. In order to apply this model, each domain should be measured by combining the most suitable indicators from the available data.

It is likely that the domains and indicators used in the English IMD are not possible or appropriate when we seek to generate deprivation indices in other countries. If we define deprivation following Townsend (1987, p. 125) 'as a state of observable and demonstrable disadvantage relative to the local community or the wider society or nation to which an individual, family or group belongs,' then clearly the state of the local community or wider society plays a large role in what it means to be deprived. China's socioeconomic trajectory and current circumstances are vastly different from those of the UK and therefore what deprivation means in a Chinese context will be different. Nevertheless, the original principles behind the concept of deprivation, still hold; it is a phenomenon made up of multiple constituent domains. The statistical

techniques used to improve the reliability and validity of the index, remain relevant. There is an imperative, therefore, to adapt these to the Chinese context.

Two papers by Yuan and colleagues (Yuan and Wu 2014; Yuan et al. 2018) have led the development of deprivation indices in China, focussing on the southern city of Guangzhou and surrounding area. These papers create an IMD following the basic rationale of Noble et al. (2006) however they ignore two key technical aspects of the method. Firstly, they do not address the issue surrounding the reliability of the small area data. This is important because when the score for a domain is based on indicators with small numbers of observations in each area, the estimate can be unreliable as it is very sensitive to small changes (e.g. chance fluctuations from year to year and measurement error). This issue is relevant with the Chinese census data as for many Residents' Committees (RCs), the smallest area at which data is available in the Chinese Census, there are also small absolute numbers of individuals/households for many of the proposed indicators (see Table 14.2). In our data, this is particularly true of the indicators we select for the household living environment domain. For example, for RCs in Shijiazhuang, the median number of households with no toilet is four. To avoid this problem, we can shrink the raw scores for indicators with high levels of uncertainty at the small area level towards the mean of the larger areas in which they are situated. In other words, estimates for small areas 'borrow strength' from the larger areas.

Secondly, previous Chinese papers scale each indicator between 0 and 1 but do not transform each domain to a common distribution before combining the indicators. This is an issue as different distributions for each domain score would mean that being a deprived RC in one domain may carry more influence than being a deprived RC in another domain, introducing an implicit weighting. In the English IMD each domain is transformed into an exponential distribution, which has two advantages (Noble et al. 2006). Firstly, an exponential distribution means that low scores in another domain do not fully cancel out high deprivation scores in one domain. The conceptual idea behind this is that an area that is highly deprived on one domain but not deprived on another domain experiences more deprivation than an area that is moderately deprived on both the domains. The second related reason is to stretch out the deprived end of the distribution to better identify the most deprived areas.

The two papers by Yuan and colleagues also use a second technique for calculating deprivation alongside the IMD called a general index of deprivation (GDI), based on a technique developed by researchers in Canada to study deprivation in Montreal (Langlois and Kitchen 2001). The papers by Yuan and colleagues use the two methods alongside each other without properly discussing their theoretical differences and the implications of these for which is the most appropriate method to use in China. Conceptually the idea of the GDI has some similarities to the IMD and the ideas of Townsend, at least in as far as its calculation is based around the idea of multiple deprivation as being made up from the combination of several different forms of deprivation. There are however, two key differences.

The first is that the method does not pre-specify domains of deprivation from theory or policy interest. It works by entering all the selected indicators into a factor analysis, creating a factor score for each RC based on the loadings for each factor,

and then calculating a deprivation index from the combination of these factor scores. The idea is that each factor will represent some aspect of deprivation and therefore, in many ways the factors produced from the analysis are analogous to the domains from the IMD, except that the process for determining them is data driven.

The second difference is that, because Langlois and Kitchen (2001, p. 130) argue that the socioeconomic component of deprivation plays the major role in, and is even a 'necessary condition' for, urban deprivation, they give this factor more influence on the GDI score than all of the other factors combined. Furthermore the formula[1] is such that in the extreme, albeit implausible scenario, where a RC is the most deprived on all of the secondary factors but scores zero on the socioeconomic component, it would score zero overall, providing complete cancellation. This is, therefore, conceptually quite different from the IMD, where the idea is that if a RC is deprived on any domain, this should not be cancelled out by the area being non-deprived on other domains.

In general, we prefer the IMD framework, over the GDI for creating deprivation indices in China. Above all, we believe specifying domains beforehand as in the IMD, rather than deciding them through factor analysis, makes more sense from a theoretical perspective. It also has practical advantages. The IMD domain scores are more easily interpretable. If the domains are chosen carefully, they will represent the aspects of deprivation that are of interest to policymakers using the data. This latter point may also be true for the GDI. However, it is possible that if two domains, for example income and education, are highly correlated, factor analysis may suggest that they can be represented by one underlying factor. This is problematic because even though the same areas have high levels of income and education deprivation, these areas still suffer from two conceptually different aspects of deprivation. It would make sense from a theoretical perspective for them to make separate contributions to the final deprivation score as well as being of practical interest to policymakers working in different sectors to have them measured separately. A further disadvantage of identifying the domains through factor analysis is that they may change somewhat with different data, leading to difficulties comparing across space and time.

At first glance, it may appear that the advantage of the GDI is that it does not involve any subjective judgement, however this is only the case for the choice of domains and not, for the weighting system used to combine the indicators. This is because to use the GDI formula, the researcher must identify the highest weighted socioeconomic factor from the output of their factor analysis. In Langlois and Kitchen's analysis in Canada this may have been obvious, however, this does not necessarily mean that in other contexts in other countries a factor analysis of deprivation indicators

[1] The formula for the GDI is.

$$GDI_i = \frac{s_{ik}(1 + \sum_{j \neq k} s_{ij})}{p}$$

where.

s^{ik} is the scaled factor score for resident' committee i on the most important factor k, s_{ij} is the scaled factor score for resident' committee i on one of the secondary factors, j, and p is the total number of factors which are included.

will always produce a single and self-evident socioeconomic factor. This makes the weighting system subjective, which is particularly problematic given that the weights are not made fully explicit in the method, something that Noble et al. (2006) suggest is imperative to avoid.

In the previous deprivation studies in China (Yuan and Wu 2014; Yuan et al. 2018) the authors appear to ignore the idea of a socioeconomic factor altogether and select the factor which explains the most variance, assuming this to be the most important. Letting the data decide, on the surface, seems sensible. However, it makes less sense with respect to the theory behind the GDI formula. The factor which explains the most variance in both Chinese studies is a factor that loads highly on indicators relating to lack of housing amenities. These are clearly important, above all as measures of socially perceived necessities resulting from a lack of income. However, there seems no reason why these should be considered several times more important than all of the other indicators combined, particularly when the second factor in their studies loads highly on indicators specifically measuring income and education.

In practice, the use of the household amenities factor as the most important in the GDI formula essentially implies that as long as people live in houses with basic amenities they are not deprived, which potentially overlooks other important types of deprivation. This is of particular concern for our interests, because as Yuan and Wu (2014) suggest themselves, it may well underestimate deprivation in urban areas, where the lack of household amenities is quite rare but other aspects of deprivation, such as household overcrowding or unemployment, are more prevalent and acute. The IMD framework gets round these issues by explicitly considering each domain of deprivation to be important, resulting in the most deprived areas being those that experience multiple deprivations rather than just high deprivation in a single area.

Therefore, we follow Noble et al.'s (2006) IMD framework. By considering how best to apply it to a Chinese context, we identify the following seven steps or core principles required to produce and interpret IMD estimates. These need to be taken into account when measuring deprivation in China using census data:

1. Identify domains appropriate to the country and regional context.
2. Identify appropriate indicators for each domain.
3. Apply Shrinkage procedures to improve the reliability of small area data.
4. Combine the indicators within the domain.
5. Rank these scores and then exponentially transform this rank.
6. Combine indicators with appropriate weights into an Index of Multiple Deprivation.
7. Apply appropriate spatial analysis to facilitate interpretation of the IMD estimates.

We now discuss these in more detail.

1. Identify appropriate domains
   The English IMD has seven domains: income; employment; health and disability; education, skills and training; barriers to housing and services; crime; and living environment. While the appropriate indicators to measure these

domains are likely to vary across countries, the domains themselves have broadly universal application, as they represent aspects of life that are thought to be important in a society. However, we shall take into account data availability. There is no available data in the Chinese census, or even possibly proxies, on crime, barriers to housing services, or geographical access to services generally. For these reasons, we follow Yuan and Wu (2014) and use five domains to measure IMD: Income, Employment, Education, Health, and Housing and living environment.

2. Identify appropriate indicators for each domain
   Once the domains have been selected, the first task is to measure each domain by identifying appropriate indicators from the census data. The most difficult domain to capture is income as the census does not measure this directly, and it is therefore necessary to resort to proxy measures. Yuan and Wu (2014) use the proportion of individuals working in typically low-income occupations, which is a reasonable approach to take. Low-income occupations include industrial workers, agricultural workers and unskilled service sector employees. Alongside this, we also include the proportion of individuals whose main income derives from minimum living allowance, unemployment benefit or family support, rather than labour income or pension.
   The employment, education and health domains are measured by a single indicator which includes the unemployment rate, the proportion of the population whose highest education was primary school or less and the proportion of people over the age of 60 self-reporting poor health. Unfortunately, the health question was only asked to those over the age of 60 in the Census questionnaire.
   Finally, for housing and living environment, we select four indicators measuring a lack of household amenities, i.e. the proportions of households without a toilet, access to a kitchen, clean energy (electricity) and piped water. We also select a measure of overcrowding, the proportion of households with less than 20m^2 housing area per person.
3. Apply Shrinkage procedures to improve reliability of small area data
   The first step is to choose the appropriate larger geographical unit to use for the data shrinkage adjustment. As our calculation of IMD is based on the spatial level of Residents' Committee (RC), we use the sub-district (*jiedao*) for the data shrinkage adjustment. Sub-district is the administrative level above the RC and in our data, there are an average of eight RCs in each sub-district. The shrunken indicator proportion for a RC j, z_j^*, is then a weighted average of the raw proportion for that RC, z_j, and the proportion for the sub-district in which the RC is situated, Z, such that:

$$z_j^* = w_j z_j + (1 - w_j)Z$$

   where the weight, w_j, can be calculated by the following equation:

$$w_j = \frac{\frac{1}{s_j^2}}{\frac{1}{s_j^2} + \frac{1}{t^2}}$$

where s_j^2 is the standard error of the RC proportion and t^2 is the variance for the k RCs in each sub-district such that:

$$t = \frac{1}{k-1} \sum_{j=1}^{k} (z_j - Z)^2$$

This means that there will be greater shrinkage towards the sub-district mean when the standard error is high, in other words, when the indicator is not reliably estimated, and/or when there is little heterogeneity between RCs in a sub-district.

4. Combine the indicators within the domain

   For the housing and income domains, there are two or more indicators and therefore these need to be combined together to produce a final domain score.

   For housing, the five household indicators selected from the census measure two aspects of housing deprivation. The first is lack of basic household amenities and four indicators measure this: the proportion of households without a toilet, a kitchen, clean energy and piped water. The second is household overcrowding and is measured by one indicator: the proportion of households with under $20m^2$ of housing area per person. Although these are separate concepts, they are both important in capturing deprivation due to housing conditions. This is backed up by our data from Shijiazhuang, which suggests that while the four amenity measures are moderate to highly correlated (the correlation coefficient, r, between each pair of measures is between 0.3 and 0.7), they are largely uncorrelated with the overcrowding measure ($r < 0.2$ in every case).

   We give each aspect of housing deprivation equal weighting. Therefore, the shrunken proportion of households with under $20m^2$ of housing area per person makes up 50% of the housing score. The lack-of-amenity measures are combined to make up the other 50% through factor analysis, as we hypothesise that the indicators are all influenced by the underlying latent variable, lack of amenities. To do this, each indicator is first standardised to be on the same scale with a mean of zero and a standard deviation of one. Maximum likelihood factor analysis is used on the standardised indicators, deriving a set of weights taken from the factor loadings. These weights are then used to combine the shrunken indicators into a lack-of-amenities sub-domain score.

   For the income domain, we give an equal weighting (50% each) to the proportion of individuals in low-income occupations and the proportion of individuals whose main income does not come from labour income, again standardising the variables before combining them.

5. Rank these scores and then exponentially transform this rank.

   To transform each domain score to an exponential distribution, the scores are first ranked from the most deprived RC ($i = 1$) to the least ($i = n$). These ranks

are scaled between 0 and 1 such that the scaled rank, R, for the ith RC is $1/i$, meaning that the most deprived RC has a scaled rank of 1 and the least deprived, a scaled rank of $1/n$. They are then transformed using the following formula:

$$-23\ln(1 - R(1 - exp^{-100/23}).$$

Where ln denotes the natural logarithm and exp is the exponential function. The scaling factor of 23 results in approximately 10% cancellation, meaning that if an RC is the most deprived on one domain but the least deprived on another domain it would be at the 90th percentile in terms of deprivation rather than at the 50th percentile if the ranks add been given equal weight without the transformation.

6. Combine indicators with appropriate weights into an Index of Multiple Deprivation
   These exponentially transformed domain scores are then combined into a composite Index of Multiple Deprivation. In many ways, this is the most problematic part, as there is no clear theory as to what the best weighting system might be. Yuan and Wu (2014) compare four different weighting schemes by ranking all the RCs in Guangzhou by the IMD calculated from each one. They select the weighting scheme that has the smallest deviation from the average rank, which also has the benefit of giving importance to both education and health, aspects of deprivation which can often be overlooked. This preferred weighting system gives a weighting of 25% to income, 15% to employment, 25% to housing and 17.5% each to health and education respectively. We adopt this system although we also conduct sensitivity analyses. They produce some differences in the final rankings yet do not change the substantive conclusions of the paper, so the results are not shown here for brevity.
   All the weighting systems for the IMD, which Yuan and Wu (2014) discuss, give relatively equal importance to each dimension of deprivation. An alternative would be to follow the logic of the GDI but within the IMD framework and to consider income deprivation as underlying all other forms of deprivation, giving this domain a significantly larger weight. While this has some logic, we would still lean towards the more equal weighting system described above, rather than one which is dominated by one domain. In the context of China's new strategic policy priority to focus on the quality of economic growth, it will become necessary to ensure that sufficient weight is also given to other domains such as health and education.
7. Exploration of the spatial distribution of deprivation
   Deprivation indices need to be interpreted in a way that is cognisant of their spatial context. This is important for understanding the local socioeconomic geography and the wider implications of the particular spatial distribution of deprivation. Neighbourhood effects arising from the concentration of poverty (Galster and Sharkey 2017), social fragmentation arising from segregation by income (Tammaru et al. 2018), and the impact of (de)centralisation of poverty on exposure to air pollution and access to employment (Zhang and Pryce 2019)

all provide strong imperatives for investigating the spatial structure of IMD results.

We first measure the extent of spatial clustering of deprivation in the city to see whether there are statistically significant clusters of local spatial autocorrelation. Local Morans measure this I (Anselin 1995), which is calculated through the correlation of each area with its five nearest neighbours.

We then gauge the extent to which deprivation is located close to the city centre as opposed to the periphery. We calculate a deprivation centralisation index (DCI) for deprivation in the city based on Duncan and Duncan's (1955) Absolute Centralisation Index, which was originally designed to measure the centralisation of a particular group within a city. This index is, in turn, based around the Gini coefficient. For the classic Gini coefficient each area would be ordered from the least deprived to the most deprived, in this case the areas are ordered from those closest to the centre of the city to the furthest. We then calculate the DCI in such a way as to compare both centralised or more evenly distributed levels of deprivation throughout the city.

The formula for the DCI is:

$$DCI = \left(\sum_{i=1}^{n} X_{i-1} A_i\right) - \left(\sum_{i=1}^{n} X_i A_{i-1}\right)$$

where X_i is equal to the cumulative proportion of the total sum of the deprivation scores for Area i and A_i is the cumulative proportion of the total number of areas for Area i.

The index is bounded by the limits [−1,1], with positive values suggesting that deprivation is centralised, negative values suggesting that deprivation is found further from the centre and a value of 0 suggesting that deprivation is evenly distributed throughout the city.

Finally, we explore the relationships between the different IMD domains, which intuitively leads on to searching for the existence of particular neighbourhood deprivation typologies—clusters of neighbourhoods with similar combinations of deprivation domain scores. We conduct a latent class analysis using the package poLCA (Linzer and Lewis 2016) in the statistical software R. The domain scores for each of the domains are split into quintiles. We first estimate the latent class models based on the five domain variables and then repeat the analysis splitting the housing domain into components such as overcrowding and lack of amenities. We then separate the income domain into its four parts; non-labour income, industrial workers, low-skilled service sector workers and agricultural workers. The aim is to look for groups of RCs with similar deprivation profiles.

14.3 Application to Shijiazhuang City in Hebei Province

14.3.1 Data and Study Area

The data comes from the 2010 Chinese census. The study area covers the five districts (Xinhua, Yuhua, Chang'an, Qiaoxi and Qiaodong) which make up the urban built-up area of Shijiazhuang, the capital city of Hebei Province. It is situated to the southwest of Beijing and is a major city in the Jing-Jin-Yi Region, the largest urban cluster in North China (see Fig. 14.1). The city has experienced tremendous economic growth and urban development over the past 30 years, resulting in significant socio-spatial differentiation. There is a rising middle class with well-paid jobs living in commercial

Fig. 14.1 Study area of Shijiazhuang urban area (shaded black) within Shijiazhuang prefecture within Hebei province

properties with a decent residential environment. There are also those who were made redundant during the industrial restructuring and the reforms of state-owned enterprises (SOE). In addition, low-skilled migrants from the countryside have swollen the ranks of the urban poor. The SOE reforms began during the 1990s when many state-owned enterprises, including many textile factories in this instance, went bankrupt. Many local residents lost their livelihood and had to seek reemployment opportunities elsewhere. Most of them are unable to afford commercial properties and live in dilapidated work unit housing allocated by their previous SOEs. In the meantime, the city has witnessed enormous urban expansion and rural-to-urban migration, similar to other Chinese cities. Migrants are excluded from most social benefits and services in the city as they lack local household registration status. They are concentrated in low-skilled jobs and live in peri-urban areas where cheap housing is available. Urban villages, former rural settlements engulfed by rapid urban expansion, have particularly become migrant enclaves due to low-cost housing and convenient location. Because of the dramatic socio-spatial differentiation, it is useful to explore the extent and spatial distribution of deprivation in the city.

The population of the study area in 2010 was 2.7 million located in 450 RCs within 59 Sub-districts. The unit of analysis at which the deprivation indices are calculated is the RC, the smallest geographical level at which data can be produced from the Chinese census. In the study area these have an average population of 6,000 people.

Spatial boundary data are only available at the higher sub-district level although at the RC level there is point data approximating the position of each committee. Additionally, while the majority of the indicators are available at the RC level, data on employment status and occupation are only available at the sub-district level. When ordering RCs in terms of their distance from the centre we use Euclidian distance from the Hebei government buildings (latitude −38.043, longitude −114.471), which local expert knowledge deemed to be the centre of the city. Sensitivity analyses indicated that there were no substantive changes to the results when alternate plausible locations for the city centre were specified.

Table 14.1 provides a list of the indicators for the five domains of deprivation with descriptive statistics for our study area.

14.3.2 Empirical Findings

We calculate an Index of Multiple Deprivation with this data using the method outlined above. We now discuss the spatial exploration of the results.

(a) Spatial Clustering
Figure 14.2 presents maps of the RCs in Shijiazhuang by quintiles of deprivation for the combined IMD. A first glance suggests some spatial clustering of deprivation but at the same time, deprivation spread across the city. For example, while there is clearly a large area of deprivation on the city's Eastern

Table 14.1 Domains and Indicators with descriptive statistics for Shijiazhuang

Domain	Sub-domain	Indicator (% in each RC)	Mean percentage (range)
Income		Industrial workers Agricultural workers Unskilled service sector workers Main income source not labour income	22.95 (8.18–55.3) 2.26 (5.67–29.18) 35.58 (21.43–66.14) 18.16 (0–100)
Employment		Unemployed	5.36 (1.38–9.66)
Education		16 + with primary school or less education	9.84 (<0.01–100)
Health		Over 60s reporting poor health	9.29 (0–50.00)
Housing	Amenities	Households with no toilet Households with no access to a kitchen Households without clean energy Households without piped water	6.05 (0–100) 3.73 (1.00–92.31) 5.73 (0–100) 3.49 (0–78.85)
	Overcrowding	Households with < 20m^2 of housing area per person	19.24 (0–80.26%)

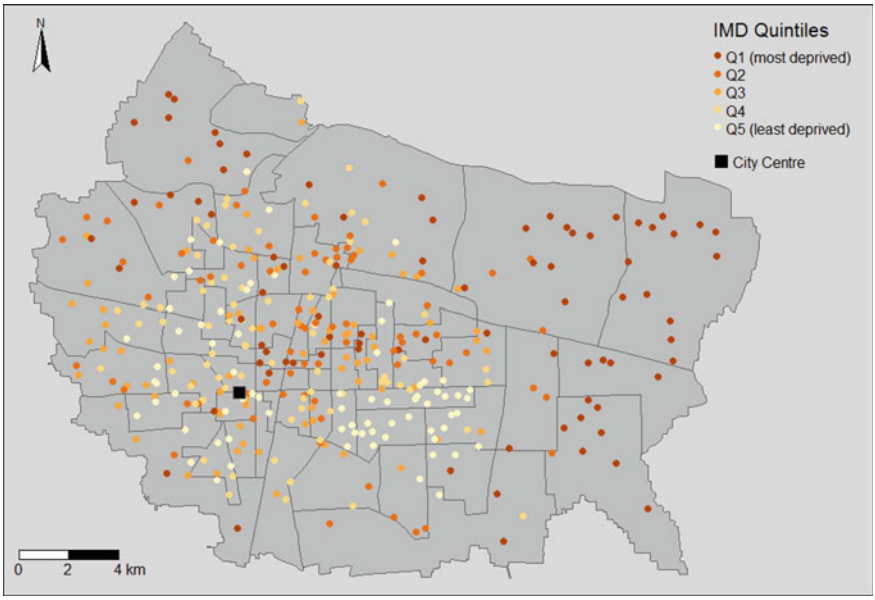

Fig. 14.2 Residents' Committees in Shijiazhuang by Index of Multiple Deprivation

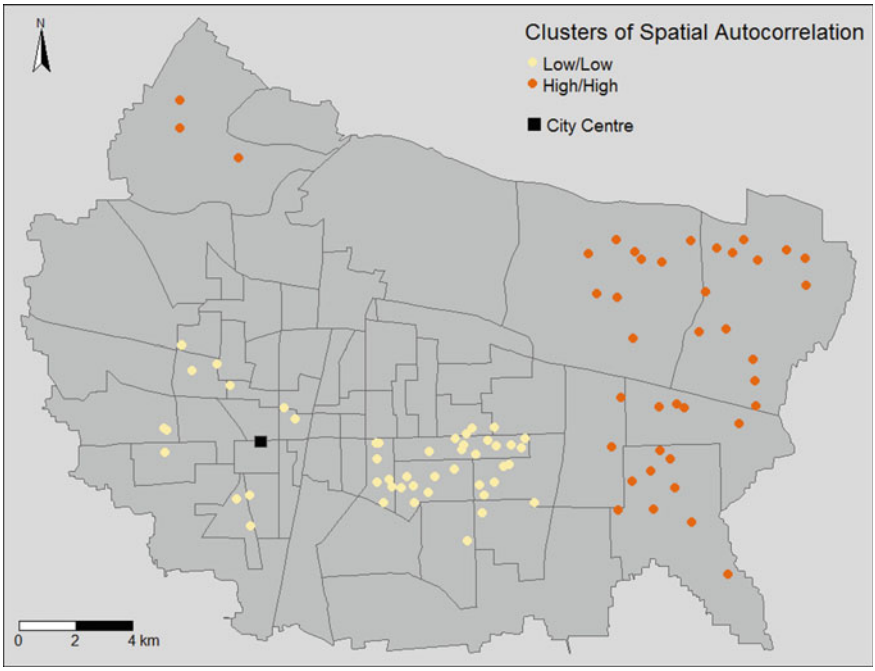

Fig. 14.3 Statistically Significant ($p < 0.05$) clusters of spatial autocorrelation

edge, there are also several RCs in the most deprived quintile close to the city centre.

Figure 14.3 confirms this, displaying statistically significant clusters of local spatial autocorrelation, measured by local Morans I. This map shows a large cluster of deprived RCs on the city's eastern edge with a smaller cluster on the northwest fringe. The largest cluster of areas with low deprivation can be found to the southeast of the city centre with smaller clusters nearer to the city centre. This is consistent with previous studies demonstrating that more deprived areas are usually situated in the suburbs of Chinese cities (Yuan and Wu 2014). Figure 3 also shows that in most parts of the city, the measure of local spatial autocorrelation is small and not statistically significant suggesting no strong spatial patterning of deprivation. In other words, in most of the city an RC is likely to be surrounded by RCs with varying levels of deprivation.

(b) Centralisation

The DCI for the whole city area is negative and statistically significant (−0.14), meaning that deprived places are on average situated further from the city centre than affluent places, consistent with our findings above. As with all single number segregation measures, this global DCI measure hides the information about the distribution of different groups throughout the city. For example, if there were high concentrations of deprived areas in the centre of the city, low

concentrations in the areas surrounding the centre and then high concentrations again at the edge, the DCI would imply that deprived areas were evenly distributed with respect to the centre of the city. This would be somewhat misleading. For this reason, we explore how the DCI changes depending on the number of nearest RCs to the centre that is included in the calculation, adopting an approach proposed by Folch and Rey (2016).

To do this, after calculating the DCI for the whole dataset, we remove the furthest RC from the centre and recalculate the DCI. We then remove the next furthest RC from the dataset and calculate the DCI a third time. We keep repeating this process until only the two closest RCs to the centre remain. It is then possible to plot how the DCI changes with distance from the city centre as in Fig. 14.4, giving a more in-depth picture of how different groups located throughout the city. This also allows us to test the sensitivity of the DCI to differences in the boundary of the study area. Although selected to approximate the extent of the city's urban area, it is based on administrative areas rather than an in-depth study of the actual city limits.

Figure 14.4 shows that the value of the DCI is sensitive to where the city boundaries are drawn. If the furthest ~ 50 RCs were removed from the analysis, the conclusion would be that there is no relationship between deprivation and the city centre. This makes sense when referring back to the map of deprivation in Fig. 14.2. This map clearly shows that the largest area of deprivation is on the periphery to the east of the city; however, there appears to be no clear relationship between deprivation and distance from the centre.

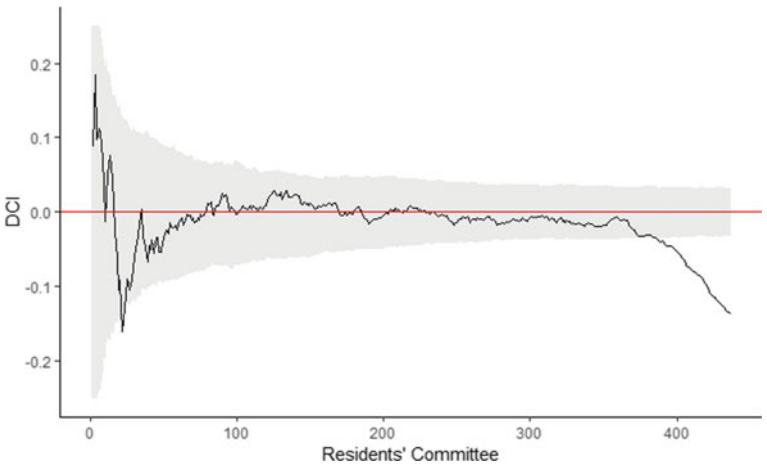

Fig. 14.4 Deprivation Centralisation Index for number of Residents' Committees away from the centre included. (Grey shaded area—95% confidence intervals from simulation)

(c) Typologies of Deprivation.

To explore the existence of different neighbourhood typologies, we first investigate the similarities and differences in the spatial patterns for each domain. Figure 14.5 shows a map of each domain separately. The spatial patterns for some of the domains appear fairly similar, however, there are some clear and notable differences. In particular, while income and education deprivation is high in the east of the city, employment deprivation in this area is low. The correlations between the domains displayed in Table 14.2 provide support for these preliminary visual observations. There are weak to moderate positive correlations between most of the domains apart from the employment domain, which appears to be uncorrelated with any of the others. The strongest correlation is between the income and education domain.

In general, these inter-domain correlations are weak when compared with the correlations between the domains in IMDs for other countries. For example, the correlations between the domains in the South African indices of deprivation

Fig. 14.5 Residents' Committees in Shijiazhuang, with each IMD domain, plotted separately

Table 14.2 Correlations between the different IMD domains

	Income	Employment	Housing	Education	Health
Income	1				
Employment	−0.06	1			
Housing	0.24	0.04	1		
Education	0.64	−0.04	0.39	1	
Health	0.36	0.02	0.23	0.38	1

range from 0.6 to 0.9 (Noble et al. 2010), while for the English IMD the correlations are typically above 0.8 for the major domains (Ministry for Housing Communities and Local Government 2020). This suggests that there are fewer areas experiencing multiple deprivations in Shijiazhuang compared with the study areas for these other indices. Note that our study area only includes the urban built-up areas and that rural areas of the Shijiazhuang city region are excluded. From looking at the maps for each domain and the correlations between the domains, it is clear that the pattern of deprivation is complex and that it is not simply the case that there are deprived areas that score high on all the domains and affluent areas that score low on all the domains. There appear to be some RCs which have particularly high IMD scores but are deprived in different ways to other RCs which have similarly high scores. In order to learn more about the distribution of deprivation within the city we therefore use the latent class analysis to explore whether there are any underlying groupings of RCs which suffer from similar combinations of deprivations.

The results of this analysis suggest that there is an affluent or non-deprived class and two distinct deprived classes with different combinations of deprivation factors. The affluent class comprises half of the RCs. This is the least deprived class on all of the indicators, with an average IMD rank of 350, where a rank of 1 denotes the most deprived RC and 450 the least deprived. As we are interested in deprivation rather than affluence, we will not focus upon it further.

With the lowest average IMD rank (52), the most deprived class comprises 12% of the total RCs. RCs in this class have the highest levels of income deprivation, with particularly high proportions of industrial workers, though low proportions of low-skilled service sector workers. 88% of RCs in this class are in the highest two quintiles for industrial workers, whereas 98% of the RCs are in the lowest two quintiles for low-skilled service sector workers. For this reason, we name it the 'industrial deprived class.' RCs in this class also have the highest levels of health and education deprivation, with 95% and 71% of them in the most deprived two quintiles for these two domains, respectively. On the other hand, they have low employment deprivation, with 81% of RCs in the least deprived two quintiles. In terms of the housing domain, the areas have high household amenity deprivation, with 100% of RCs in this class in the most deprived two quintiles, but at the same time low levels of overcrowding, for which 79% of RCs in this class are in the least deprived two quintiles.

The final class, consisting of 37% of all RCs, is also deprived but slightly less so. The average IMD rank in this class is 82. RCs in this class are deprived in terms of income, though they have low levels of industrial workers (only 27% of RCs in this class are in the top two quintiles). Instead, they have the highest levels of low-skilled service sector workers with 78% of RCs in this class in the top two quintiles for this occupation. We, therefore, name these areas 'low-skilled service deprived.' The level of education and health deprivation of the RCs in this class is mixed but tends to be higher rather than lower. Some 45% and 48%, respectively, of RCs are in the top two quintiles of deprivation for these domains. RCs in this class have the highest levels of employment deprivation and the worst levels of overcrowding with 51% and 54% in the most deprived two quintiles for these two indicators. They also tend to be deprived in terms of housing amenities with 61% of RCs in the most deprived two quintiles. Interestingly although not included in the LCA, further exploration shows that this class of RCs has by far the highest proportion of rural migrants without urban *hukou* status.[2]

Figure 14.6 maps the RCs in each of the three classes and shows a clear pattern across the city. This map shows that the RCs in the industrial deprived class are highly clustered and can be found exclusively on the periphery of the city, mainly in the sub-districts on the eastern fringe. On the other hand, the RCs in the low-skilled service deprived class tend to be found closer to the city centre, although their geographical distribution is more variable across the city. Table 14.3 summarises the differences between the RCs in the two classes with different deprivation profiles.

14.4 Conclusion

In this paper, we have outlined a general method for producing an Index of Multiple Deprivation in China. We have shown the importance of drawing upon the theoretical background of deprivation when calculating deprivation indices and have therefore been able to build upon previous attempts to measure deprivation using Chinese census data. Using data from the city of Shijiazhuang in Hebei Province, we have employed our method to produce an IMD for the city and then used the results to provide a deeper understanding of deprivation within a medium-sized Chinese city.

The most important substantive finding from this analysis is the complex spatial nature of multiple deprivations in Shijiazhuang. The latent class analysis has shown

[2] *Hukou* is the name given to the Chinese system of household registration. Urban *hukou* status is awarded to individuals born in cities and confers eligibility for employment, housing, education, health, and social services. Rural migrants who come to work in cities typically do not have urban *hukou* but retain their rural *hukou* status. The system has been reformed over the years but still remains a key source of inequality between urban citizens and migrant workers. See Chapter 1 for more information on the history of hukou, and Chaps. 4, 5, 6, 7, 8 and 9 for detailed examples of its implications for segregation and inequality today.

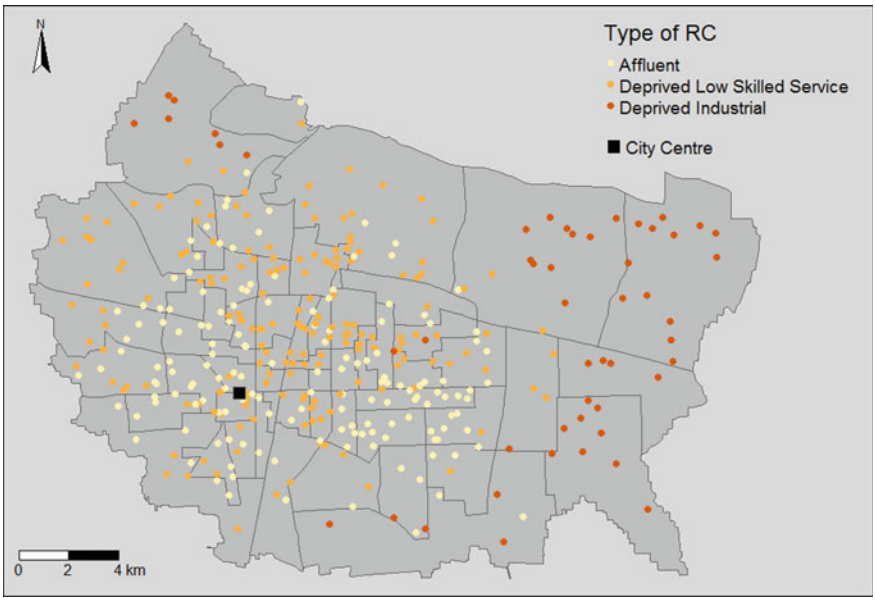

Fig. 14.6 Map of the three types of Residents' Committee

Table 14.3 The two types of deprived Residents' Committees compared

Industrial deprived	Low-skilled service deprived
• Peripheral to the city • Many industrial workers but few low-skilled service workers • Poor household amenities but low overcrowding • Lowest levels of health and education • Low Unemployment	• Closer to the centre of the city (although distance varies substantially within group) • Few industrial workers but many low-skilled service workers • Fairly poor household amenities and high levels of overcrowding • Mixed, but generally lower than higher, levels of health and education • Higher levels employment

that there are different types of deprived areas that experience different deprivation profiles and that these areas are to be found in different parts of the city. While the more traditional forms of deprived areas with poor household amenities, low education and low incomes still exist, a more modern type of deprived area, with high levels of unemployment and household overcrowding, has emerged in pockets of Shijiazhuang. While they did not explore different types of deprivation, this reflects the analysis of Yuan et al. (2018) in Guangzhou who found an increase in urban deprivation relative to rural areas between 2000 and 2010. This is likely to be explained by growth in this second type of deprivation. This also fits with other reports of new forms of deprivation in urban environments that have emerged after rapid urban expansion. The benefits of rapid economic growth in China have not been shared

equally (Wu 2004; Ouyang et al. 2017). Different policy responses are therefore important to address areas with varying deprivation profiles. This finding also highlights the importance of an approach to measuring deprivation that measures different domains of deprivation separately, as a single measure would hide this underlying complexity. To take this further, future research should look for similar patterns of deprivation in cities of varying sizes and also whether there were different groupings of deprivations in rural as opposed to urban areas. Additionally, understanding the link between new kinds of deprivation and migrant settlement patterns, particularly with respect to urban villages, is important (Hao et al. 2013).

The greatest obstacle to calculating deprivation indices in China is the data. For example, the indicators for some of the domains in this study are only available at a coarser scale than our unit of analysis. Moreover, some of the indicators are fairly crude measures of the underlying concept. Further research could conduct some form of *ground truthing*—direct observation of living conditions for a selection of neighbourhoods—to test the validity of the deprivation indicators. These issues are unlikely to affect our understanding of the overall spatial patterns of deprivation within the city. However, measurement error becomes potentially very important if the goal is to use scores for apportioning funding to the most deprived RCs. While this ultimately represents a limitation within our study, it also highlights the importance of the statistical procedures we have outlined, which minimise measurement error as far as is practicably possible.

One option for future research is to combine other data sources alongside the census data such as administrative data (as in the case of the English IMD), survey data, or other types of geographical data. For example, Chen and Yeh (2018) have recently used points of interest and road network data to develop a measure of accessibility to services for different areas of Guangzhou. A method like this can potentially be adapted to create an 'accessibility to services' domain. Another possible avenue for future research is to develop a more robust weighting system for combining the domains. By working with potential end-users of the data it would be possible to determine the criteria for more accurately weighting indicative levels of deprivation in China.

In conclusion, while analysing deprivation in China is not easy, we have outlined a framework using reliable statistical techniques based on the English Indices of Deprivation, which can create deprivation indices in China. This framework provides opportunities to improve understanding of the socio-spatial nature of deprivation in Chinese cities as well as being a potential useful tool for policy makers.

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Chapter 15
Future Directions for Research on Residential Segregation and Inequality in China

Gwilym Pryce

Abstract This chapter summarises some of the key findings and themes of the book and considers their implications for future research on inequality and segregation in China. I highlight four priority areas. First, there is a need for more research on the dynamics of residential segregation. I argue that the real story of segregation is revealed in the factors and processes that drive long-term change. Second, I emphasise the need for more research on the spatial foundations of inequality—how inequality leads to the geographical separation of rich and poor and how this segregation mediates and reinforces almost every aspect of inequality. Third, I consider the relational and psychological impacts of inequality and the imperative for them to be included in the calculus of policy planning. Fourth, I consider the implications of the Causal Revolution in research methods and argue that they potentially offer the prospect of achieving a scientific approach to policy development and evaluation. I conclude with some reflections on the implications of our findings for future policy directions in China.

Keywords Social frontiers · Segregation · Inequality · Homophily horizons · Social networks · Residential sorting · Spatial persistence · China · Spatial opportunity structures

15.1 Introduction

Our goal in producing this edited volume has been to explore the shared and contrasting experiences of segregation and inequality in Europe and China, and to further the inter-continental dialogue between European and Chinese scholars. Our work is also highly relevant to current policy priorities in China and to many of the future social challenges likely to emerge over the coming decades.

In 2014 the Chinese government announced a new phase in the country's development, involving slower economic growth and a greater focus on improving quality

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of life (Han et al. 2016, p. 176). Given the enormous problems of pollution and overcrowding in many Chinese cities, this new policy agenda was a welcome development. But it also raised several important questions. What are the policy changes needed to enhance human welfare? Is improving societal wellbeing only a matter of reducing pollution, overcrowding and congestion? Or are there deeper social issues that need to be tackled if the government is to improve mental and physical wellbeing?

Income inequality, as measured by the Gini coefficient, for example, has rose markedly from around 31.0 before reforms began in 1978, to around 37 in 2000 (Kanbur and Zhang 2005). These are likely to be underestimates, however. Once unreported income is taken into account, Zhang and Zhao (2019)[1] reckon that the Gini coefficient had risen to around 56.0 in 2003 and to over 58.0 in 2015. In comparison, the Gini index for income inequality in the USA rose from around 40.0 in the 1960s to around 47.0 by the late 2000s.[2] The question raised by this enormous rise in income inequality in China, and the associated rise in segregation (see Chap. 10), is whether it has had a negative impact on the wellbeing and quality of life of its citizens.

Certainly, there is a significant body of evidence from Europe and the USA to support the view that inequality and socioeconomic segregation, the main themes of this book, have significant negative impacts on health and wellbeing (Pickett and Wilkinson 2015; Patel et al. 2018). There is also evidence that they adversely affect educational attainment, economic growth, crime, social cohesion and social mobility (Galster and Sharkey 2017; Graham 2018; Corak 2013; Dean et al. 2019; Boterman et al. 2019).

Such findings pose a dilemma for China's move towards a market-based economy, as inequality and segregation tend to go hand-in-hand with economic liberalisation (Chap. 3; Tammaru et al. 2015; van Ham et al. 2018). This is because a competitive labour market provides the greatest rewards for the most talented, and for those who are the most educated, entrepreneurial and geographically mobile. It also means that those who have fewer opportunities to acquire qualifications and develop skills, can become impoverished. The wealth accrued by those who succeed in a meritocratic system can confer advantages that are transferred down generations. It can be used for example, to improve the life chances of their own children and erect barriers to the social mobility of their poorer peers. The better education, and higher status social networks enjoyed by children of the wealthy provide employment, business, and marriage opportunities that reinforce their social position. Excluded from these networks, resources and opportunities, the children of poorer households, on the other hand, are more likely to become locked into a life of precarious low-wage, low-skill employment. This pattern of disadvantage is then passed on to their own children.

[1] Official estimates of the Gini coefficient from the Chinese National Bureau of Statistics (NBS) show a continued rise in income inequality to around 49.0 in 2009 (Zhang and Zhao 2019). Although official estimates show the Gini coefficient falling in China to around 46.0 in 2015, Zhang and Zhao (2019) have shown that this decline is largely due to unreported income in the NBS calculations.

[2] See https://www.census.gov/library/visualizations/2015/demo/gini-index-of-money-income-and-equivalence-adjusted-income--1967.html.

Income inequality also tends to affect social geography. It becomes an additional mechanism to reinforce and reproduce these inequalities, leading to the spatial separation between rich and poor. As income inequality increases, those at the top of the income scale will have more purchasing power to facilitate residence in the most desirable neighbourhoods. As income inequality widens, affluent homeowners bid up the prices of the most desirable areas, widening the house price differentials between neighbourhoods that have low crime, negligible pollution, excellent access to employment, amenities and education, and those that do not. In addition, the wealthy are more likely to be able to own homes in such desirable neighbourhoods, thereby reaping substantial capital gains as properties appreciate (Galster and Wessell, 2019). Thus, once the power of the market to sort people geographically according to their income and wealth is unleashed, low-income households will be increasingly concentrated in the least desirable neighbourhoods. This in turn exacerbates inequalities in opportunities and life trajectories for adults and children alike. Over time, segregation and inequality become entwined, creating vicious circles of spiralling inequality and social division (see Chap. 3 in this volume, Sampson 2012; Sharkey 2013; van Ham et al. 2018; Galster 2019: ch. 7). It then becomes increasingly difficult to tackle one without addressing the other. This makes the design of effective policy programmes ever more challenging. This has certainly been the experience of Western Europe and North America (see Chap. 3).

We have sought in this volume to draw lessons from the Western experience of urban segregation and inequality. China's socioeconomic and political development over the past century has been radically different to that of the US and Western Europe, marked initially by far-reaching communist restructuring of socioeconomic and political life. There then followed a shift towards a unique form of state capitalism since the post-1978 reforms. Yet the country now arrives at a similar position to Western nations, albeit with some uniquely Chinese characteristics (see Chaps. 4–9). China once flattened the income distribution and eradicated segregation in cities through the creation of worker and residential units (Chap. 4), and a collective approach to resource allocation. It now faces income inequality on a similar scale to Western neoliberal economies with growing evidence of residential and workplace segregation (Chaps. 4, 10, 11, 12, and 14; Sako 2020 Ch. 24).

In the remainder of this chapter, I reflect on these issues and consider the most fruitful avenues for future research. I identify four under-researched aspects of inequality and segregation in the Chinese context that are particularly important for policy development both now and in the future. The first of these is the dynamic nature of segregation and its causal processes. Most of the research on segregation in China is based on a static approach, a snapshot of how spatially separated population groups are at a particular point in time. I argue in Sect. 15.2 that an understanding of the dynamic patterns in the factors leading to segregation is necessary if we are to tackle it. The second area I recommend as an avenue for future research is the spatial dimension of inequality. In Sect. 15.3, I set out the key issues and concepts that come under this theme which we believe are vital for understanding the true challenges that lie ahead for redesigning social policy in China. The third avenue for future research, discussed in Sect. 15.4, relates to the impacts of inequality and segregation and the

need to develop rigorous evidence, based on their impacts in a Chinese context. I argue that the absence of robust quantitative evidence is a major omission when it comes to improving the quality of life of Chinese citizens. The fourth suggested area of research for prioritisation is the scientific evaluation of policy. I argue in Sect. 15.5 that for policies to be effective, there must be a rational and efficient mechanism for evaluating them. We suggest that this can be facilitated by drawing on 'causal inference', a relatively recent development in statistical methods that can shed light on the impact of policy interventions.

Much of the discussion in this chapter, and across the book as a whole, draws on lessons from the past, and learning from the experiences of Europe and the USA. We are mindful, however, that by doing so we risk re-fighting previous battles, rather than those that lie ahead. To avoid falling into this trap, I offer some final thoughts in Sect. 15.5 that include some reflections on issues that could dominate the direction of segregation and inequality in the decades to come.

15.2 Dynamics of Segregation and Its Causal Processes

We noted in the Introduction that much of the research on segregation in China relies on static analysis. Most of the Chinese segregation research reviewed in Chap. 4, for example, was based on cross sectional data, estimating measures that provide a snapshot of various dimensions of segregation—typically evenness using the index of dissimilarity[3] (e.g. Hannum and Xie 1998; Hannum and Wang 2006; Li and Wu 2008). However, such measures do not shed light on the dynamics of the segregation process, how segregation will emerge in future or the propensity of particular neighbourhoods to become increasingly segregated. The dynamic nature of segregation is particularly relevant to China, as the country is in the process of rapid urbanisation and urban transformation. Market-oriented reforms have resulted in enormous changes in the urban residential landscape and significant socio-spatial differentiation. Static approaches cannot capture the changing nature of inequalities and segregation. Our contention is that to understand segregation, one must understand the underlying processes that generate it, which in turn means we need to quantify the nature of the dynamic process. What this means in practice will hopefully become apparent as we consider some of the core ideas below, mainly drawn from Western experience. We discuss their relevance to China which has undergone a radical transition from a centrally-planned economy to a market one.

[3] For more information on the Index of Dissimilarity, its applications, limitations and statistical inference, see Piekut (Chap. 2 in this volume), Massey and Denton (1988), Massey et al. (1996), and Lee et al. (2015).

15.2.1 Market Sorting, Homophily Horizons and Budget Constraints

One of the major advances in the housing and environmental economics literatures over the past twenty years has been the development of 'equilibrium sorting models' (see Chap. 12 of this volume for one of the first examples of an equilibrium sorting model applied to Chinese data; see also review by Kuminoff et al. 2013). Equilibrium sorting models (ESMs) seek to capture the way markets sort people into particular neighbourhoods, depending on their preferences for various amenities, proximity to work, and their preference for living in neighbourhoods with a particular ethnic or social composition (Bayer et al. 2003; Bayer and McMillan 2005; Bayer et al. 2016). These models have their roots in the seminal work on household location choice and urban social structures by Alonso (1964), Mills (1967), Muth (1969), and Schelling (1969, 1971).

Schelling's (1971) contribution was to illustrate the far-reaching impact of even modest levels of 'homophily'—the tendency to be drawn to people with similar characteristics to our own (see review by McPherson et al. 2001)—on overall levels of segregation. Using a computer simulation model based on an artificial grid-square city, where each cell of the grid-square represents a residential household location, he was able to simulate the long run dynamics of urban population patterns. In this model, households are assumed to relocate in the next round of moves if they are in the minority among their immediate neighbours with respect to some essential feature such as ethnicity. Immediate neighbours are represented by the 8 grid squares surrounding the residence in question. Starting off with a random distribution of ethnic groups (e.g. Blacks and Whites) across the city, Schelling showed how, over time, this behavioural assumption resulted in almost complete segregation. The outcome of extreme segregation is surprising because none of the households in the model desired it; they simply did not want to be in the minority among their immediate neighbours.

While the Schelling model is very simple—there are no house prices or income constraints, for example, and all neighbourhoods are homogenous in all respects other than their ethnic identity—it illustrates very powerfully how seemingly innocuous levels of homophily at the micro level can have far-reaching and unintended macro consequences. More recently, research has shown that some of the apparently incidental aspects of the Schelling model have major implications for the long run trajectory of residential segregation. Bakens and Pryce (2019), for example, have highlighted the importance of the 'homophily horizon'—the number of concentric layers of neighbours around a person's home in which households do not want to be in the minority.

In the original model, households' expression of homophily is limited to the single layer of grid cells surrounding their home. In reality, more distant homophily horizons may affect household location choice—that is the ethnic composition of multiple concentric layers of neighbours. Crucially, Bakens and Pryce (2019) find that increasing the homophily horizon by just one layer of concentric cells will

dramatically increase the rate at which the city converges towards complete segregation. For example, if residents seek ethnic or socioeconomic homogeneity not only among their immediate neighbours but also among their neighbours' neighbours. The authors also provide an example using data from Glasgow, Scotland, of how the homophily horizon could be measured empirically.

The estimation of homophily horizons could be a useful and important measure for policy makers seeking to understand and influence the drivers of long run segregation trajectories in Chinese cities. This is because market-oriented housing reforms have resulted in a vibrant urban real estate market. People increasingly have options to purchase commercial properties according to their preference and budget. Policymakers could, for example, prioritise interventions that improve inter-group relations in areas that are found to have distant homophily horizons and hence are more at risk of rapidly descending into segregation. Due to its relative ethnic homogeneity—over 90% of the population are Han Chinese – China does not have ethnic and racial divisions on the scale of North American and European countries. Nevertheless, there is evidence of ethnic segregation (Tan et al. 2019; Morales 2019), ethnic tensions (Smith 2002; Roberts 2018; Irgengioro 2018) and ethnic inequality (Wang 2019; Morales 2019; Hannum and Xie 1998; Zang 2012) in China. As discussed in Chaps. 4 and 10, there is also evidence of segregation emerging along socio-economic lines, and with respect to *hukou* household residential status, and ethnicity. Ongoing research by Owen et al. (2020) as part of the ESRC Understanding Inequalities project also finds significant levels of residential segregation among migrant workers by province of origin.

Homophily is, of course, only one possible type of preference that households might exhibit concerning the socioeconomic composition of their neighbours. Some may prefer neighbours who are better-off than themselves as they may feel it reflects favourably on their own status. Others may prefer to have some worse-off neighbours to whom they can feel relatively superior. Recent research on mobility patterns in the Netherlands by Musterd et al. (2016) and in Oslo, Norway by Galster and Magnusson Turner (2017, 2019) demonstrates the importance of 'status discrepancy'—the difference between a household's income and the neighbourhood's median income—in the decisions to both move out of a neighbourhood and choose another. For example, middle- and high-income Oslo households avoid neighbourhoods with median incomes higher than their own. People in higher-income households are more attracted to places that may demonstrate the superiority of their incomes compared to the neighbourhood median. These studies also confirm the importance of homophily but with the vital nuance of threshold concentrations. Middle- and high-income Oslo households only demonstrate an aversion to a neighbourhood when the share of low-status households exceeds the average of the region (Galster and Magnusson Turner 2019). These findings suggest that simple segregation models based on universal homophily preferences across all income groups are grossly oversimplified and may produce erroneous conclusions. They also imply that although the consideration of residential income segregation related to the status of neighbours is a powerful driver, public policies aimed at neighbourhood diversification nevertheless have potential efficacy due to threshold relationships.

15.2.2 Equilibrium Sorting Models

The relative importance of these status preferences alongside factors such as income constraints, environmental characteristics and access to amenities remain largely unknown in a Chinese context. This is where equilibrium sorting models come into their own as they can, in principle, disentangle the influence of different drivers of household location choice. They do this by combining data on a large number of house moves with information on the economic and socio-demographics of each household. They can be used to compare the value particular groups of households place on locating near other population groups (Caetano and Maheshri 2019) compared with the value they place on the proximity of physical attributes, low crime, clean air, etc. (see discussion of revealed preference methods in Chap. 12, and Bayer et al. 2016).

This kind of research could potentially help policy makers better understand the drivers behind emerging segregation in China. To what extent, for example, is the segregation of *hukou* residents in Chinese cities (Chaps. 4 and 10) based on preference for neighbourhood homogeneity (e.g. migrant status homophily), and to what extent does it derive from financial constraints on location choice? And to what extent does prejudice among city-born residents against rural migrants drive housing decisions compared with the impact of other factors such as institutional constraints, choice of school catchment, housing quality, and proximity to family and friends?

The data requirements of full equilibrium sorting models are, unfortunately, formidable, typically requiring detailed longitudinal data following individuals and households over long periods of time and fine-grained location data. Nevertheless, Liang et al. (Chap. 12) illustrate how this can be done using existing Chinese data. More extensive and powerful models could be developed through linking existing Chinese Census data longitudinally in the same way that subsamples of the UK censuses have been linked. Given that each Chinese citizen has a unique personal id number, this might be feasible. Less data-demanding methods can, however, yield insightful results on segregation dynamics. Easton and Pryce (2019), for example, using house transactions data find that White British homeowners in Glasgow are more likely to move out the neighbourhood if Pakistani homeowners move within 50 m (see Chap. 2 and the wider US-European literature on 'White Flight': for example Galster 1990; Bråmå 2006; Card et al. 2008; Boustan 2010; Kaufmann and Harris 2015; Andersen 2017).

15.2.3 Spatial Persistence

We argue in this section that early signs of residential sorting between different population groups since the onset of China's reforms could have a disproportionately important impact on long-term residential segregation patterns. Given that segregation in urban China was almost eliminated in the communist era, it is possible that Chinese cities are still in the early stages of the segregation process. Even so, these

emerging patterns may prove to be surprisingly prescient as indicators of future segregation trends due to the phenomenon of 'spatial persistence', which in turn may lead to the 'power persistence' (Bian and Logan 1996)—the entrenchment of inequalities and spatial stratification.[4]

'Spatial persistence' is *the tendency for early patterns of segregation to have a determining effect on future patterns*, leading to a form of path dependency in the geographical pattern of particular ethnic or social groups. Olner et al. (2020) argue that standard approaches to quantifying segregation are intrinsically static, which means they are at odds with the theoretical literature on segregation dynamics. They explore the role of 'polya processes' to conceptualise and measure these dynamic processes. To illustrate, imagine an urn containing an equal number of blue and red balls. Polya selection would involve randomly drawing a ball from the urn, and then replacing it with the addition of another of the same colour. So, if your initial selection turned out to be red, you would return the selected red ball and add another red to the urn. In terms of the impact on future random draws, your initial selection and replacement would increase the number of red balls relative to blue ones and therefore increase the likelihood of choosing a red ball on your next draw but only marginally so. If you chose a blue ball on your next selection, you would replace it with an additional blue ball, and the odds would even up again. But as you keep on choosing balls from the urn and replacing them with others of the same colour, the chances are that at some point you will have a sufficient run of draws of the same colour to cause the replacements to tip the chances of future selection markedly towards that colour. Path dependency starts to emerge so that future selections will become more and more likely to be of the same colour and the contents of the urn become increasingly dominated by balls of that colour.

Olner et al. (2020) suggest that this captures the process by which segregated neighbourhoods emerge. In the first rounds of migration, migrant location decisions are largely determined by financial constraints, proximity to employment and other practical considerations. This is because, even though migrants may want to locate in neighbourhoods with high proportions of their own group, no such neighbourhoods exist in the initial stages of migration. Over time, however, clusters of migrant households will emerge in particular cities, and as these clusters grow, they will exert increasing gravitational pull on future migrants seeking to locate near their own group. Using Scottish census data, the authors find very strong evidence of polya processes at work, with initial patterns of migrant destinations having a long-term impact on the geography of segregation.[5]

This kind of analysis could be used to study the emergence of segregation in China. Such an approach would reveal the extent to which the segregation dynamics of rural

[4] The persistence of power imbalances and inequalities from the old regime to the new one is exemplified in the redevelopment of urban villages where more affluent families were able to manipulate the redevelopment processes exacerbating pre-existing inequalities (see Chap. 6).

[5] For rather different reasons, we may also find path dependencies in terms of neighbourhood poverty and social deprivation. Zwiers et al. (2017), for example, find that 'the original quality of neighbourhoods and dwellings seems to be an important predictor for future neighbourhood trajectories, indicating a high level of path-dependency' (p. 363).

migrants are characterised by spatial persistence. It would quantify the extent to which the initial patterns of migrant location during the years following the opening-up of China determine the long run socio-demographic landscapes of its cities. One of the important implications of the existence of polya processes in segregation dynamics is that policy makers have much greater chances of shaping segregation patterns early in the process. In other words, there is a tipping point beyond which patterns of segregation become very difficult to remedy (Card et al. 2008).

However, in the Chinese context, these findings may need to be qualified somewhat due to the greater proclivity for radical intervention. For example, many urban villages have been subject to extensive redevelopment by local governments (see Chap. 6). This can lead to significant welfare loss for millions of migrant residents who are inadequately compensated during the redevelopment process and are forced to leave their villages and find alternative accommodation, usually further from amenities. Nevertheless, China's propensity for comprehensive intervention could, if more sensitively and strategically enacted, be used for good, particularly with respect to issues like entrenched segregation and geographical inequality.

Although much of the research on the dynamics of segregation has concentrated on residential segregation, Piekut (Chap. 2) notes how the 'increasing availability of geocoded data at the individual level, coupled with new, rich sources of (big) data, could bring further methodological and conceptual innovations for the joint study of place- and people-based segregation'. Indeed, there has been a proliferation of research exploring segregation across a variety of domains and dimensions in European research (e.g. see van Gent et al. 2019, and Chaps. 9–20 in Part II of Musterd 2020). Given the extent to which people's movements in China are routinely monitored by the government, there may be considerable research potential in the data collected to explore how different domains of segregation—residential, workplace, leisure, education, online—interact and change over time.

15.2.4 Institutional and Political Factors

The process of residential sorting is not, of course, only about mover preferences with respect to the composition of neighbours. Other factors, such as institutional context, public policy and inequality in household finances, are also key drivers. As a result, extensive residential segregation can occur even in the absence of homophily. I shall discuss the financial drivers of segregation in some detail in Sect. 15.3 as it has significant ramifications for how inequality is experienced, compounded and reproduced. First, though, it is worth reflecting on the institutional and political drivers of inequality which have particular salience in the Chinese context.

China's opening-up did not lead to the uniform emergence of liberalised markets and the rolling back of the state as liberals had hoped. Instead, the transition was idiosyncratic, complex, characterised by significant state control, with many lingering inequalities and institutional biases from the old communist system. The upheavals and peculiarities of The Great Leap Forward and The Cultural Revolution

meant that the Chinese socialist system was highly stratified. Children born to cadre parents, for example, enjoyed a range of special privileges and much more favourable life chances than those with working class parents or those born to the '*distrusted class'* (Zhou et al. 1996, p. 768)—those with 'parents or grandparents who were small business owners (*yezliu*)[,] … middle peasants (*zhongnong*), … landlords or large business owners (*zibenjia*)'. There were also inequalities among work-units depending on their political status. Those producing 'strategic products for the state (e.g. large steel companies) or … with higher administrative ranking (e.g. provincial level state-owned enterprises) had more bargaining powers when they negotiated with supervisory government agents for resources and investments' (Chen and Chen, Chap. 4, p.60). Inequalities in the old system translated into new ones to some extent due to 'power persistence' (Logan et al. 2009). Those who enjoyed privileges under socialism because of their family or work-unit status were better placed to take advantage of the opportunities afforded by liberalisation. Persistence in socioeconomic and political status associated with *hukou* (locals vs others, and insiders vs outsiders) led to a disadvantaged position for migrants in the urban labour and housing markets resulting in spatial segregation between migrants and non-migrants. Further inequalities emerged because of the reforms themselves. Wu (2004, p.401) describes the 'poverty of transition': new forms of urban poverty arising from the 'disjuncture between the old and new institutions'.

Perhaps the most prominent example of institutionally-driven inequality in China is the *hukou* system of household registration (see, for example, Chaps. 4, 5, 6, 7, 8, 9, 11, 12, 14). It has origins in the household registration systems of ancient China, but was also influenced by the Soviet passbook system and other twentieth century registration prototypes (Cheng and Selden 1994). The socialist implementation of *hukou* in the 1950s,

> 'decisively shaped China's collectivist socialism by creating a spatial hierarchy of urban places and prioritizing the city over the countryside; by controlling population movement up and down the spatially defined status hierarchy, preventing population flow to the largest cities, enforcing the permanent exile of urban residents to the countryside, and binding people to the village or city of their birth; and by transferring the locus of decision-making with respect to population mobility and work from the transformed household to the work unit or *danwei,* specifically, in the countryside, to the lowest unit of the collective'. (Cheng and Selden 1994, p. 645).

Even now, the *hukou* system remains one of the most potent drivers of both inequality (Chaps. 7, 8) and segregation (Chaps. 4 and 10). By deepening our understanding of how the *hukou* system has driven the dynamics of segregation using the methods and models described above, we could potentially help policy makers become better equipped to address its long-term effects. They could explore ways to reform the system and monitor the effectiveness of different policy interventions to redress historical injustices.

One of the most marked injustices described in this volume has been the inequalities inherent in the redevelopment schemes described in Chap. 6 in relation to urban villages. 'Families with larger residential plots and larger houses had more bargaining power and would receive both more compensation and relocation housing floor space.

Large families with a smaller residential plot and smaller traditional houses would receive less compensation and smaller flats' (Chap. 6, p.118). The impacts of these initial inequalities have the potential to cascade down generations.

Of course, the idea that institutional structures can reinforce inequalities is by no means unique to China. Sharkey (2013, 2020) has demonstrated how, even in longstanding neo-liberal countries such as the USA, a variety of legal, planning and political measures have been used to reinforce neighbourhood- and school-level segregation (see also Yinger 1999; Freund 2007; DeLuca et al. 2013). Similar issues have even arisen in the social welfare states of Scandinavia (Andersen et al. 2016). However, there are particular challenges for post-socialist countries seeking to reform institutions to facilitate the transition to market allocation (see Chap. 13). Wu et al. (2010), for example, emphasise the structural origins of neighbourhood effects rooted in public housing estates created in the socialist era that have created long-term path dependencies in neighbourhood poverty in China.

15.3 Spatial Foundations of Inequality

In the Introduction to this chapter we described the tendency for inequality in income and wealth to drive the geographic separation of households according to their level of affluence (see Chap. 3, Musterd et al. 2017, and Tammaru et al. 2015) for empirical evidence from European cities). To illustrate this point, consider a hypothetical world where every household has the same income, wealth, and preferences, and all houses have identical physical characteristics. Houses in the most desirable locations would be in greater demand, so their prices would be higher than those in the least desirable locations. But this inter-neighbourhood price disparity would be limited by what consumers were able and willing to pay for the differences in neighbourhood desirability. The outcome is that housing in the best neighbourhood would be affordable to any household who chose to live there. Moreover, all households would be equally well-off regardless of where they ultimately lived because differences in housing costs would exactly offset differences in the desirability of the location. Next suppose that this hypothetical world is transformed by allowing income and wealth to vary across households. As these individual economic inequalities increase, so does the potential for house prices to diverge more severely across neighbourhoods. The larger the inequality in household economic wherewithal, the greater the relative capacity of the most affluent to bid up house prices in the most desirable neighbourhoods, assuming a positive income elasticity of demand for the amenities in such places. In an unequal society, the outcome is that house prices in the best neighbourhoods can rise well beyond the level that poorer households can afford, so economic segregation follows.

The purpose of this thought experiment is to illustrate how inequalities in income and wealth drive the geographical separation of affluence and poverty even if households have no preference for the socioeconomic status of their neighbours. If households develop a degree of homophily with respect to affluence as income levels diverge, then these sorting effects will be amplified.

Our illustration is especially germane to former socialist countries where the gradual removal of government controls on wages and property prices are likely to awaken the leviathan of market sorting. China is a powerful example of this, having transformed from a relatively egalitarian communist country where socioeconomic segregation was almost non-existent (see Chap. 4) into one where market forces will, if unchecked, herd the poorest households into the most polluted neighbourhoods and homes with the worst access to schooling, employment, and other public and environmental amenities. At the same time it will empower affluent households to occupy the most desirable locations. Chen and Chen, in Chap. 4, describes how privatisation of land and real estate market sorting processes has allowed this inequality to be increasingly reflected in the geographical distribution of income groups.

Why, then, is segregation based on income, wealth and social position, a problem? After all, access to desirable neighbourhoods is part of the reward for talent and hard work that motivates workers to maximise their talents and opportunities. Various authors (e.g. Cheshire 2009; Merry 2013) have argued that segregation brings many benefits, not least the creation of 'specialised neighbourhoods' that potentially enhance the quality of life of rich and poor alike. The problem with this view is that segregation by income generates cumulative advantages and disadvantages that embed and reinforce inequalities over the course of individual lives and across generations. As in the Schelling model, left to its own devices, market forces can lead to levels of segregation beyond those originally desired by households, and beyond what is socially just (Galster 2019: ch. 9).

A key source of evidence on these issues is the 'neighbourhood effects' literature (Sampson et ai. 2002; van Ham et al. 2012; Galster and Sharkey 2017) which explores the extent to which place matters for life outcomes and human flourishing. Where we grow up affects our life outcomes. It affects our chances of accessing the skills, knowledge and opportunities to progress in the labour market. It also affects our exposure to physical and psychological risks that potentially undermine wellbeing and our capacity to maximise our potential (Galster and Sharkey 2017; Galster 2019: ch. 8). North American and European research into the impact of place on life outcomes has bourgeoned into a major strand of social science literature spanning geography, urban studies, economics, sociology and social psychology. It remains largely undeveloped in the Chinese context. Yet, an understanding of the long-term impact of geographical concentrations of poverty and affluence is essential if policy makers are to achieve their goal to improve wellbeing and life expectancy. Although the literature is much less developed in China, there is evidence that neighbourhood effects operate in similar ways to other parts of the world. For example, Wu et al. (2010, p. 134) find that 'living in impoverished neighbourhoods increases the probability of becoming poor' due in part to the 'path dependency of institutionally derived inequalities'. As China's cities become increasingly subject to the same forces that

have driven neighbourhood effects in European and American contexts, there will be a growing imperative to monitor and understand these effects in the sino-capitalist context and find effective ways of mitigating their long run consequences.

Development of the evidence base will require significant public investment in data and research capacity because of the dynamic and interconnected ways in which neighbourhoods affect life outcomes. To illustrate the scale and variety of processes at work, we now consider some of the key ways in which the geographical concentration of poverty could be a major obstacle to China achieving its new goal of improving societal welfare.[6]

15.3.1 Social Relationships and Associations

First, there are effects arising from social relationships within the neighbourhood, notably the influence of peers and role models. These relationships affect behaviour (such as the likelihood of engaging in criminal activities), and shape our aspirations, and values. Research has found that the likelihood of a person offending is strongly affected by the level of crime and the number of offenders living nearby (Livingstone et al. 2014, Santiago et al. 2014, Billings et al. 2016; Rotger and Galster 2019). Santiago et al. (2014), for example, found that teenage childbearing and fathering are significantly more likely in neighbourhoods with high crime and low occupational prestige.[7] Similarly, Popkin et al. (2010) find that girls whose parents who move to low-poverty neighbourhoods are less likely to feel pressurised to engage in early sexual activity. The behaviour and reputation of residents can impact on other residents in the neighbourhood even without personal connection or behavioural influence. Stigmatisation of residents, because of perceived associations, irrespective of their personal attitudes and behaviours, can impose life-long limitations on housing and employment prospects (Bourdieu 1999, Wacquant 2008; Keene and Pakilla 2014; Warr 2006).

15.3.2 Risks

An additional layer of disadvantage arises from the concentration of environmental and safety risks in poor neighbourhoods. Historically, waste disposal sites and polluting industrial activities were often located in the poorest areas as the result of those communities having less lobbying power and political influence (Bryant and Mohai 1992). However, even when highly polluting activities are located in affluent or middle-income areas, proximity to these facilities will probably cause

[6] For a theoretical and empirical review of the various mechanisms through which neighborhoods exert their influence, see Galster (2012a).

[7] The proportion of residents working in professional and high-skill occupations.

house prices to fall as wealthy homeowners move to less risky locations. These locations may nevertheless compare favourably with the alternative housing options within their price range for low-income households, leading to disadvantaged groups 'coming to the nuisance' (Depro et al. 2015).

Although the relationship between air pollution and neighbourhood deprivation can be complex (Bailey et al. 2018), overall the environmental justice literature 'has found consistent evidence that, within most metropolitan areas, different forms of environmental hazards are more common in low-income communities' (Galster and Sharkey 2017, p. 5). There is strong evidence also of the negative impacts of contaminants and air pollution on cognitive development, mental health, physical health, and life expectancy. Exposure to other risks such as violent crime also tends to be higher in low-income areas. Massey (2004) provides a comprehensive synthesis of these effects, mapping out the causal pathways from the social environment to health and cognitive impacts. Income inequality and racial segregation interact to 'produce concentrated poverty and its correlate, spatially concentrated violence' (Massey 2004), leading to a higher 'allostatic load'—accelerated biological ageing and negative health/cognitive outcomes as a result of cumulative psychological stress. Subsequent empirical findings, mainly based in the US, generally confirm this view. Sharkey (2010), for example, finds that a homicide in the neighbourhood has an acute deleterious effect on children's cognitive performance. Research by Burdick-Will (2016, p. 133) reveals that 'children from more violent neighbourhoods fall farther behind their peers from safer neighbourhoods as they progress through school'. Boynton-Jarrett et al. (2008) find that exposure to violence in childhood is associated with lower health outcomes in adulthood.

Research on these effects in the Chinese context remains relatively undeveloped and is an important avenue for future investigation. Lei (2018) draws on China Family Panel Studies to find a statistical association between the socioeconomic status of the neighbourhood and children's verbal and mathematical test scores. However, the study does not draw on longitudinal analysis to establish causation[8] and does not explore the impacts of specific effects such as violent crime or pollution. There is a well-established Chinese literature on the incidence and effects of domestic violence towards children (Liao et al. 2011) but not of exposure to neighbourhood violence. Again, many of these studies rely on cross sectional data which makes it impossible to identify the long-term impacts over the course of an individual's life, or infer causal relationships. Research on the impacts of pollution is much more developed. For example, Zhang et al. (2018) link data from a nationally representative longitudinal survey with air quality data in China to estimate the long-term effects of exposure to air pollution on cognitive performance. They find significant impacts, particularly for men and the less educated. To develop a more robust evidence base on relational neighbourhood effects will require data sets that can facilitate detailed longitudinal analysis and causal inference (see below). This could be achieved by creating large

[8] For a fuller discussion of the challenges related to quantifying the independent causal impacts of neighbourhoods and techniques for meeting these challenges, see Galster and Sharkey (2017) and Graham (2018).

panel surveys, but linkage of existing data is probably more cost effective. Linked administrative datasets in the Nordic countries, the Netherlands and more recently New Zealand provide exemplars of what can be achieved. However, the UK approach that involves linking Census data with administrative data might be more feasible in the short run and provide a useful interim data infrastructure that exploits existing datasets.

15.3.3 Externally Determined Resources and Mechanisms

The third source of neighbourhood effects are those arising from external factors and mechanisms (Galster 2012a). Low-income communities often have access to fewer resources and are less well-served by public services even though their needs are greater. An especially troubling example of this is the Inverse Care Law which says that the 'availability of good medical care tends to vary inversely with the need for it in the population served' (Hart 1971, p. 405). This law, Hart proffered, 'operates more completely where medical care is most exposed to market forces' (ibid). For similar reasons, access to transport, schooling and employment opportunities will also tend to be significantly lower in poorer neighbourhoods (Sampson et al. 2002). While there is a sizeable and growing literature on these inequalities in China (e.g. Chap. 8, 11, 14; Liu et al. 2014; Chen and Yeh 2019), more research is needed on their causal impacts over the life-course,[9] and how they interact to create cumulative disadvantage for particular individuals and groups.

To address these external sources of inequality, Chinese policy makers will need to disentangle the multi-layered political, economic and institutional factors that drive them. The desirability of particular neighbourhoods and the consequent rise in rents and house prices, is often determined by factors on a wider geographical scale. Factors such as economic dynamism, transport facilities and environmental risks can affect clusters of neighbourhoods and even entire municipalities. This means that poor neighbourhoods are often concentrated in local authority areas with less potential for economic and housing development. Consequently, they have limited ability to raise tax revenue through leasing land to developers. This, in turn, means that these local authorities have the least fiscal capacity to fund the health, education, transport, police, environmental monitoring and enforcement services that are desperately needed by their disproportionately disadvantaged residents (Galster 2012b).

There also remain pronounced urban-rural (Chen et al. 2016; Lu and Chen 2006; Cao 2010; Xu and Xie 2015), and regional (Chap. 8) dimensions to inequality in health, housing, education and employment. Hannum and Wang (2006, p. 253) highlight the extent of inequalities in education between Chinese regions and how these

[9] I.e. over the course of a person's life. The 'life course approach' was developed in the 1960s to look at the effects on different life stages, particularly how events in the formative years affect the trajectory of a person's life thereafter. It is an interdisciplinary approach that seeks to understand the full range of factors that affect life outcomes.

have been rising since the 1960s, attesting to the 'enduring significance of geography as an educational stratifier'. Some of these inequalities are reinforced by limited fiscal autonomy at the local level. There is a complex system of tax and revenue sharing and transfers through the various tiers of government in China that leaves local governments with 'hardly any discretionary power to modify taxation' and 'fiscal disparities within provinces remain high and are much greater than between regions in OECD countries' (Wang and Herd 2013, p. 1).

The multiscale drivers of inequalities in services, amenities and resources are mirrored in the multiscale drivers of life outcomes—educational achievement, job prospects, housing careers, health and wellbeing, etc. If governments overlook the multiscale nature of neighbourhood effects[10] they may severely underestimate the true impacts of concentrated poverty on wellbeing and life outcomes. The risk of underestimating these impacts is increased by the complex and multi-faceted factors involved and by multiple spatial scales such as neighbourhood, jurisdiction and region (Sampson 2012, 2019). Many empirical and theoretical studies of neighbourhood effects fail to capture the profoundly interconnected nature of geographic context, and we are aware of no attempts to explore this in the Chinese context. Most studies focus on a particular geographic scale (such as the local neighbourhood), a single outcome (such as health, educational or employment) and/or a particular strand and direction of causality.

Galster and Sharkey's (2017) *Spatial Opportunity Structures* model provides a comprehensive theoretical framework for thinking about these effects, one that highlights the inadequacy of partial approaches. They argue that the geographic context of our childhood affects not only our access to good schooling and safe environs, but also shapes our attitudes and motivations. It affects our ability to make important life decisions, how we evaluate options and determines the information available to us to make choices. It affects our perception of ourselves, of our status in the world. It affects our parents and their attitudes, behaviours and choices, which in turn shape our own. It affects the cultural, financial, and educational resources available to us as we grow up. It affects our social networks, our role models and our experience of peer pressure. The overall impact is amplified through feedback effects as each of these factors interact with each other, often in mutually-reinforcing and path-dependent ways.

So, geography matters. It affects life outcomes by structuring the opportunities available to us both directly and indirectly and does so in ways that interact across spatial scales. Many of China's neighbourhoods have only been formed in the past 20 years and many more are in the process of being formed or in a state of transition. Amenities and public services to support these communities are still in development. China still has the opportunity to prevent the geographical entrenchment of inequality. The *Spatial Opportunity Structure* model offers a powerful framework for

[10] 'Neighbourhood effects' is the name given to broad range of impacts on life outcomes of the various features of the neighbourhood environment (housing, transport, exposure to crime and pollution, access to employment, amenities, health care etc.). See van Ham et al. (2012), Galster and Sharkey (2017) and Graham (2018) for recent reviews.

various layers of the Chinese government to develop joined-up policy interventions, infrastructure and service provision in ways that are cognisant of the interconnected geographical drivers of inequality.

15.3.4 Housing Wealth Inequality

We have argued that growing income inequality can drive up housing prices in the most desirable locations, leading to the concentration of highly-educated affluent households in the best neighbourhoods. This, in turn, can make prosperous neighbourhoods all the more attractive as buyers seek to buy into the social networks and positive peer group opportunities that such neighbourhoods ostensibly confer. In principle, this sorting process can further drive up house prices in the most desirable locations creating significant gains in housing wealth for those who can afford to buy into up-and-coming neighbourhoods. Housing wealth accumulation can, in turn, reinforce intergenerational inequalities as affluent homeowners use their housing wealth to assist with house purchases of their children and grandchildren (Galster and Wessel 2019) and contribute towards school and university fees.[11]

In principle, we would expect rates of housing wealth accumulation to equilibrate across neighbourhoods (Levin and Pryce 2011). The initial growth in housing wealth inequality during a period of economic reform and market liberalisation can, however, confer lasting advantage to affluent households and their descendants. This creates further path dependencies in poverty and affluence (Toft and Ljunggren 2016; Toft 2018; Galster and Wessel 2019). It is also possible for significant gulfs to emerge in housing wealth accumulation over prolonged periods between rural and urban areas (Wang et al. 2020). Inequalities can also emerge at the regional level due, for example, to the unequal impacts of austerity measures. Particular sectors and regions of the economy may also experience structural growth while others endure structural decline (Owen et al. 2020).

15.4 The Relational Impacts of Segregation and Inequality

So far, our discussion of the processes that drive socioeconomic segregation and the consequences of concentrated poverty has focussed on four key aspects: (i) socialisation effects; (ii) exposure to environmental and social risks such as pollution and violent crime; (iii) poor access to resources, public services and various amenities; and (iv) discrepancies in housing wealth accumulation.

In addition to these important factors, another category of influence arises from the direct effect that inequality has on our sense of worth and self-efficacy. We label these

[11] Note the growing for affluent parents to invest in private education for their children to prepare them for college entrance exams (Shi et al. 2020).

'relational impacts', which, broadly speaking, include the consequences of inequality and socioeconomic segregation for human relations and wellbeing. Our concern here is with the psychological, and social impacts of inequality and segregation and the need for a policy response that is fully cognisant of these effects. We consider the psychological impacts first, followed by the consequences for social cohesion and social mobility.

15.4.1 Status Anxiety and the Shame of Poverty

Economics Nobel Laureate Amartya Sen (1983, p. 159) claimed that shame is at the 'irreducible absolutist core' of poverty. Mixed-methods empirical research by Walker et al. (2013, 2014) supports this claim, finding that households who are relatively poor in affluent countries feel similar levels of shame, worthlessness and status anxiety as poor households in developing countries, even though their living standards are markedly higher. How steep the hierarchy is, and our perceived position within it, are potentially important drivers of individual wellbeing and social outcomes (Wilkinson and Pickett 2009, 2018).

The concern is that income inequality becomes 'a marker of wider status hierarchy that provokes an emotional stress response in individuals that is harmful to health and wellbeing' (Layte and Whelan 2014, p. 525). The more unequal the society, the steeper the social hierarchy, and the greater the pressure at all levels to demonstrate personal significance through status and acquisition of material goods that signal that status. Layte and Whelan (2014), for example, explored the relationship between income inequality and status anxiety using data from a cross-national survey of over 34,000 individuals from 31 European countries. They found that respondents in higher-income countries do indeed report higher levels of status anxiety. Wilkinson and Pickett (2009, 2018) claim that these psycho-social effects have much wider ramifications, arguing that they are the primary driver of various health and social outcomes associated with inequality. As a result, inequality is bad for everyone, not just the poor. Inequality reduces the levels of trust among people, leads to greater social conflict, higher crime rates, poorer mental health and wellbeing, and ultimately shorter life expectancy (Wilkinson and Pickett 2009; Oishi et al. 2011).

These causal claims remain contentious, however. For example, few of these studies consider the impact of geographical concentrations of poverty and the wider Spatial Opportunity Structures noted in the previous section. There are also questions about the direction of causality: does inequality lead to lower trust and social cohesion, or does lower trust and social cohesion erode public support for measures that reduce inequality? Also, it is not clear how the relationship between subjective feelings of shame and status anxiety estimated in European and North American contexts translates to China's very different social, cultural and historical context and other post-socialist countries.

Nevertheless, the upward long-term trend in income inequality in China means that these impacts are of growing concern. Estimates by Zhang and Zhao (2019)

reveal that China currently has a Gini index of at least 58 which suggests a level of income inequality well in excess of most European countries (though comparisons across countries are inevitably frustrated by differences in spatial scale, data and methods). This inequality is marked not only in terms of inequalities between regions and cities, but also within them. Lie and Wu (2008, p. 404) conclude that, 'Chinese cities, once characterised by egalitarianism, are becoming the most unequal cities in the world'. All this reinforces the imperative to understand the psycho-social impacts of inequality in the Chinese context and to design an appropriate policy response.

15.4.2 Inter-Group Contact and Social Mobility

One of the most important implications of income inequality, and its tendency to divide affluent and poor households into separate neighbourhoods, is the consequence for relations between these groups. Allport's (1954) seminal contribution to the understanding of the causes and nature of prejudice argues that lack of positive contact between rival groups can lead to distrust and antipathy (see further discussion in Chap. 2 and in Pettigrew and Tropp 2006, 2011). This geographical separation can lead to enduring tensions and conflicts between groups, particularly when income disparities overlap with other forms of social stratification, such as ethnicity (Tan et al. 2019; Morales 2019; Wang 2019; Hannum and Xie 1998) or migrant status (Chaps. 4 and 10).

One of the important implications of Allport's contact hypothesis is that forms of segregation that arise initially for benign reasons—as accidents of history, side-effects of well-meaning policies, etc.—can in the long run erode relations between the separated groups. So, while gated communities in China may have Maoist communal origins free from the 'connotations of exclusivity and xenophobia associated with gated communities in the West' (Chap. 4, p. 70), they may nevertheless, in due course, become sources of social fragmentation, prejudice, and territorial behaviour.

When the geographical separation of groups takes the form of 'social frontiers'—sharp spatial differences between adjacent neighbourhoods in the social, religious or ethnic mix of residents (see Chap. 13)—these divides can take on territorial meaning. Social frontiers may, for example, evoke defensive responses from the rival communities, and increase the likelihood that prejudices, misunderstandings and conflicts escalate (Chap. 2; Dean et al. 2018). These effects can, in time, have negative impacts on health and wellbeing. Maguire et al. (2016, p. 845), for example, find that while traditional measures of segregation had no impact on mental health, the effects of social frontiers were very large indeed. Proximity to social frontiers—such as the 'peacelines' in Belfast, which kept rival communities apart—'increases the likelihood of antidepressant medication by 19% … and anxiolytic medication by 39% …, even after adjustment for gender, age, conurbation, deprivation and crime'. The mental health impacts, in turn, have the potential to affect educational and employment outcomes, particularly when they are associated with higher rates of violent crime (Dean et al. 2018), and anti-social behaviour (Legewie and Schaeffer 2018).

For example, Layard et al. (2014) find that, 'the most powerful childhood predictor of adult life-satisfaction is the child's emotional health', which highlights the potential for segregation and inequality to erode human capital and economic efficiency.[12]

When the psycho-social and relational effects are considered alongside the demographic and spatial factors discussed earlier, we might expect a measurable overall impact on economic output and social mobility. Indeed, the research is more than suggestive that there are macro-level impacts on economic dynamism. Ostry et al.'s (2014) research for the International Monetary Fund, for example, finds that lower inequality is 'robustly correlated with faster and more durable growth'. Moreover, research by Corak (2013) finds that more equal countries have higher rates of social mobility.

15.5 Policy Effectiveness

In this section, I discuss recent advances in using robust research methods to investigate social and economic policy questions and consider practical ways in which policy making could be improved at various levels of government in China.

15.5.1 Evaluation, RCTs and Causal Inference

One of the most important revolutions in the social science and epidemiological literature over the past 30 years has been the development of methods that allow researchers reliant on observational data to mimic the robustness of the scientific experimental method. In the natural sciences, Randomised Control Trials (RCTs) have long been considered the gold standard for establishing the causal effects of a particular intervention or influence. So, for example, if a pharmaceutical company wants to know the effect of a drug on reducing blood pressure, it will randomly assign participants to a Treatment Group and a Control Group. The Treatment Group will receive a genuine dose of the drug, while the Control Group will receive a placebo. Central to the explanatory power of RCTs is the randomised allocation of participants between the two groups. Laboratory experiments are rarely feasible or ethical for the exploration of social questions. Yet, social scientists and other researchers reliant on observational rather than experimental data have found increasingly innovative ways to mimic this key attribute of the scientific method.

As a result of this 'Causal Revolution' (Pearl and Mackenzie 2020) in social and economic research, policy makers now have the option to design interventions in a way that allows for robust evaluation of its causal effectiveness. They now include a control group and carefully randomise participants. Pilot schemes designed in this way may not cost much more than those without the randomisation, but

[12] For a theoretical analysis of segregation and social efficiency, see Galster (2007, 2019: ch. 9).

add hugely to how well they can be evaluated. Consequently, randomised policy experiments have bourgeoned in recent years. See, for example, the plethora of such American experiments that have emerged in the domains of education (Raudenbush and Schwartz 2020), employment training (Riccio 2010) or rental housing vouchers (Sanbonmatsu et al. 2011).

It is also sometimes possible to observe public policy interventions that mimic random assignment, and these are known as 'natural experiments'. For example, such natural experiments involving the quasi-random assignment of households to locations have been used to quantify neighbourhood effects. These have drawn from racial-ethnic desegregation programmes in US public housing, the allocation of tenants to social housing in Canada and Denmark, and the placement of refugees in particular locales in Scandinavia (see Galster 2019: ch. 8 for a comprehensive review).

Statistical techniques have also been developed that potentially allow researchers to infer the causal impacts of historical policy interventions. These include housing-based urban regeneration initiatives on employment (Zhang et al. 2020), neighbourhood policing on crime (Verbitsky-Savitz and Raudenbush 2012), or comprehensive revitalisation strategies on property values (Galster et al. 2006). Many of the statistical techniques for estimating these kinds of programme impacts are now well-established.[13] They include iterated fixed-effects models (Bai 2009), synthetic control approaches (Xu 2017), difference-in-difference methods (Zhang et al. 2020), adjusted interrupted time series (Galster et al. 2004), family fixed effects (Aaronson 1998), and regression discontinuity (Cunningham 2018; Angrist and Pischke 2008). Moreover, there are new waves of methodological innovation, such as the rapidly expanding field of machine learning approaches to causal inference (Kreif and DiazOrdaz 2019). These methods make science-based policy tantalisingly feasible and reinforce the potential benefits of an evidence-based approach to twenty-first century policy strategies for tackling segregation and inequality in China.

15.5.2 Shadow Pricing

One of the drawbacks of a policy strategy focussed exclusively on economic growth is that many of the factors that affect quality of life—clean air, access to green space, protection from flood risk and toxic waste, access to amenities and transport—are not accounted for in estimates of Gross Domestic Product (GDP). Policies that focus on GDP growth will overlook these impacts and provide a distorted sense of progress. How then can China develop an approach to economic accounting that is fit for purpose in a new policy regime where quality of life (Han et al. 2016, p. 176) and ecological impacts (Zheng et al. 2019) are prioritised?

[13] For a fuller review of these techniques, see Shadish et al. (2002), Graham (2018) and Galster (2019: ch. 8).

The solution, from an economics perspective, is to estimate implicit prices. Essentially, this entails computing the monetary value that individuals place on their ability to access non-traded goods, such as beautiful views, clean air, and avoid non-traded 'bads', such as pollution and contaminated land. In Chap. 12, Lian, Song and Timmins argue that Hedonic Pricing techniques and equilibrium sorting models provide practical ways to estimate the implicit value of untraded goods and 'bads' from consumers' choices. How much extra are households willing to pay to live in neighbourhoods with good air quality, for example, provides a useful guide to the economic value of this attribute.

Suppose we include these implicit prices in economic policy. It will mean that the cost to society of economic activities that give rise to harmful pollution or contamination will be seen as less attractive than activities without these unwanted side effects. This will guide policymakers in taxing activities that produce these negative 'externalities'—outcomes of commercial activity that are not reflected in the market price. In this way, governments can help reduce the gap between the price paid by consumers for the products of such firms and the larger overall cost to society.

15.6 Conclusions for Policy

Over the past 40 years, China's Reform and Opening-up have led to a reduction in rural poverty for over 700 million people, contributing 70% of global poverty reduction (Chap. 5). This is a truly extraordinary achievement. At the same time, however, there has been a rise in income inequality (Zhang and Zhao 2019), socioeconomic segregation (Chap. 10), and environmental hazards (Wang et al. 2016). The enormous growth of the urban population (from 172 to 813 million between 1978 and 2017) as a result of rural to urban migration also brought people into close proximity from very different social and cultural backgrounds. All this has heightened the potential for social fragmentation and neighbourhood segregation.

China once again faces the processes that generate inequality and segregation, the social ills that the 1948 communist revolution sought to eradicate. We have sought to highlight these emerging challenges and identify the sino-capitalist features that gave rise to them. An ambitious programme of poverty reduction and inclusive growth was launched in 2018, but there have been questions about managing funds and whether they have been appropriately allocated (Diallo 2019). While poverty levels among those with urban citizenship status has declined, 'levels of chronic poverty among migrant workers has continued to grow, accounting for about 75% of the total population of urban poor' (Chap. 5).

We also contend that there are deeper and more systemic questions. To what extent can we address poverty and disadvantage without tackling the entwined processes of segregation and inequality that are intrinsic to capitalist systems? Poverty and deprivation in a market economy context should not be viewed as static outcomes to be fixed by one-off interventions or government handouts. If China's new phase of

urbanisation is to succeed, policy makers will need to appreciate the dynamic interactions between the political and legislative sectors, rural and urban areas, and between social and market forces. Understanding these linkages, and how they are shaped by local context, will help local and regional governments develop interventions that bring about lasting structural change (Sharkey 2013).

Multidimensional spatial inequalities can be extremely difficult to rectify; certainly, that has been the Western experience (Meen and Gibb 2005; Gibb et al. 2019). While China has demonstrated an impressive capacity to bring about transformative social and economic change, it will face challenges in the coming decades that will make tackling segregation and inequality all the more difficult.

Challenges associated with the country's rapidly ageing population are likely to become prominent. The ratio of dependents to workers will increase significantly. This could suppress growth, exacerbate pressures on public finances, and potentially increase existing inequalities in income (Chen et al. 2018), health (Gu et al. 2019; Wang et al. 2012) and social care (Lou and Ci 2014). China's working age population is forecast to decline by 63.6% by 2100, one of the largest proportionate declines in the workforce predicted for any the world's major economies (Vollset et al. 2020; Campbell 2019). Further pressures on the economy are likely to come from climate change (Tol 2018) and growing geopolitical tensions in China's relationships with other countries (Kavalski 2020; Le Corre 2020; Walker 2020; Niu 2020). There could be uncertain but potentially important impacts on trade, export growth and the domestic economy.

Chinese policy makers will need to grapple with the complexity of these anticipated changes and consider how they might affect the processes of residential segregation and inequality. A modernising social policy will require strategies that are specific to China rather than the re-cycling of policy approaches from Anglo-American and European contexts.

All this heightens the imperative to develop a home-grown evidence base on which to develop policy. I have argued in this chapter that informed policy will require a robust empirical approach to analyse and monitor the dynamic processes that drive segregation (Sect. 15.2) and the associated Spatial Opportunity Structures (Sect. 15.3). An understanding of how these processes affect health, wellbeing and social mobility (Sect. 15.4), will help policy makers design better policies, not only for mitigating inequality and segregation, but for the benefity of society and economy more generally. Appropriate data infrastructure, and the research capacity to evaluate the true impact of interventions (Sect. 15.5) are needed to achieve this.

But what should those interventions be? What policies are needed to tackle the growing problems of segregation and inequality in China and the further entrenchment of their impacts upon future generations? In this volume we have drawn together leading experts to reflect on China's remarkable economic success story, and the policy changes that are needed for the next phase of its development. These recommendations are illustrative rather than exhaustive but nevertheless offer a clear set of guidelines for policy development in the years to come. They are summarised as follows:

- **Reform of the *hukou* system:** a disproportionate amount of the inequality and segregation identified in by authors relate to the *hukou* household registration system. It will be a priority for the government to increase the proportion of rural migrants with full urban citizenship and to reform the *hukou* system (Chap. 5). However, this will have significant resource implications as widening access to urban public services for rural migrants will require a major expansion of those services. At present, public services are characterised by 'dualisation' in urban–rural provision and 'fragmentation' across regions in terms of the level and quality of service. To genuinely improve the citizenship rights of migrant workers, China will need to delineate administrative and expenditure responsibilities, develop a transfer payment system, diversify and enhance public service supply, integrate resources, use information technology to reduce public service inequality, and standardise laws and regulations (Chap. 8).
- **Regeneration of rural areas and small towns:** One way to ease pressures on public services in large cities will be to complement the reform of the *hukou* system with policies and infrastructure investment aimed to make rural areas and small towns more attractive places to live and work (Chap. 5). This should include an integrated set of measures to make shanty town redevelopments sustainable and attractive (Chap. 7).
- **Tackling the decentralisation of poverty:** Unlike many UK and US cities, poverty in China is often concentrated at the periphery and in the suburbs rather than in urban centres. This places an additional burden on poor families in terms of the costs and risks of commuting to work and poor access to amenities. Urban sprawl has been a major feature of city growth in China, but high-quality facilities and services such as hospitals and schools often remain located in the city centre (Chap. 4; Chen and Yeh 2019). Addressing these significant inequalities will require concerted reform of planning policy to ensure a more socially just approach to the location of public institutions, infrastructure and services.
- **Addressing the multidimensional nature of the problem:** The unequal provision of public services is just one aspect of the multi-faceted nature of disadvantage and risk exposure. Hence, in Chap. 14 we emphasised the need to measure deprivation not only in income but also in housing, education, environment, employment, transport and health. The design of policies to tackle poverty is much more likely to be successful if these multidimensional features are reliably monitored and made explicit in policy targets.
- **Reform of housing and land ownership system:** In Chap. 9, Wang and Dong highlighted the many administrative barriers that inhibit equal access to housing and set out a programme of reforms to tackle these. Under the present system, urban land is owned by the state while rural land is collectively owned. These two systems are incompatible in numerous ways that hinder new construction that would benefit rural migrants and prevent capital release to enable them to access homeownership. Extensive reforms are needed to create an integrated urban and rural land market that encourages the construction of affordable homes and improves access to high-quality housing for the urban poor. They also recommend demand-side measures including subsidies and an expansion of social housing

construction. Reforms are also needed in the private rental sector which has emerged rapidly in an unplanned way in response to rapid urban growth. This sector particularly needs better regulation to address the prevalence of substandard housing and the exploitation of migrant workers by landlords. At present, rural migrants 'usually live in temporary sheds or densely populated dormitories provided by employers' (Chap. 9). Such accommodation is often unfit for human habitation and is also highly precarious as migrant workers have no security of tenure.

- **Next-generation planning**[14]**:** Inspired by the architectural philosophy of Le Corbusier, the post-war period saw the rapid development of high-rise housing across many European cities and the clearance of significant numbers of traditional urban buildings as a result. However, subsequent changes in demography and lifestyle aspirations[15] led to the demolition of many of these high-rise dwellings, especially those of questionable construction quality. There has also been renewed appreciation for traditional buildings and a sense of lost heritage due to the destruction of the historical urban landscape during the high-rise revolution. The rapid redevelopment and modernisation of Chinese cities over the past 30 years raises the question of whether China may eventually experience a similar backlash against high-rise living. The dissatisfaction reported in Chap. 6 in the context of urban village redevelopment, for example, may be an early indication of more widespread disenchantment. Projections of a rapidly ageing population in China (Vollset et al. 2020) will raise further questions about the best way to address future housing and social care needs (Ikels 2004; Vollset et al. 2020). Moreover, experience of Covid19 has led many to question the desirability of high-density living in a world where pandemics may become more frequent due to climate change and increased animal-human contact.[16] Chinese policy makers, along with their counterparts around the world, will need to develop a long-term strategy for next-generation urban planning that will learn from the mistakes of European planners and anticipate the housing needs of the future.
- **Social integration of rural migrants:** The research presented in Chap. 11 reveals the complex and multi-layered nature of social separation of rural migrants and local urban residents working in care homes in Shanghai. These findings are illustrative of a wider problem of hidden stratification that emanates from the

[14] I am grateful to Sako Musterd for raising the question of impending obsolescence of high rise housing in China in his comments on this chapter.

[15] In the preface to their book, High-rise housing in Europe, Turkington et al. (2004) note that, 'High-rise housing was constructed on a mass scale in the belief that blocks and estates would work for everybody who lived in them. However, the world has changed since then. Other housing types have taken their place, the single family dwelling represents the ultimate aspiration for many households. Whilst it is clear that the condition and market position of high-rise varies between countries, many complexes have deteriorated physically, socially, and are in the worst cases faced with a multiplicity of problems.'.

[16] See, for example, https://www.gavi.org/vaccineswork/5-reasons-why-pandemics-like-covid-19-are-becoming-more-likely, and https://www.who.int/globalchange/climate/summary/en/index5.html.

social inferiority of rural migrants in the Chinese system. International research on migration agrees on a crucial point. For migrants to integrate socially, they need to be able to achieve 'outcomes within employment, housing, education, health etc. which are equivalent to those achieved within the wider host communities' (UK Home Office report, 2004). Such outcomes are vital because they offer migrants, minorities and other marginalised groups the opportunity to advance in the labour and housing markets, and acquire the resources needed to connect with the wider society. Without equivalent rates of social mobility among migrant workers and local residents, economic gaps will continue to widen between them, engendering a deepening sense of injustice and discrimination. The negative impact of the *hukou* system goes beyond the practical consequences of inability to access opportunities. There is also an emotional impact that stems from the stigma of being categorised as second-class citizens. Interventions to address these issues may involve measures to encourage positive social contact between groups, such as mixed tenure housing and inclusive approaches to the design of school catchments (Brown and Hewstone 2005; Ramos et al. 2019; McGlynn et al. 2004). These initiatives may be especially important where there are 'social frontiers' (see Chap. 13; Dean et al. 2018).

- **Shadow pricing and macroeconomic policy:** Earlier in this chapter, and in Chap. 12, we discussed the importance of incorporating the value of nature, clean air, and other non-traded outcomes of economic activity into economic decisions. One way to do this is to make greater use of shadow pricing to place monetary values on important impacts of economic activity that are currently unaccounted for in economic planning. This raises a more general issue: the need to synthesise macro- and micro-economic policy. The focus of our recommendations so far has largely been on specific areas of social policy and legal reform. However, we should not forget the role of macroeconomic policy in the generation of socioeconomic inequalities, not only through the taxation of income and wealth, but also through monetary policy (e.g. Coibion et al. 2017). Taxation of housing wealth comes under the remit of macro policy but also has implications for the intergenerational transfer of housing wealth inequalities. As house prices increase dramatically in boom cities, such inequalities are likely to widen considerably over the coming decades. Landlords and homeowners may accumulate wealth rapidly in these areas. Tenants will be excluded from these rewards and may also face rising rental costs. Macroeconomic policy should therefore be included in the mix for a fully coordinated response, although it is beyond the scope of the current volume to explore this in the Chinese context.

15.6.1 Final Thoughts

Our goal has not been to make the case for a return to communist-era economic planning.[17] Instead, we stress the need to understand the very real challenges currently posed by a modern market economy and its tendency to generate self-reinforcing cycles of inequality and segregation. As inequality in China continues to rise, it will become increasingly important to find an appropriate policy response to shape the country's future and determine the success of its new emphasis on improving the quality of life.

As many of the authors of this volume have noted, China's economic policies have achieved an extraordinary rise in the living standards of hundreds of millions of people. It has also generated growing inequality across regions, between urban and rural areas and ethnic groups. Those without full access to citizenship rights suffer most. I have also raised the question of whether the negative consequences of inequality and segregation can to some extent offset the benefits of economic growth for the disadvantaged.

Crucially, there needs to be a robust way to evaluate the efficacy of polices and to foster a culture of policy-making that abandons or reforms policies that are ineffective or unjust. I have highlighted various methodological innovations, including those arising from the Causal Revolution in social science research. Combined with investment in China's socioeconomic data infrastructure, these recommendations pave the way to a more rational and transparent approach to policy development.

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[17] As noted in Chap. 3, very low levels of inequality can also have negative consequences, such as economic stagnation.

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Author Index

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Subject Index

G. Pryce et al. (eds.), *Urban Inequality and Segregation in Europe and China*,
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