

Equity in transport: Learning from the policy domains of housing, health care and education

J. F. Jeekel¹ · C. J. C. M. Martens^{2,3}

Received: 9 January 2017 / Accepted: 26 September 2017 / Published online: 6 November 2017
© The Author(s) 2017. This article is an open access publication

Abstract

Introduction The aim of this paper is to explore the equity principles in three main domains of government intervention (health, education and especially housing) and to draw lessons for the domain of transport. In line with the burgeoning literature, we consider equity in transport to be primarily – albeit not only – concerned with the level of accessibility conferred by the transport-land use system to persons. While some (recent) research has explored what requirements of fairness may imply for accessibility the issue has received scant attention in the practice of transport planning and policy. In contrast, equity principles are fairly well established in the domains of health care, education and housing. By analyzing the equity principles in each of the latter domains, and assessing their possible relevance for the domain of transport, we want to contribute to the rapidly growing literature addressing equity concerns in the domain of transport.

Methods The paper consists of two parts. In the first part, we conduct a thought experiment with the aim to provide a rough first estimate of the population at risk of what we call

accessibility poverty. In the second part of the paper, we contrast the (lack of) equity principles in the transport domain with the type of equity principles underpinning three domains of government intervention: health care, education, and housing. We have selected these domains, because in contrast to transport, they are generally considered key anchors of developed welfare states; and in parallel to transport, they are each concerned with the delivery of a particular good to citizens.

Results We estimate that in developed (Northern-European) countries about 9% to 11% of households is at risk of accessibility poverty. Of this group, 7% of all households is at risk because of a poor transport system (and sometimes also because of affordability problems), while another 2% to 4% is at risk of accessibility poverty because of disproportionately high motoring costs. We observe that most Western societies have well-established policies regarding the fair provision of health care, education and housing for all (income) groups. In contrast, decision-makers have not even started to define what fairness in the domain of transport could amount to.

Conclusion Given the importance of mobility in modern societies, we argue that there is an urgent need for societal and policy debates about fairness and for subsequent translation of the outcomes of these debates into adequate principles, standards, and policies for the transport domain.

This article is part of Topical Collection on Transport poverty, equity and environmental justice

✉ J. F. Jeekel
J.F.Jeekel@tue.nl

Keywords Mobility · Equity · Accessibility · Affordability · Health care · Education · Housing · Comparison

¹ School of Innovation Sciences, Faculty Industrial Engineering & Innovation Science, Eindhoven University of Technology, P.O. Box 513, 5600 MB, Eindhoven, Netherlands

² Technion - Israel Institute of Technology, Technion City, 3200003 Haifa, Israel

³ Department of Geography, Planning and Environment, Institute for Management Research, Radboud University Nijmegen, PO Box 9108, 6500 HK, Nijmegen, Netherlands

1 Introduction

The aim of this paper is to explore the equity principles in three main domains of government intervention (health, education and especially housing) and to draw lessons for the domain of transport. In line with the burgeoning literature,

we consider equity in transport to be primarily – albeit not only – concerned with the level of accessibility conferred by the transport-land use system to persons (e.g. [5, 40, 53, 68]). While some (recent) research has explored what requirements of fairness may imply for accessibility (notably [42]), the issue has received scant attention in the practice of transport planning and policy. In contrast, equity principles are fairly well established in the domains of health care, education and housing (e.g., [1, 2, 28, 50]). By analyzing the equity principles in each of the latter domains, and assessing their possible relevance for the domain of transport, we want to contribute to the rapidly growing literature addressing equity concerns in the domain of transport.

The paper consists of two parts. In the first part, we conduct a thought experiment with the aim to provide a rough first estimate of the population at risk of what we call accessibility poverty. This part consists of three sections. In Section 2, we briefly discuss the notions of transport poverty, accessibility poverty and transport-related social exclusion and their interrelationships. We then present two indicators of transport poverty which we will use to identify the share of the population at risk of accessibility poverty (Section 3). In Section 4, we present our thought experiment to provide an estimate of the share of the population at risk of accessibility poverty. By providing this estimate, we intend to map the scope of the equity problem in the domain of transport, thereby providing a justification for the second part of the paper.

In the second part of the paper, we contrast the (lack of) equity principles in the transport domain with the type of equity principles underpinning the three domains of government intervention mentioned above: health care, education, and housing. We have selected these domains, because (1) in contrast to transport, they are generally considered key anchors of developed welfare states; and (2) in parallel to transport, they are each concerned with the delivery of a particular good to citizens [24]. This second part encompasses two sections. In Section 5, we give a brief account of the equity principles underlying the provision of health care, education and housing. In Section 6, we make a more in-depth comparison between housing and transport: what are the guiding principles in these two sectors, and what could explain the differences between both sectors?

We end the paper with a plea for action, as we estimate that about 9% to 11% of households in European societies are disadvantaged due to the lack of attention for equity in the domain of transport (Section 7).

2 Defining transport poverty and accessibility poverty

In the burgeoning literature on transport and equity, a range of notions is used to refer to the nexus between (a lack of)

transport and persons' life opportunities. Frequently used terms include transport disadvantage, transport poverty, transport-related social exclusion, and accessibility poverty. Before commencing our analysis, it is important to clarify these terms and their interrelationships (see also Lucas, Mattioli et al. 2016). For this purpose, we follow the distinction between income poverty and social exclusion, as developed in the literature on disadvantage and deprivation (e.g., [32]). In this body of literature, income poverty refers to a *lack of material resources*, notably money. The notion of social exclusion, in contrast, underscores that a lack of material resources is *only one* of the possible causes of deprivation [29]. The notion of social exclusion is thus broader in nature than poverty and relates to “the lack or denial of resources, rights, goods and services” *leading to* “the inability to participate in the normal relationships and activities, available to the majority of people in a society, whether in economic, social, cultural or political arenas” ([32] – in [36]).

Following this distinction, we argue that the notion of transport poverty should be used to refer to a lack of transport-related resources. That is, a person experiences transport poverty if he or she lacks access to adequate *means of transport*, limiting a person's potential mobility in comparison to what is common among a particular population. The notion of potential mobility refers here to a person's ability to move through space [41, 55]. Persons may experience transport poverty because of financial reasons (e.g. inhibiting the purchase of a car or of (multiple) public transport tickets), legal reasons (e.g. lack of a driver's license), or mental or physical abilities (e.g. a person may not be able to use a bus service because of a travel-related impairment).

The term accessibility poverty differs from the notion of transport poverty, in that it is based on a broader interpretation of the notion of resources. Accessibility poverty occurs if a person has a lack of access to key opportunities, such as employment, education, health care, or social support networks [35, 36]. Transport poverty does not always have to translate into accessibility poverty, for instance in case a person manages to reach key destinations with minimal physical mobility (e.g., if she is living in a dense, mixed-use, environment). However, transport poverty does imply accessibility poverty whenever a substantial level of mobility is necessary to gain access to key destinations [31]. This latter situation is increasingly likely in modern Western societies, based as they are on the assumption of high mobility [23]. Moreover, even if a person manages to gain access to destinations without a high level of mobility, it is highly likely that transport poverty will translate into accessibility poverty at some point in a person's life, for instance when a person's circumstances or plans of life change and a significant level of mobility becomes necessary to access key destinations. Persons experiencing transport poverty are thus *at risk* of accessibility poverty. Note furthermore that accessibility poverty may also occur independently of transport poverty, for instance when a person enjoys a high

level of potential mobility but lives in a (very) remote locality. In this latter case, accessibility poverty is caused by the existing land use patterns rather than by transport poverty. Note that in what follows, we only relate to accessibility poverty if it results from transport poverty.

Transport-related social exclusion, in turn, is not about the resources available to a person, whether in terms of transport means or accessibility opportunities, but about the level of participation in society. Accessibility poverty develops into transport-related social exclusion if systematic problems of access to opportunities lead to significant impacts on a person's life, such as unemployment, deterioration of health, or social isolation [67]. Accessibility poverty is thus less severe than transport-related (or accessibility-related) social exclusion: the latter assumes long-term impacts on a person's life, while the former may also occur without these long-term effects and may not even affect a person's level of activity participation [42, 43]. Yet, persons experiencing accessibility poverty over a long period of time and for a range of destinations, are highly likely to experience social exclusion from (parts of) society, in particular as a person's circumstances change over time and it may become necessary to access a new set of destinations. In other words, persons experiencing accessibility poverty are *at risk* of transport-related social exclusion.

Finally, it is important to underscore the difference between the everyday notion of 'transport problems' and accessibility poverty. Many persons may experience 'transport problems', for instance because of road congestion or inconvenient transit itineraries. This will clearly affect a person's level of accessibility. However, as long as these problems do not hinder persons from the possibility of reaching a broad set of desired destinations against reasonable costs in terms of time, money and effort, they do not suffer from any form of accessibility poverty as they are not excluded from the possibility of accessing a substantial range of destinations due to a transport problem. Again, a parallel with the domain of income is in place: while even relatively well-off households may experience 'income problems', for instance because they have difficulties to balance income and expenses on a monthly basis, such households typically have adequate income to fulfill much more than their basic needs. This contrasts with households in income poverty, who not merely struggle to make ends meet, but experience systematic difficulties to purchase even a minimal set of basic goods. Persons with regular, everyday, 'transport problems' are comparable to the former type of households, while persons experiencing accessibility poverty are in a comparable situation as the latter type of households.

Following the literature, and as mentioned in the introduction, we uphold that accessibility is the proper metric for assessing equity in the domain of transport. The notion of accessibility provides insight in what persons can do with the transport-related resources available to them, which is more important than those resources themselves [44]. The level of

activity participation, in turn, is highly dependent on a person's particular situation and stage in life, and shaped by many other factors than transport alone, which makes it a problematic index to assess equity in the domain of transport [43].

In what follows, we seek to estimate the share of the population *at risk* of accessibility poverty. Lacking detailed data on levels of accessibility for different population groups, across a range of contexts and at a national level, we will employ two indicators of transport poverty to identify the population at risk of accessibility poverty. As mentioned above, the lower the level of transport-related resources, the higher the likelihood of transport poverty and the higher the risk at accessibility poverty.

3 Indicators of transport poverty risk and accessibility poverty risk

The transport literature abounds with studies addressing the disparities in transport resources, mobility, and accessibility, between population groups and across metropolitan areas. This includes studies that belong to the research strands on transport and social exclusion [35, 36], on accessibility (e.g., [4, 46, 53]), on women and transport [30], and on the spatial mismatch hypothesis (e.g. [26, 51]).

Yet, to the best of our knowledge, no study has attempted to provide estimates of the overall number of persons at risk of accessibility poverty. Even the report of the UK Social Exclusion Unit [58], arguably one of the most authoritative pieces of evidence on the nexus between transport and social exclusion, does not provide an overall estimate of the share of the population affected by the range of accessibility problems identified in the report. We aim to address this issue by presenting an estimation of the magnitude of accessibility poverty *risk* in developed countries.

In order to obtain this estimate, we will use two key indicators of transport poverty: car ownership and transport-related expenditures (Table 1). The first indicator, car ownership or, rather, the lack of car ownership, is clearly an indicator of transport poverty: a car is an important transport-related resource in current societies. Indeed, the importance of this indicator is based on the understanding that, under normal circumstances, a society's dominant mode of transport provides an acceptable level of accessibility for all who have access to that transport mode. Land use patterns are shaped by transport networks and tend to organize around the speed provided by the dominant transport mode, i.e. the mode used by the majority of the population [20]. The motor car is clearly the dominant mode of transport in virtually all industrialized societies. Persons with access to a motorcar will typically have no problem navigating these land use patterns. In contrast, from the literature we know that households without a car are particularly at risk of accessibility poverty, because of the (often) poorer levels of potential mobility provided by other modes

Table 1 Types of transport poverty risks and related risks at accessibility poverty

	Car-owning households	Car-less households
Mobility expenditures above 20% of net household income	Risk of transport poverty and thus risk at accessibility poverty due to affordability problem	Risk of transport poverty and thus risk at accessibility poverty due to affordability problem, possibly in combination with poor transport options other than the car
Mobility expenditure lower than 20% net household income	No accessibility poverty due to transport poverty, but accessibility poverty may occur because of unfavorable land use patterns	Risk of transport poverty and thus risk at accessibility poverty due to poor transport options other than the car No risk of accessibility poverty in case of or choice for car-free lifestyle

of transport (public transport, bicycle, walking, or a combination of these). At the same time, we also know that many car-less households do not experience such problems, for instance because they are young and studying, are less pressed for time, or have limited needs to access a range of destinations, or because they are car-free households by choice and succeed to organize their lives in such a way that high, car-based, mobility is not necessary to gain access to key destinations ([23], p. 224–225). The level of car ownership is thus not a direct indicator of transport poverty, but of transport poverty risk, and, through it, of the risk at accessibility poverty.

The second indicator to identify the population at risk of accessibility poverty is a high share of expenditure for mobility in the net household budget. The share of expenditure is not the most obvious indicator of transport poverty risk. However, it may be clear that households spending a very high share of their income on transport may not be able to continue to do so if the circumstances change, for instance if oil prices increase or if households expenses go up unexpectedly. Under such conditions, households may be forced to adjust their mobility patterns and even reduce their actual mobility, or alternatively give up on other essential goods [47, 16, 37]. This suggests that households with high transport expenditures are at risk of transport poverty and thus also at risk of accessibility poverty. For this reason, we employ this indicator in our estimate of households in accessibility poverty below.

The available data on transport-related expenditures can provide a basis to determine a threshold of affordability. On average households in Europe spend between 10% to 20% of their net income on transport [33]. However, the figures differ substantially between income groups. While the lowest income groups spend, on average, less on transport than higher income groups due to low levels of car ownership, the situation is fundamentally different if only households with car-related transport costs are taken into account. In that case, low income households spend by far the largest share of their income on car-related costs. For instance, one study for the US found that households in the lowest income quintile spend on average 31% of their net income on car-related costs, while the figure drops slowly for each of the subsequent quintiles (from 18% for the second-lowest quintile, via 16% and 14% to 12% for the highest income quintile) [9]. Another study for the US

found that households in the lowest income quintile spend as much as 40% of their net income on car-related costs [60].

The high share of car-related costs in overall households expenditures is obviously related to the problem of forced car ownership. This notion points at the phenomenon that the poorest households sometimes (may be forced to) live in (low cost) locations, with virtually no employment or services and non-existent or poor quality public transport [12]. Such households may be compelled to buy a (cheap) car from their limited incomes to maintain a reasonable level of mobility and accessibility, and are thus faced with high transport costs. Two studies conducted in Australia found that car-related costs sometimes exceed 40% of the income of households in the lowest income quintile [13, 25]. Comparable figures were found for Scotland by Cain and Jones [10].

In line with the literature, we propose to use a threshold to determine whether households spend a disproportionate share of their income on transport-related expenses. Following Litman [33], we will use 20% of household income for households in the lowest income quintile as our threshold. A higher share of overall household budget spent on transport expenditures suggests that household may be at risk of accessibility poverty, because they may not be able to maintain such a level of expenditures over a longer period of time or may experience problems in purchasing other necessities due to high transport expenditures. Some low-income car-owning households may also seek to control their transport expenses by minimizing car use, suggesting that car ownership does not necessarily translate into car-based accessibility under all circumstances [10]. The share of income spent on transport is thus an indicator pointing at households at risk of transport poverty, which may translate into a risk at accessibility poverty, as explained above.

By juxtaposing the two indicators, four types of transport poverty risk and thus accessibility poverty risk can be distinguished (see Table 1).

4 Estimate of the population share at risk of accessibility poverty

Based on the two indicators defined above, we will now try to estimate the share of households at risk of accessibility poverty. Lacking precise data for any particular country, the estimate

should be seen as first and foremost a thought experiment. As we will draw on data and studies from countries like France, Germany, the Netherlands, Sweden and the United Kingdom, the thought experiment is mostly relevant for the situation in wealthy Northern European countries. These countries are relatively comparable regarding the two indicators for transport poverty risk. First, they have largely comparable levels of car ownership, which is high in comparison to e.g. Eastern European countries but low in comparison to particularly the US. Second, the countries have somewhat comparable levels of income, which are (substantially) higher than what can be found in countries of South and Eastern Europe. We will draw on a range of figures, but acknowledge that more research is needed to produce reliable figures on the prevalence of accessibility poverty risk in any particular country. Note furthermore that for reasons of readability only, we have opted to mostly present single numbers only rather than a range of possible values. Clearly, given the available data, it is impossible to arrive at any precise estimate.

Drawing on the first indicator of transport poverty, we start by making a distinction between households with and without a car, given the important role of the car in providing accessibility to destinations in current societies. The share of households without a car varies amongst the five countries on which we focus, with the highest share in Sweden and the United Kingdom (25%), followed by Germany (23%), the Netherlands (20%), and finally France (19%). For reasons of simplicity, we assume in what follows that about 22% of all households do not own a car ([23], p. 221–245).

Let us now try to estimate which share of the car-less households may be at risk of accessibility poverty. In order to do so, it is important to have an understanding of the reasons for households not to own a car. For this purpose, we draw on a German study amongst a large sample of car-less households [17]. This study asked respondents to indicate the reasons for not owning a car. If presented by only the most important reason, the result shows that 50% of the respondents considered a car too expensive, 19% gave health- or age-related reasons, 16% indicated to have no need for a car, 5% rejected cars, while 10% indicated other reasons for not owning a car. Clearly, these estimates may be quite different in other countries, but the figures do provide a reasonable basis to further develop our thought experiment (Fig. 1).

These German figures suggest that at least 20% of car-less households, i.e. 4% of all households, are car-less by choice. It may be assumed that this group of households does not experience severe accessibility problems. Students and other young households will most likely be overrepresented among this group. Furthermore, it may be expected that a relatively large share of this group lives in the (core of) larger cities, and thus benefits from the density of destinations and the quality of public transport provision in those areas.

In contrast, for about 70% of car-less households (15% of all households) circumstances are at least partly the cause of their car-ownership status. The extent to which these

households will be able to reach the places they need and want to access will vary, across and within countries. Some share of these households may manage fairly well by relying on public transport, cycling, walking and obtaining rides from friends or family members. A small share of car-less households also holds a driver license and may be able to rent a car or make use of carsharing services to access to destinations beyond walking or cycling distance. While some households may indeed manage, it may also be expected that a (substantial) share of this group is at risk of accessibility poverty. How large that share is, is difficult to determine. The report of the Social Exclusion Unit in the UK may provide some insight [58]. The report found that two out of five jobseekers find transport is a barrier to getting a job; that 31% of people without a car have difficulties travelling to their local hospital, compared to 17% of people with a car; that 16% of people without cars find access to supermarkets difficult; and that 18% of people without a car find seeing friends and family difficult because of transport problems, compared with 8% for car owners. Clearly, these figures do not deliver a direct estimate of the share of car-less households experiencing accessibility poverty, but taken together it seems reasonable to assume that about 40% of households who are car-less by circumstance experience substantial problems in accessing one or more key destinations. If we assume that the same percentage holds for households indicating not to hold a car for ‘other’ reasons (10% of all car-less households in the German sample, i.e. about 2% of all households), then the share of households at risk of accessibility poverty is at least 7%.

This, however, is only an estimate for the households without a car. Households with a car may also be at risk of accessibility poverty, notably because of affordability problems. Lacking detailed studies on the distribution of motoring costs among low income households, we have to rely on a rough estimate of the possible share of low income, car-owning, households at risk of accessibility poverty due to affordability problems. Based on the studies cited above, we estimate that between 40% to 60% of car-owning households in the lowest income quintile spend more than the threshold level of 20% on car-related transport costs. Given that only about a quarter to one third of all households in this quintile own a car (e.g., [10]), this implies that between 10% to 20% of low-income households could face affordability problems, which equals about 2% to 4% of all households in the population (for instance: 20% of households belong to the lowest quintile, of which about 30% own cars, of which 60% may experience affordability problems: $20\% \cdot 30\% \cdot 60\% = 3.6\%$).

The final estimation is thus that about 9% to 11% of households is at risk of accessibility poverty. Of this group, 7% of all households is at risk of accessibility poverty because of a poor transport system (and sometimes also because of affordability problems), while another 2% to 4% experiences accessibility poverty because of disproportionately high motoring costs.

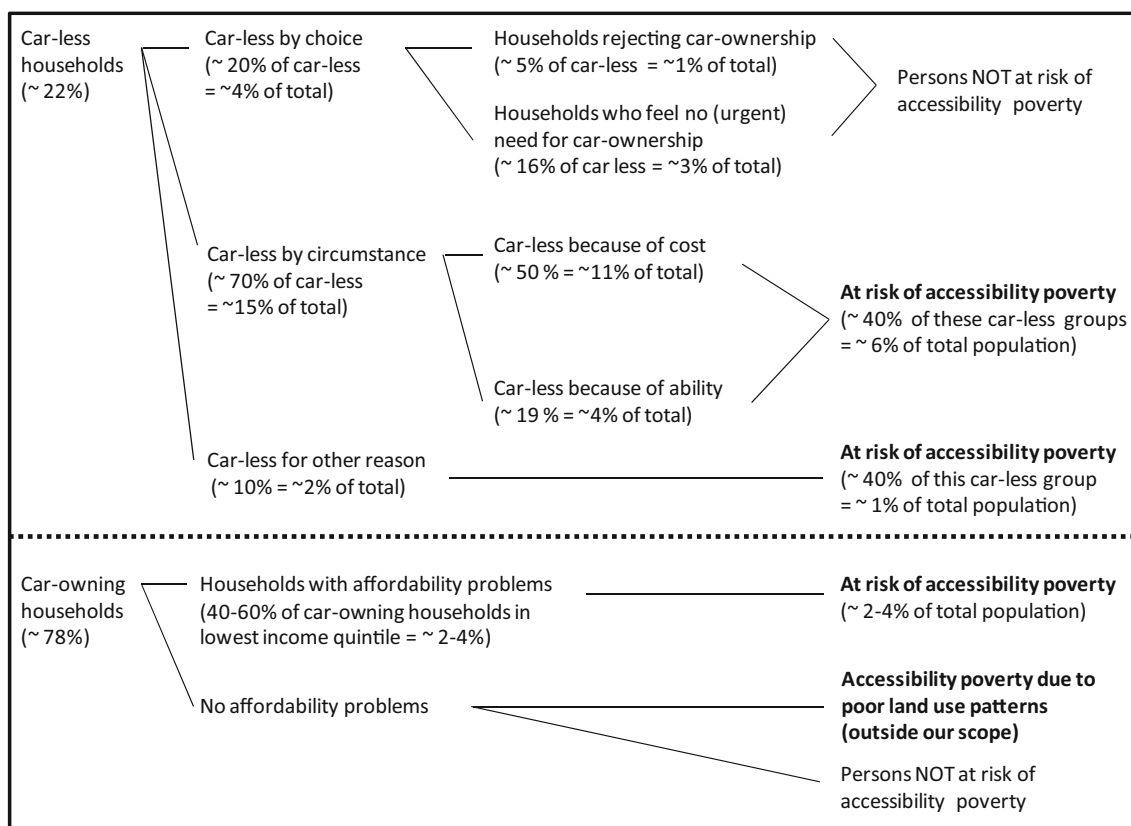


Fig. 1 Tree-like estimate of the share of households at risk of accessibility poverty

5 Equity principles in welfare states: Health care, education, housing and mobility

The results of our thought experiment – i.e. our estimation that a small but substantial share of the population is likely to be at risk of accessibility poverty – obviously reflect the transport policies and investments enacted over the past decades in most developed countries. Indeed, it can be argued that the incidence of accessibility poverty is partly the consequence of the largely demand-driven transport policies and of the lack of attention for equity concerns in the domain of transport [39, 57]. In what follows, we will contrast the approach in transport domain with the equity principles as prevalent in other key domains of government intervention: health care, education, and housing.

We start our analysis with a report published by the Netherlands Institute for Social Research (SCP), which compares public sector performance in 28 developed countries [24].¹ While each of these countries obviously had its own particular development of the public sector, there proof to be

¹ It concerns the following countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, South Korea, Spain, Sweden, Switzerland, United Kingdom, United States.

surprisingly similarities. In almost all societies education, health care and social protection are the largest (government) sectors. These sectors are central in the SCP study, but also substantial attention is given to housing. Missing in the report is a discussion of the provision of transport services and infrastructures.

5.1 The provision of (public) services in welfare states

As may be expected, the 28 countries show substantial differences in the role of the government in the provision of different (public) services, and hence in the achievement of a range of policy goals. In all countries governments are heavily involved in the regulation, financing and delivery of health care, education and housing, but organization and magnitude of the involvement differ, as may be expected.

To some extent, the provision of public services is related to the type of welfare state. The most comprehensive work on this theme is Esping-Andersen's *Three Worlds of Welfare Capitalism* ([15]; see for a critical discussion [3]). Esping-Andersen defined a welfare state regime as a complex system of legal, institutional, neatly intertwined, arrangements of social policy. The division in types of welfare states is based on the degree of de-commodification: the extent to which

households, irrespective of their market income, can maintain or reach a socially accepted living standard.

Esping-Andersen identified three types of welfare states. First, the liberal welfare state. In this case, the state has a relatively weak position in structuring the social and economic life of its households, and social benefits provided by the state are means-tested and targeted at the lowest income stratum, which leads to stigmatization and residualization of state benefit recipients. The United States can be seen as an example of a liberal welfare state. The second is the social democratic welfare state, with a far stronger role of the state. Here, social benefits are more generous, and universal in provision, leading to far lower degrees of income inequality, and less stigmatization of the poorest households. In between these two types are the conservative, corporatist welfare states. They do not embrace a universal social system as the social democratic welfare states do, but state provisions are generous as in the social democratic welfare state.

On the basis of the research presented in *Countries compared on public performance* it can be noticed that the welfare states show more substantial differences in the provision of social protection, social welfare, and housing, than in the provision of education or health care (with the USA being until recently a notable exception).

In the next sub-sections the focus will be on equity principles underlying the provision of health, education, housing and mobility.

5.2 Equity principles underlying the provision of health care

With the exception of the United States, there is vast agreement among developed countries about the equity principles that should guide the provision of health care. Indeed, most European, and many non-European, health care systems are based on a fundamental notion of solidarity [61], meaning that people ought to have equal access to a reasonable minimum range and standard of health care services irrespective of their ability to pay for these services [24]. More precisely, the basic equity principles guiding health care provision in most countries can be summarized as follows: (1) equal access to health care for persons with a comparable need for health care, and (2) equal utilization of health care for those in equal need of health care [14]. The extent to which these principles are actually achieved in the delivery of health care differs across countries, in part as a result of the particular structure of the health care system. Jonker [24] reports that the first principle of “equal treatment for equal need” is met to a high degree in primary health care in most countries, but that there is a tendency towards “pro rich” secondary health care in some of the wealthier OECD-countries. That is, weaker population groups, in terms of socio-economic position, gender and ethnicity, show a lower uptake of specialized health care than

better positioned citizens. Furthermore, there is some relation between the requirement of out-of-pocket payments and unmet health needs among in particular the lowest income quintiles, suggesting that equity principles are also not completely met for primary health care.

The latter findings, however, do not imply that equity principles do not play an important role in the delivery of health care. They merely underscore the ongoing challenge to balance equity and the costs of health care provision. Furthermore, they also show the importance of other resources, such as education and social capital, in the actual reception of health care provision [14].

5.3 Equity principles in the provision of education

Like in the case of health care, there is broad agreement in developed countries about equity principles in the domain of education. This agreement is reflected in the United Nations statement that education should ‘enable all individuals to realize their right to learn and to fulfill their responsibility to contribute to the development of their society’. It is also reflected in Article 26 of the Universal Declaration of Human Rights: “Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. (...) Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit” [64]. Countries have set up quite different educational institutions, but the key equity principle guiding the provision of education in virtually all developed country is the notion of equal access to primary and secondary education. It is broadly understood that equal access to education is undermined if people have to pay the costs for primary and secondary education themselves, as these costs are typically higher than most low and middle-income households can afford from their annual incomes. The fundamental goal of education policies is thus to guarantee that children have equal opportunities to obtain a (basic) education, irrespective of their parents’ or caretakers’ income, background or preferences ([2, 24], p. 73).

Clearly, education has a value for society beyond the benefits education confers to the individual. Education cannot only empower the individual, but it also enables society to ‘tap’ into all ‘human capital’ of a new generation, which is considered to be beneficial for economic development. Furthermore, education also serves the purpose of socializing and informing people and thus fostering social cohesion in a society. These are additional reasons for government involvement in the provision of education, but they are not directly related to concerns over equity and do not necessarily imply equal access to education. It is the concern for equality of opportunity that provides the philosophical underpinning for the equity principle of equal access to education.

5.4 The provision of housing

Housing provision differs from the provision of health care and education. In the latter cases, provision is heavily dependent on public expenditure, financed through some form of (general) taxation or health insurance scheme. In contrast, direct government spending is often limited in the housing sector; by far the greatest share of housing consumption and housing production takes place through the market. For this reason, housing is sometimes called the “wobbly pillar” of welfare states [63].

Yet, in virtually all developed countries, housing policies are based on firm and widely shared equity principles. Indeed, as we will discuss below, the equity principle underpinning housing regimes is often enshrined in national constitutions. In such cases, the underpinning equity principle has taken on the form of a right, i.e. the right to adequate housing. This right also guides housing policies in many developed countries that have not legally formalized a right to housing [7, 52].

Yet, because the important role of the market in the provision of housing, public expenditure for housing is more contested than for health care and education [24]. This is so in part because most households are able to purchase and maintain an adequate level of housing themselves, in particular in developed countries with a well-functioning mortgage market. The share of the population able to secure an adequate level of housing has also increased over the past decades. For instance, in the UK, the share of home-owning households has increased from 58% to 70% since the 1970s, with a parallel reduction in households in the social sector.

The dominance of the market in the housing sector in most developed countries implies that policies guaranteeing an adequate level of housing only benefit a minority of the population, a minority that has also decreased in size over the past decades. Nevertheless, virtually all developed countries are involved in the regulation of the housing sector with the aim of providing housing for this minority of the population. Indeed, Bengtsson (2001 cited in [19]) argues that housing policies are best understood as “state correctives to the market”. These “correctives” typically aim to guarantee affordable and adequate housing to households that are not able to secure housing on the market. Countries differ widely in the way in which they achieve this goal, but typically combine subsidization of supply, subsidization of demand (typically renters) and rent regulation.

The ways these policy tools are employed differs substantially between countries. In line with the categorization of the three types of welfare states above, a number of countries opt for a housing policy with public expenditure only aimed at the lowest income segments of society, thus leading to policies based on residualization, i.e. a clear delineation of a small population group that cannot cater for its own needs. Yet other countries provide (partly) publicly financed housing to a

larger segment of the population. This leads to different figures on the magnitude of the social rental sector, ranging from about 30% in the Netherlands, to around 20% in France, United Kingdom and Sweden, only a few percent in Italy and Canada, and to zero in Germany (where another system for providing housing for lower incomes has been introduced after recent privatization) ([24], p. 242).

The relatively modest size of government expenditure in the housing sector, in contrast to the domains of education and health care, underlines that regulation is at least as important in securing equity in the domain of housing as direct government spending [19].

5.5 Provision of mobility

Mobility cannot even be considered a ‘pillar’ of modern welfare states. States do spend a substantial share of their budget on transport infrastructure and services, but the extent and direction of this spending is typically based on notions of economic efficiency rather than considerations of welfare and equity. Furthermore, private expenditures take up a large share of total spending, notably through the purchase of vehicles and fuel. Most households are able to buy both commodities, as well as afford the taxes that are used to finance, maintain and operate public infrastructures, from their incomes.

Yet, as we have shown in the first part of this paper, it is clear that a small, but certainly not insignificant, share of households will experience problems in purchasing an adequate level of car-based mobility and accessibility. Their problems are to some extent mitigated through the provision of transport services via public expenditures. Governments typically spend public budgets on creating, maintaining and operating walking and cycling infrastructures, public transport services, and on-demand mobility services (for instance for the elderly and for persons experiencing travel-related impairments). While these infrastructures and services are typically (heavily) subsidized in the sense that the full costs of provision are not born directly by the users, their provision and continued operation is often subject to considerations of economic efficiency, at best in addition to considerations of welfare. Considerations of welfare and equity, in turn, have been poorly specified in the domain of transport, which makes the sector stand out vis-à-vis the other policy domains discussed above. Martens and Lucas argue that much of the public subsidies are best seen as some form of charity or benevolence, rather than a matter of justice ([45]). Equity principles empower (potential) recipients and in particular weak population groups vis-à-vis state institutions. In contrast, when public subsidies are distributed as a matter of charity, the power remains in the hands of the benefactor, i.e. the government, who can give, withhold or withdraw subsidies as it sees fit. Hence our conclusion that the domain of transport cannot (yet) be seen as a pillar of welfare states.

5.6 Intermediate conclusion

The overview provided above leads us to draw a distinction between health care and education on the one hand, and housing and mobility on the other.

Health care and education have in common that a large share of the population is unable to obtain an adequate level of each of these services from their regular income. Against this background, there is broad agreement in most developed countries that governments have a key role to play in the guaranteeing the delivery of these goods. The underlying equity principles are typically egalitarian in nature: they guarantee equal entrance and service delivery rights for all households. Typically, too, households who want to obtain a better quality of delivery than the level-of-service guaranteed to all households, may purchase additional services from their own incomes. In some countries the creation of such “pro-rich” systems is discouraged, because concerns about the development of two-tier service levels and to loss of solidarity.

The domain of housing and mobility have in common that the vast majority of the population is able to purchase an adequate level of these services from their regular income. Moreover, this share of the population has been steadily increasing over the past decades and the general expectation is that most households will continue to be able to obtain ample housing and mobility services via the market. At the same time, a small but significant minority of households has not been, and will not be able, to fulfill their housing and mobility needs via the market. It could thus be argued that the ‘equity challenge’ is comparable in the domains of housing and mobility. Yet, the role of governments in both domains is fundamentally different. Government intervention in the domain of housing is firmly based on equity principles, which are often even enshrined in a country’s constitution. In contrast, while government involvement in the domain of transport is vast in all developed countries around the world, interventions with a concern for welfare are a form of charity rather than a form of equity.

The exceptional position of the transport domain is especially noteworthy, if one realizes that delivery of equity in each of the other domains depends on adequate transport services. Access to education and health care depends not only on regulations, institutions and subsidies, but also on physical access to schools and universities, to health clinics and hospitals. Likewise, and as acknowledged in various international treaties, adequate housing incorporates the notion of location and accessibility (see below). Thus, it could be argued that the ideal of the welfare state remains ‘incomplete’, as long as this ideal does not address the physical access to the goods it seeks to deliver to its citizens.

Given the comparable ‘equity challenge’ in the domain of housing and transport, we will now explore the equity principles that give direction to government’s involvement in the housing sector in more detail, in order to explore possible principle for the domain of transport.

6 Equity principles for transport: Drawing lessons from the housing sector

As argued above, the provision of housing and mobility have elements in common. In both domains the market plays an important role in the provision of commodities and services (broadly conceived), which contrasts with the domains of health care and education. However, substantial differences exists between housing and mobility in terms of the organization of the provision, the guiding principles, and the actual government policies. In what follows, we describe in more detail the equity principles of housing provision in Western societies and subsequently draw possible parallels for the domain of transport.

6.1 Equitable provision of housing

The importance of the provision of housing is underscored by the Universal Declaration of Human Rights. Article 25 lid 1 reads: “Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control” [66]. The International Covenant on Economic, Social and Cultural Rights contains a comparable formulation but adds that “(...) State Parties will take appropriate steps to ensure the realization of this right (...)” ([65], Article 11). The latter declaration thus underscores that governments have responsibility for safeguarding the right to adequate housing. And adequate housing means not simply shelter but “...rather it should be seen as the right to live somewhere in security, peace, and dignity” ([11], Article 7). Furthermore, “state parties should establish housing subsidies for those unable to obtain affordable housing, as well as forms of housing finance which adequately reflect housing needs” (ibid., Article 8c). This means that accessible and adequate housing should be provided to persons who cannot secure housing on the market [49]. A recent study found that over hundred countries have codified the right to housing in their respective constitutions [52].

Adequate housing is thus seen as a human right, a right mirrored by a government responsibility regarding provision, especially to the most disadvantaged and vulnerable groups. But what is “adequate housing” in practice? Here, governments start to diverge, as there is no international agreement on the standards for adequate housing, beyond the general statement that “adequate shelter means (...) adequate privacy, adequate space, adequate security, adequate lightning and ventilation, adequate basic infrastructure and adequate location with regard to work and basic facilities, all at reasonable cost” ([11], Article 7).

The explicit acknowledgement of housing as a basic right is part-and-parcel of welfare states. Yet, Harloe [21] observed nearly two decades ago that “housing is the least decommodified and the most market-determined of the conventionally accepted constituents of welfare states” ([21], p.2). This observation holds even more today, as an increasing share of housing provision is organized via the market. Moreover, while the cost of decommodified housing, mostly called social rent housing sector, is typically heavily regulated by governments, these costs are still to a large extent charged to consumers (certainly a far larger share than the private payments for health care and education). There may be a number of reasons for this, such as the situation that costs of housing (and, indeed, mobility) occur throughout a person’s life, while costs for education only occur during a part of a person’s life (typically when raising children), while health expenses are unpredictable and often also unpredictably high. And there is a more paternalistic argument: if people are charged (even a bit) for health care or education, they may consume too little of it. This risk is smaller in case of housing, given the immediate benefits people obtain from housing.

6.2 Equitable provision in the domain of transport

What kind of equity principles for the provision of transport could be derived from the principles guiding the provision of housing? This question was posed in a Dutch study which will be followed here [70].

First, the strong formal basis of rights in the domain of housing suggests that comparable rights would have to be established in the domain of transport. Depending on the conceptualization of the domain [40], this would imply the codification of the right to mobility or accessibility as a basic human right. Currently, neither mobility nor accessibility is explicitly mentioned in any of the declarations on human rights. Yet, interestingly, the ‘right’ to accessibility is implicitly mentioned in the right to housing where it reads that “adequate shelter means (...) adequate location with regard to work and basic facilities, all at reasonable cost” ([11], Article 7). Clearly, “adequate location” can be understood in a broad sense to include both the actual geographical location within an urban area and the connectivity to key destinations provided by the transport system. This implicit acknowledgement of the importance of accessibility for human’s quality of life is in line with the literature on transport-related social exclusion, and suggests that accessibility could, and perhaps should, be addressed more explicitly in the universal declaration of human rights (see [42, 43] for an extensive argument).

Secondly, what could be defined as “adequate transport”, “adequate mobility”, “adequate accessibility” or an “adequate location”? Here, the literature on transport-related social exclusion could provide some directions. Adequate accessibility could be defined as allowing persons to reach a range of

activities, including education, employment, health care, leisure facilities, and family members and friends, within reasonable time and against reasonable costs. The trip itself should also live up to reasonable standards, in terms of (social and traffic) safety, hygiene, comfort. Travel cost should not exceed a reasonable part of a household’s budget. In line with the general approach to housing, such a definition still does not determine the exact standards, but leaves this decision to the process of democratic decision-making in each country.

Third, in parallel to housing, the provision of accessibility may consist of a market-led part and a ‘social’ part. Like in many of the models of housing provision, the former would be financed in full through user fees, in line with the self-financing theorem proposed in the economic literature on (toll) roads [48, 69]. Like in the housing sector, the ‘social’ part of the mobility sector would provide an alternative service for persons not able to purchase adequate levels of mobility and accessibility in the market. Like in the housing sector, these persons would possibly receive a lower quality (perhaps in terms of comfort or speed), but would be offered it at a reduced price, possibly through a combination of supply-side and demand-side subsidies. This model of provision would thus guarantee an adequate level of accessibility, while limiting direct government expenditure on transport, in analogy to the model dominant in the housing sector.

This model resembles the form of government involvement in the transport domain currently seen in many developed countries, in which road transport largely pays for its direct costs in most countries (but rarely for its indirect, external, costs), but public transport services are almost always (heavily) subsidized and walking and cycling infrastructure is delivered for free to end-users. However, the model proposed here differs in two fundamental ways from this familiar arrangement.

First, the model would require the introduction of a user-pays principle for the ‘strong’ segments of society. This is a deviation from current practice, where users typically pay only part of the direct costs related to their trips. Indeed, as has been shown in the literature, the transport domain abounds with cross-subsidization between various user groups, such as users of different types of vehicles (diesel, gasoline, electricity), different types of users (private versus commercial, person versus freight transport), and different types of regions (center versus periphery) [27, 54, 62, 71]. Such cross-subsidization is clearly at odds with a market-led approach and a comparison with the housing domain underlines the peculiarity of these financial arrangements. Cross-subsidization would not be ruled out across the board, but would require additional justification, for instance based on considerations of environmental externalities including climate change.

Second, the model would provide a fundamentally different underpinning for the provision and financing of public transport services (or possibly also car ownership support schemes; [6]). These would no longer be seen as a form of

charity, but rather as the means to uphold the formal mobility or accessibility rights of citizens.

These are clearly far-reaching proposals. But if government intervention in the transport domain would indeed be based on this model and the underlying principles, the domain would develop into an additional ‘pillar’ of developed welfare states.

7 Conclusion and discussion

The state-of-the-art on equity and mobility seems to be: a vast amount of empirical studies on the disparities in terms of mobility, potential mobility, and accessibility; an emerging body of literature exploring and developing possible interpretations of the notion of equity in relation to transport; and little public and political debate about the equity underpinnings of transport planning and policies [45].

Our brief discussion of provision in the health care, education and housing sectors shows that defining the provision of a service as a human right generates public and political support. Governments are held accountable by advocacy groups and ultimately the courts to take responsibility to protect human rights and provide the required services. While mobility and accessibility are implicitly mentioned in the Universal Declaration of Human Rights (see above), they are not mentioned explicitly. Clearly, formulating a human right is as much the end of a process of debate, advocacy and decision-making, as its beginning. Yet, the transport domain could clearly benefit if interested parties would actively advocate a human right to (sufficient) mobility or (sufficient) accessibility. The extensive body of literature on transport-related social exclusion could serve as the empirical basis for such a demand (see [36]).

The establishment of a human right always creates duties or responsibilities [18]. In the case of a positive right, like the right to mobility or accessibility, this typically implies a duty on government to provide a service in case persons are not able to guarantee their rights through ‘free’ market transactions. The establishment of a right thus creates a need for budgeting and for a financing system. We argue that part of the budget could be found in redirecting at least some government budgets currently generated through car-related taxes, which are typically reserved primarily for fighting congestion. The general agreement among transport researchers (if not the wider public or decision-makers) that congestion is inevitable unless pricing or rationing mechanisms are introduced [8, 59], underscores that congestion management may better be addressed through various travel demand management strategies (e.g., [22]). Martens [42, 43] goes one step further and calls for the establishment of a mobility insurance scheme, in analogy to (publicly mandated) health insurances schemes seen in most developed countries.

Some countries have already made some steps in the suggested direction. This includes the US, where regulations and

directives based on the Civil Rights Act of 1964 have led to increasing scrutiny of transportation plans and policies from the perspective of justice, although it has by no means resulted in the establishment of a right to mobility or accessibility [34, 38, 45, 46, 56]. The same holds for the short-lived experiment with accessibility planning in the UK. Introduced in 2004, accessibility planning required local authorities to analyze to what extent a range of population groups, such as women, children, younger and older people and low-income households, could access key destinations, such as schools, doctors and food shops, within their vicinity. The authorities were subsequently required to introduce supplementary service provisions where significant gaps in public transport service provision were identified [35]. While certainly a step in the right direction, accessibility planning was framed from the start as an auxiliary policy, complementing ‘business-as-usual’ in the domain of transport. Thus, most of the national transport budget remained reserved for investments in major road schemes and (high speed) rail, with little consideration for the fact that these projects would do little to alleviate the problems of population groups with the most severe transport problems (i.e., people experiencing transport poverty) [45]. Accessibility planning thus did little to move the transport sector away from charity towards justice. The fact that accessibility planning was quickly abandoned after the economic crisis of 2008 only underscores this observation.

The legal framework in Flanders, the Dutch-speaking region in Northern Belgium, perhaps comes closest to what we envision in this paper. Here, the beginnings of a social justice approach to transport can be discerned in the Law on Mobility Policy, adopted in 2001 and again in 2009.² The law formalizes five goals, the second of which reads: “to provide everyone with the opportunity to be mobile (...), with the aim of full participation of everyone in society” (translation by the authors).³ The law thus explicitly underscores that mobility is a prerequisite for activity participation, which is strongly in line with the (theoretical) literature on social justice and transport discussed above. Initially, this second goal was translated into highly detailed guidelines regarding the provision of public transport: bus stops were to be provided so that all houses located in a built-up area would be located within a predefined distance from a bus stop. These guidelines were paralleled by substantial funds to establish new bus stops and provide some basic bus service at each stop. Because of these high ambitions, the law received the nickname ‘Law on Basic Mobility’, even though the law addressed much more than public transport provision.⁴

² In Dutch, the law is called ‘Decreet betreffende het mobiliteitsbeleid’. See for the full text of the law: <https://codex.vlaanderen.be/Portals/Codex/documenten/1017814.html>

³ In Dutch: “iedereen op een selectieve wijze de mogelijkheid bieden zich te verplaatsen, met het oog op de volwaardige deelname van eenieder aan het maatschappelijk leven”.

⁴ In Dutch, the nickname of the law is ‘Decreet Basismobiliteit’.

While the public transport improvements were ambitious in nature, they should be seen first and foremost as a supplement to Flanders' overall transport policy, just as accessibility planning was in the UK. This observation is confirmed by the recent proposals of the Flemish government to abandon the notion of basic mobility, in an effort to reduce expenditures on public transport. The proposed change, however, may also present an opportunity, as the government has suggested to replace the idea of basic mobility by the notion of basic accessibility. This shift in framing must be welcomed from a social justice perspective. Where the notion of 'basic mobility' emphasizes the means ("the opportunity to be mobile"), the notion of basic accessibility stresses the importance of the goal ("full participation of everyone in society"). Whether the Flemish government will indeed establish a 'right' to some basic level of accessibility remains to be seen, but the language of the law certainly pushes the debate in the right direction [45].

These developments are hopeful, but few countries have followed suit. We therefore want to end our paper with a call for action. Most Western societies have well-established policies regarding the fair provision of health care, education and housing for all (income) groups, as we have briefly discussed in this paper. In contrast, decision-makers have not even started to define what fairness in the domain of transport could amount to. Given the importance of mobility in modern societies, we argue that there is an urgent need for societal and policy debates about fairness and for subsequent translation of the outcomes of these debates into adequate principles, standards, and policies for the transport domain.

Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

References

1. Avis J (2007) Education, policy and social justice: learning and skills. Continuum International Publishing, New York
2. Ayers W, Quinn T, Stovall D (2009) Handbook of social justice in education. Taylor & Francis, New York
3. Bamba C (2007) Going beyond the three worlds of welfare capitalism: regime theory and public health research. *J Epidemiol Community Health* 61(12):1098–1102
4. Benenson I, Martens K, Rofé Y, Kwartler A (2011) Public transport versus private car: GIS-based estimation of accessibility applied to the Tel Aviv metropolitan area. *Ann Reg Sci* 47(3):499–515
5. Beyazit E (2011) Evaluating social justice in transport: lessons to be learned from the capability approach. *Transp Reviews Transnational Transdisciplinary J* 31(1):117–134
6. Blumenberg E, Pierce G (2014) A driving factor in mobility? Transportation's role in connecting subsidized housing and employment outcomes in the moving to opportunity (MTO) program. *J Am Plan Assoc* 80(1):52–66
7. Bratt RG, Stone ME, Hartman C (eds) (2006) A right to housing: foundation for a new social agenda. Temple University Press, Philadelphia
8. Buitelaar E, Van der Heijden R, Argioli R (2007) Managing traffic by privatization of road capacity: a property rights approach. *Transp Rev* 27(6):699–713
9. Bureau of Labour Statistics (USA) (2007) Consumer Expenditures. USA, Bureau of Labour Statistics
10. Cain A, Jones P (2007) Does urban road pricing cause hardship to low-income car drivers? An affordability based approach. 87th Annual Meeting of the Transportation Research Board, Washington, DC
11. Committee on Economic Social and Cultural Rights (1991) General Comment 4, The right to adequate housing (Sixth session). *U.N. Doc. E/1992/23, annex III at 114 (1991); Adopted by human rights treaty bodies, U.N. Doc HRI/GEN/1/Rev6 at 18 (2003)*
12. Currie G, Delbosc A (2011) Mobility versus affordability as motivations for car-ownership in urban fringe, low-income Australia. In: Lucas K, Blumenberg E and Weinberger R (eds) *Auto Motives: understanding car use behaviours*. Bingley, Emerald, p 193–208
13. Currie G, Richardson T et al (2009) Investigating links between transport disadvantage, social exclusion and well-being in Melbourne-Preliminary results. *Transp Policy* 16(3):97–105
14. Denier Y (2007) Efficiency, justice and care: philosophical reflections on scarcity in health care. Springer, Dordrecht
15. Esping-Andersen G (1990) The three worlds of welfare capitalism. Princeton University Press, Princeton
16. Fan Y, Huang A (2011) How affordable is transportation? A context-sensitive framework. Center for Transportation Studies, University of Minnesota
17. Follmer R, Gruschwitz D, Jesske B, Quandt S et al (2010) Mobilität in deutschland 2008: Struktur – aufkommen – emissionen – trends. Bundesministerium fuer Verkehr, Bau und Stadtentwicklung, Bonn
18. Griffin J (2008) On human rights. Oxford University Press, Oxford
19. Haffner M, Lennartz C, Dol K (2012) Housing. In: Jonker J-J (ed) Countries compared on public performance: A study of public sector performance in 28 countries. Centraal en Cultureel Planbureau, Den Haag, pp 241–285
20. Hansen WG (1959) How accessibility shapes land use. *J Am Inst Plann* 25:73–76
21. Harloe M (1995) The People's home: social rented housing in Europe and America. Blackwell, Oxford
22. Ison S, Rye T (eds) (2008) The implementation and effectiveness of transport demand management measures. Ashgate, Aldershot
23. Jeekel H (2013) The car dependent society: a European perspective. Ashgate, Farnham
24. Jonker J-J (ed) (2012) Countries compared on public performance: a study of public sector performance in 28 countries. Den Haag, Centraal en Cultureel Planbureau
25. Johnson V (2007) Car ownership and social exclusion in Australia. Paper presented at the CAITR Conference, 5–8 December
26. Kain JF (1968) Housing segregation, negro employment, and metropolitan decentralization. *Q J Econ* 82(2):175–197
27. Kastrouni, E., K. Gkritza, S.L. Hallmark and W.R. Stephenson (2015) Fuel tax versus vehicle-miles-traveled fee: identifying vulnerable households by three-stage least squares analysis. *Transp Res Rec J Transp Res Board* (2531): 161–169
28. Kemeny J (1995) From public housing to the social market: rental policy strategies in comparative perspective. Routledge, London
29. Kenyon S, Lyons G, Rafferty J (2002) Transport and social exclusion: investigating the possibility of promoting inclusion through virtual mobility. *J Transp Geogr* 10(3):207–219

30. Law R (1999) Beyond 'women and transport': towards new geographies of gender and daily mobility. *Prog Hum Geogr* 23(4):567–588
31. Levine J, Greng J et al (2012) Does accessibility require density or speed? A comparison of fast versus close in getting where you want to go in US Metropolitan Regions. *J Am Plan Assoc* 78(2):157–172
32. Levitas R (1998) *The inclusive society? Social exclusion and new labour*. MacMillan Press, Hampshire
33. Litman T (2015) *Transportation affordability: evaluation and improvement strategies*. Victoria Transport Policy Institute, Victoria
34. Lowe K (2014) Bypassing equity? Transit investment and regional transportation planning. *J Plan Educ Res* 34(1):30–44
35. Lucas K (2012a) A critical assessment of accessibility planning for social inclusion. In: Geurs KT, Krizek KJ, Reggiani A (eds) *Accessibility analysis and transport planning: challenges for Europe and North America*. Edward Elgar, Cheltenham, p 228
36. Lucas K (2012b) Transport and social exclusion: where are we now? *Transp Policy* 20:105–113
37. Lucas K, Mattioli E et al (2016) Transport poverty and its adverse sociale consequences. *Proceedings of the Institution of Civil Engineers-Transport*, Thomas Telford (ICE Publishing) 169(6): 353–365
38. Manaugh K, Badami MG, El-Geneidy AM (2015) Integrating social equity into urban transportation planning: a critical evaluation of equity objectives and measures in transportation plans in north america. *Transp Policy* 37:167–176
39. Martens K (2006) Basing transport planning on principles of social justice. *Berkeley Plann J* 19:1–17
40. Martens K (2012) Justice in transport as justice in access: applying Walzer's 'Spheres of Justice' to the transport sector. *Transportation* 39(6):1035–1053
41. Martens K (2015) Accessibility and potential mobility as a guide for policy action. *Transp Res Rec J Transp Res Board* 2499:18–24
42. Martens K (2017a) *Transport justice: designing fair transportation systems*. Routledge, New York
43. Martens K (2017b) Why accessibility measurement is not merely an option, but an absolute necessity. In: Silva C, Bertolini L, Pinto N (eds) *Designing accessibility instruments: lessons on their usability for integrated land use and transport planning practices*. Routledge, New York
44. Martens K, Golub A (2012) A justice-theoretic exploration of accessibility measures. In: Geurs KT, Krizek KJ, Reggiani A (eds) *Accessibility analysis and transport planning: challenges for Europe and North America*. Edward Elgar, Cheltenham
45. Martens K, Lucas K (2017) Perspectives on transport and social justice. In: Craig G (ed) *Handbook on social justice*. Edward Elgar
46. Martens K, Golub A, Robinson G (2011) A fair distribution of transportation benefits: interpreting title VI for transportation investment programs. Paper presented at the 90th annual conference of the Transportation Research Board, 23–27 January 2011, Washington DC, USA
47. Matas A, Raymond J-L, Roig J-L (2009) Car ownership and access to jobs in Spain. *Transp Res A Policy Pract* 43(6):607–617
48. Mohring H, Harwitz M (1962) *Highway benefits: an analytical framework*. Northwestern University Press, Evanston
49. Office of the High Commissioner for Human Rights (1991) *The right to adequate housing*, CESCR General Comment 4
50. Oliver A, Mossialos E (2004) Equity of access to health care: outlining the foundation for action. *J Epidemiol Community Health* 58:665–668
51. Ong PM, Miller D (2005) Spatial and transportation mismatch in Los Angeles. *J Plan Educ Res* 25(1):43–56
52. Oren M, Alterman R, Zilbershatz Y (2014) Housing rights in constitutional legislation: a conceptual classification. In: Kenna P (ed) *Contemporary housing issues in a globalized world*. Ashgate, Farnham
53. Páez A, Scott DM, Morency C (2012) Measuring accessibility: positive and normative implementations of various accessibility indicators. *J Transp Geogr* 25:141–153
54. Rosenbloom S, Altshuler A (1977) Equity issues in urban transportation. *Policy Stud J* 6(1):29–40
55. Sager T (2006) Freedom as mobility: implications of the distinction between actual and potential travelling. *Mobilities* 1(3):465–488
56. Sanchez TW, Wolf JF (2005) *Environmental justice and transportation equity: a review of metropolitan planning organizations*. The Civil Rights Project at Harvard University, Cambridge
57. Sheppard E (1995) Modeling and predicting aggregate flows. In: Hanson S (ed) *The geography of urban transportation*. The Guilford Press, New York, pp 100–128
58. Social Exclusion Unit (2003) *Making the connections: final report on transport and social exclusion*. Retrieved 18 September, 2003, from http://webarchive.nationalarchives.gov.uk/+http://www.cabinetoffice.gov.uk/media/cabinetoffice/social_exclusion_task_force/assets/publications_1997_to_2006/making_transport_2003.pdf
59. Stopher P (2004) Reducing road congestion: a reality check. *Transp Policy* 11(2):117–131
60. Surface Transportation Policy Project (2003) *Transport costs and the American dream: why a lack of transportation choices strains the family budget and hinders home ownership*. Washington, A Special Report from the Surface Transportation Policy Project
61. Szawarski Z, Evans D (Eds) (1993) *Solidarity, justice and health care priorities*
62. Taylor BD, Norton AT (2009) Paying for transportation: What's a fair price? *J Plan Lit* 24(1):22–36
63. Torgersen U (1987) Housing: the wobbly pillar under the welfare state. *Scandinavian Hous Plann Res* 4(sup1):116–126
64. United Nations (1948) *Universal declaration of human rights*. U. Nations. Linkoping, Sweden
65. United Nations (1966) *International covenant on economic, social and cultural rights*. U. Nations, Washington
66. United Nations (1983) *Treaty series: treaties and international agreements registered or filed and recorded with the secretariat of the United Nations*, New York
67. Urry J (2004) The "system" of automobility. *Theory, Culture & Society* 21(4–5):25–39
68. Van Wee B (2011) *Transport and ethics: ethics and the evaluation of transport policies and projects*. Edward Elgar, Cheltenham
69. Verhoef ET, Mohring H (2009) Self-financing roads. *Int J Sustain Transp* 3(5–6):293–311
70. Vonk K (2014) *Eerlijke financiering van mobiliteit en rechtvaardigheidsprincipes in volkshuisvesting*. Radboud University, B.Sc
71. Wachs M (2003) *Improving efficiency and equity in transportation finance*. The Brookings Institution, Washington DC