

Chapter 13

Social Frontiers: Estimating the Spatial Boundaries Between Residential Groups and Their Impacts on Crime



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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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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 citizenship³ 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.

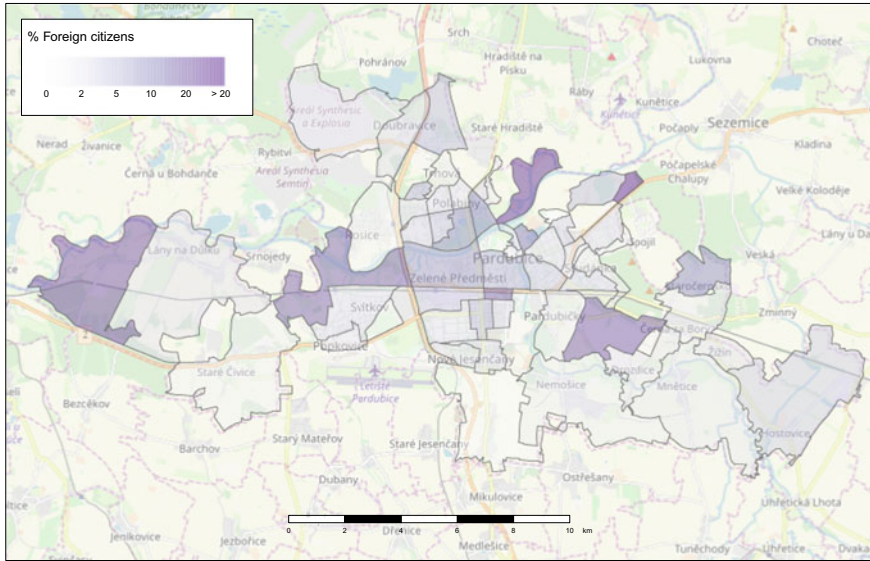


Fig. 13.1 Foreign citizens as percentage of BSU population in 2011. *Source:* Pardubice: OpenStreetMap contributors, 2017

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 β_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:

$$\begin{aligned}
 Y_k &\sim \text{Binomial}(N_k, p_k); k = 1, \dots, n \\
 \ln\left(\frac{p_k}{1 - p_k}\right) &= \beta_0 + u_k \\
 u_k | u_{-k}, W, \lambda, \tau^2 &\sim N\left(\frac{\sum_{k \sim l} u_l}{1 - \lambda + \lambda_{wk+}}, \frac{1}{\tau^2(1 - \lambda + \lambda_{wk+})}\right) \\
 \beta_0 &\sim N(0, b) \\
 \tau^2 &\sim \text{gamma}(e', f') \\
 \text{logit} &\sim N(0, 100)
 \end{aligned}$$

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

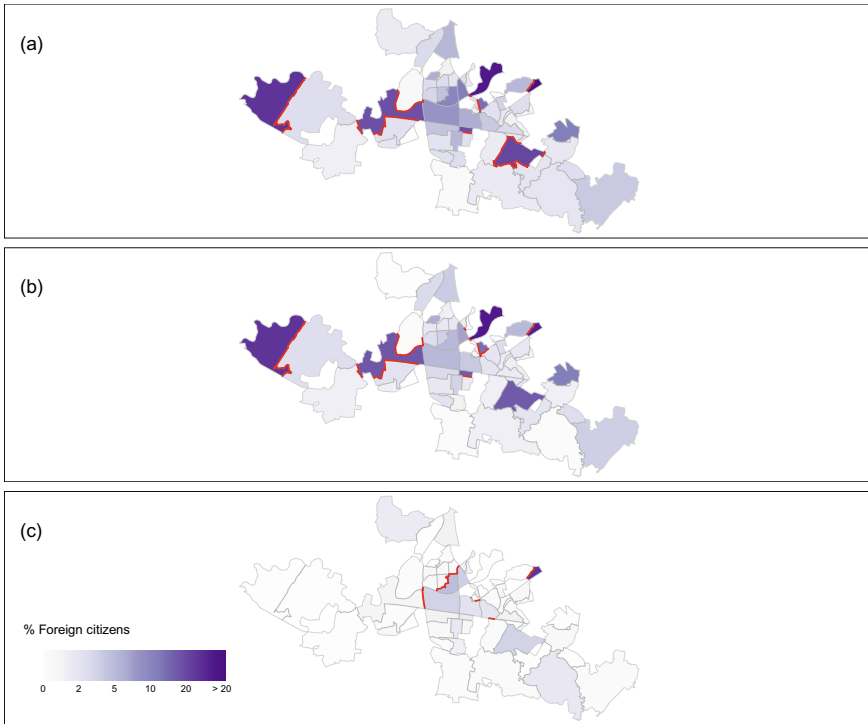


Fig. 13.2 Proportion of all (a), culturally closer (b), and culturally more distant (c) foreign citizens in population with the location of social frontiers (red) in 2011

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	<i>p</i> -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

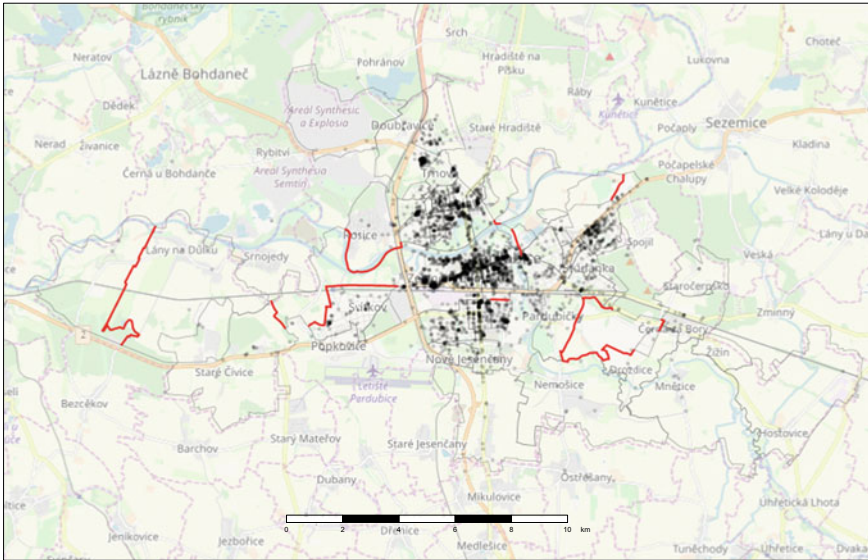


Fig. 13.3 Location of individual conflicts and social frontiers (red) based on all foreign citizens

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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