11. A justice-theoretic exploration of accessibility measures

Karel Martens and Aaron Golub

11.1 INTRODUCTION

As the various problems posed by mobility planning have increased in severity, interest in accessibility planning in both academia and practice has grown (Department for Transport, 2004; Lucas, 2006; Curtis and Scheurer, 2010). The call for a shift towards accessibility planning inevitably implies the need to develop and apply adequate accessibility indicators to assess the performance of transport systems and, increasingly, of integrated land-use and transport interventions. Alongside regional issues, accessibility measures can generate insight into the level of accessibility for specific user groups, whether by geographical location, mode availability, income, race, or travel motive (work, leisure, business, freight). As a consequence, accessibility measures can be used to address the distributive question in transport: who reaps the accessibility benefits from investments in the transport system?

The choice of accessibility measures, however, may affect the result of a distributive investigation. Different measures may highlight different distributive patterns and hence point to the need for different policy responses. We argue, therefore, that the choice of accessibility measures employed to address distributive questions should be based on a clear understanding of the distributive question in transport. An exercise into understanding and developing a justice-theoretic approach to transport arguably requires three steps. Firstly, one must define the focus or dimension of an equity analysis in the field of transport (that is, what should be distributed in a fair way?). In the philosophical literature on social justice this central dimension of comparison is termed the ‘equalizandum’. Secondly, there is a need to derive a proper distributive goal regarding the equalizandum identified in the first step (that is, to answer the question: what constitutes a fair distribution of the equalizandum?). Finally, it is necessary to define measures that can be employed to determine progress towards the distributive goal identified in the second step. In this chapter,
we perform step one: we explore what should be the focus of an equity analysis in transport. This will provide the first coordinates regarding the types of accessibility measures to be used in equity analyses of transport policies.

This chapter is organized as follows. Section 11.2 provides a brief background to the problem of equity and accessibility measures. We highlight three egalitarian approaches to equity: equality of welfare, equality of resources and equality of ‘midfare’. Each is subsequently discussed in separate sections 11.3, 11.4 and 11.5. In section 11.6, we link these approaches to existing accessibility measures. We eliminate a number of measures which, based on the philosophical arguments presented in the chapter, are considered unsuitable as an equalizandum for equity analyses in the field of transport. We end with a brief conclusion and call for additional, philosophically inspired research into the relationship between transport, equity and accessibility measures.

11.2 THE CONTEXT

Transport is a field of government intervention in which considerations of justice traditionally play only a rather marginal role (Martens, 2012). Yet, transport is of key importance for citizens as it enables people to participate in a range of activities crucial for well-being and full-fledged citizenship, such as employment, education or leisure activities. The rapidly growing body of literature on transport-related social exclusion demonstrates that the distributive question cannot be ignored in the transport field (e.g., Lucas, 2006). As mentioned in the introduction, an explicit engagement with issues of justice, in our view, raises three basic questions. In this chapter, we focus on the first of these questions: what should be the focus of an equity analysis in the field of transport?

We aim to answer this question by drawing on the long-standing debate in the social justice literature on the difference between equality of welfare and equality of resources. We will briefly outline both positions and translate them to the distributive question in the field of transport, primarily based on the work of Dworkin (1981a, 1981b) (sections 11.3 and 11.4 below). We will then distinguish a third position, later developed, which can be described as equality of midfare (Cohen, 1989) (section 11.5 below). Subsequently, we will compare the three approaches and argue for a best option. This will result in reflections on, and recommendations regarding, the type of access measures to be used in future equity studies.

Note that while we use the terms ‘equality of welfare’ and ‘equality of resources’ this by no means implies that we uphold that equality should be
the distributive yardstick to be applied in the transport sector. As Cohen (1989) points out, a difference can be made between a strong and a weak equality argument. The strong argument claims that people should be as equal as possible in the dimension (for example welfare or resources) it specifies. The weak argument claims that people should be as equal as possible in some dimension, but subject to whatever limitations need to be imposed in deference of other values. For example, where income is the equalizandum, proponents of the strong version would argue that incomes should be as equal as reasonably possible. Proponents of the weak equality argument, in contrast, might argue that differences in income are acceptable if they result in a prospering economy and in this way in a better situation for all, including the lowest income group (compare Rawls’s theory of justice; Rawls, 1971).

Note that, as we have argued elsewhere, the de facto impossibility of equality in the field of transport might be an additional reason to opt for a weak equality claim (Martens, 2012; see also Lucy, 1981). That is, a choice for a particular equity dimension or equalizandum implies at least a weak call for equality in that dimension, subject to possible limitations. In practice, this may mean that a distributive yardstick different from the principle of equality is called for.

11.3 EQUALITY OF WELFARE

Dworkin (1981a) distinguishes between two main groups of conceptions of welfare. The first group he calls success theories of welfare. Authors who adhere to this conception suppose that a person’s welfare is a matter of their success in fulfilling their preferences, goals and ambitions. The second class of theories of welfare Dworkin calls conscious state theories. These theories focus on some aspect or quality of people’s conscious life, for example pleasure or pain, as used by the early utilitarians like Bentham and Mill (see Rosen, 2003). Dworkin uses the more general terms ‘enjoyment’ and ‘dissatisfaction’ that encompass the full range of desirable and undesirable conscious states or emotions that a person might obtain. In the former case, a person’s welfare increases as more of their preferences, or their stronger preferences, are fulfilled; in the second case, their welfare increases as they get more enjoyment. Here we will consider both as largely comparable, although there are clear differences between the two readings.

Proponents of equality of welfare call for a redistribution of goods in such a way that welfare, however conceptualized, is equalized. More precisely, the equality of welfare approach holds that a distributional scheme treats people as equals when it distributes or transfers resources among
them until no further transfer would leave them more equal in welfare. Thus resources are being distributed (they are the ‘object’ of government intervention), but welfare levels determine how the resources are distributed.

Translated to transport, a focus on welfare implies a focus on the ‘satisfaction’ people derive from their travel. Two possible interpretations seem possible here: it may relate to travel per se, that is, the trip itself; or it may concern the pleasure derived from combined travel and activity participation. Note that in both cases, the welfare approach implies that the prime focus should be on actual travel or on the combination of actual travel and actual activity participation, as a person will derive most of their welfare from their actual behaviour (although some welfare may be derived from potentialities (that is, the ability to travel), in line with the economic concepts of option value and non-use value (e.g., Roson, 2001; Laird et al., 2009). The former interpretation seems at odds with the general understanding of travel as a burden, a disutility or a derived demand; our starting point would therefore be to focus on the pleasure a person derives from the combination of travel and activity participation.

In the literature, two main objections are formulated against equality of welfare: the argument of offensive tastes and the argument of expensive tastes. The first criticism is that the satisfaction a person may take in discriminating against other people or in subjecting others to a lesser liberty should not count equally with other satisfactions in the calculus of justice. Translated to transport, it could be argued that the welfare that persons derive from making somebody else’s trip less attractive, for example a car driver enjoying speeding in part because of the danger they create for other travellers, should not be accounted for in the welfare calculus. This objection is generally believed to defeat equality of welfare as an attractive equity goal, but an easy way out has also been formulated: rather than calling for equality of welfare as such, a welfare egalitarian can now simply shift to a call for equality of ‘inoffensive’ welfare (Cohen, 1989).

The second criticism concerns the expensive tastes argument. That argument goes as follows. ‘Imagine two persons, one satisfied with a diet of milk, bread and beans, while the other is distraught without expensive wines and exotic dishes. In short, one has expensive tastes and the other does not’ (Cohen, 1989, p. 913). A welfare egalitarian must provide both persons with a sufficient set of resources so that each can achieve the same level of satisfaction. This implies, ceteris paribus, that the person with expensive tastes will have to be provided with more resources than the modest person for them to be equally happy. For Rawls, this conclusion is unacceptable from the perspective of justice. He upholds that, as moral persons, citizens have some part in forming and cultivating their final ends.
and preferences. To argue in favour of equality of welfare seems to presuppose that citizens’ preferences are beyond their control as propensities or cravings which simply happen, that citizens are passive carriers of desire (Cohen, 1989). In contrast, Rawls argues that citizens have the capacities to assume responsibilities for their goals in life. Comparable arguments have been made by others, such as Arrow. Cohen (1989) concludes that the expensive tastes objection defeats welfare egalitarianism. In other words, the argument suggests that justice should not focus on equality in terms of persons’ welfare.

To what extent can this argument be transposed to the field of transport? As suggested above, a focus on welfare implies a focus on the pleasure a person derives from the combination of travel and activity participation. Now, if we would follow the welfarist approach, equity would occur if each and every person derives the same level of pleasure from the combination of travel and activity participation. In line with the expensive tastes argument, this seems to lead to perverse results. Imagine two persons with identical activity patterns. Now, two situations could occur, in line with the expensive tastes argument. In one case, one person derives a lot of pleasure from activity participation, the other only little. Applying the welfarist approach in this case would suggest providing the latter with a high-quality transport service so that the disutility (‘negative pleasure’) from travel is low, in order to compensate them for the low level of pleasure derived from activity participation.

In the other case, the two persons differ in terms of the disutility they derive from an identical trip (for example, they ascribe a different disutility to the time involved in trip making). In that case, the person with the highest disutility from travelling should be provided with the best transport service, in order to guarantee equality of welfare (see Martens and Hurvitz, 2011). As in the case of the expensive tastes, both scenarios abstract from citizens’ capacity to assume responsibility for their preferences. Furthermore, as in the general argument presented above, the application of the welfare approach to the distribution in the transport sector results in conclusions which run counter to an intuitive understanding of equity.

Sen (1980) adds another argument. He argues that welfare or utility is an unsuitable guide to policy, if only because a person may adjust their expectations to their condition. The fact that a person has learned to live under harsh conditions, and to smile courageously in the face of it, should not nullify their claim to a better life (Cohen, 1993). Translated to transport, that a person has learned to deal with the fact, for example, that they are not able to drive a car and have learned how to get around with a much slower transit system should not nullify their claim for a better system.
Note that other arguments against the welfare approach have been put forward by Dworkin and Scanlon (Cohen, 1993).

Taken together, the arguments above suggest that the equity analysis of transport should not focus on the welfare that people derive from either actual travel or the combination of actual travel and actual activity participation. Thus, transport-related equity analyses should not focus on the welfare levels that persons derive from travel or combined travel and activity participation.

11.4 EQUALITY OF RESOURCES

Based on the arguments provided above, both Rawls and Dworkin dismiss welfare as the key equalizandum, or central dimension of comparison, of a theory of justice (see also Denier, 2007). Rawls argues in favour of the difference principle, that is, inequality in the division of primary goods is only acceptable if it works to the benefit of the worst-off economic class (a weak equality claim regarding resources). Dworkin, in contrast, argues in favour of equality of resources (a strong, or stronger, equality claim). Here, we will take a closer look at Dworkin’s theory, as we believe it can help in determining the type of accessibility measure to be used in transport-related equity analyses.

Dworkin proposes resources rather than welfare as the proper equalizandum. He conceptualizes resources as the sum of material resources and mental and physical capabilities. He argues that people should enter economic activity with equal initial resources (Dworkin, 1981b). He develops a complex argument stating that people should be compensated for deficiencies in these resources. Where most philosophers of social justice juxtapose equity and free market exchange, Dworkin argues that the idea of an economic market, as a device for setting prices for a variety of goods and services, must be at the centre of any feasible theoretical development of equality of resources. As Denier (2007) argues, this point is most clearly shown by his example of the ambition-sensitive auction.

Dworkin proposes an imaginary auction as a model whereby equality of resources might be achieved. He starts with an imaginative society in which all resources are up for sale. He further assumes that each member of that society has an equal amount of some form of currency – 100 clamshells in his example – and uses the clamshells to bid for those resources that best suit their life plan. Since each person has equal ‘wealth’, each person plays an equal role in determining the bundle of resources that will be chosen. Therefore, if the auction is properly executed, no one will envy another person’s set of purchases after the auction, because they could
have bid for that bundle of goods, rather than the goods they bid for. Dworkin calls this the envy test: ‘no division of recourses is an equal division if, once the division is complete, any [person] would prefer someone else’s bundle of resources to his own bundle’ (Dworkin, 1981a, p. 217).

Now, Dworkin recognizes that not all are born equal. Some may have disabilities, while others are very talented. These differences will shape the benefit a person may derive from a set of purchased resources. Dworkin develops the concept of the hypothetical insurance scheme as a way to solve these differences. Again, he presents an imaginative society in which each person is given an equal share of some currency. Furthermore, he argues, let us assume that everyone has the same risk of developing physical or mental disability in the future. Subsequently, each person is asked how much they are willing to spend on insurance for the natural disadvantages one may suffer, in addition to the purchase of the other resources up for sale in the auction. How much coverage would the average person of the community purchase? Dworkin argues that this question would provide a workable baseline from which to work out a premium. This will be so, even though particular persons differ in the risks they are willing to take and the insurance premiums they would be prepared to pay. People would, Dworkin argues, make roughly the same assessment of the value of insurance against disabilities such as blindness or loss of limbs, as is currently the case in at least part of the actual insurance market. On average, for instance, people might be willing to spend 10 per cent of their income. Consequently, we could compensate those who develop disabilities accordingly, out of some fund collected by income taxation or other compulsory insurance with a fixed premium.

What is the relation with transport? Firstly, if equality of resources is taken as the starting point, it implies that only the distribution of transport-related resources deserves attention. That is, we should not focus on the welfare a person derives from travel and activity participation, but solely on the resources that assist people to travel in order to participate in activities. The resource approach thus implies a focus on mobility or, better perhaps, potential mobility: the ease with which a person can move through space (Martens, 2012). Secondly, Dworkin’s approach would only compensate for particularities of the person, such as disabilities which are typically important in the case of transport. That is, the resource approach suggests looking only at a person’s ability to travel through space, rather than at the access that is actually provided by that travel.

The resource approach has been criticized strongly by Sen (2011 [1980]). While his original argument focused on Rawls’s primary goods, much of the argument can be extended to the resource approach more basically. Sen’s argument is simple but powerful. He argues that differently
constructed and situated people require different amounts of resources to satisfy the same needs. Therefore, it is overly cumbersome to focus on equality of resources when it is often disconnected to its actual meaning for satisfaction of needs. It is a ‘fetishist handicap’ to be concerned with goods or resources as such, rather than to concentrate on what goods ‘do to human beings’ (Sen, 2011 [1980], p. 218). Or, as Sen expressed it later:

-what people get out of goods depends on a variety of factors, and judging personal advantage just by the size of personal ownership of goods and services can be very misleading . . . It seems reasonable to move away from a focus on goods as such to what goods do to human beings. (Sen, 1982 in Cohen, 1993, p. 16)

This argument could also be translated to the distribution in the field of transport. If the focus is merely on a person’s ability to travel through space, then what this ability can do to a person is ignored. Potential mobility, for instance defined in terms of the speed with which one can travel through space, does not provide insight into the possibility of a person to translate the resource into something useful; in Sen’s terms this would be capability, in transport terms it would be activity participation.

The critique to the resource approach is thus twofold. In relation to a pure resource approach, such as that proposed by Rawls, it is argued that a resource approach does not take into account the differences between the recipients of those resources. This relates to disabilities, but goes further than that. For instance, Sen gives as an example a pregnant woman who is in need of more nutrition than would normally be the case. The second critique relates to the fact that resources say little about what a person can do with those resources given the circumstances in which they finds themself. This critique relates to the circumstances outside the individual, and may include the particular spatial setting of the person. While hardly explicitly addressed in the philosophical literature, this latter objection is of key importance for the distributive question in the field of transport, as circumstances outside the person’s control determine to a large extent what a person can do with a particular level of potential mobility.

Based on the above argument, it may be concluded that the resource approach is also insufficient as a guide for addressing equity concerns in the field of transport.

### 11.5 EQUALITY OF ‘MIDFARE’

Cohen (1993) develops a third position in the debate between equality of resources and equality of welfare based on Sen’s capabilities approach.
He notes that the major contribution of Sen to the debate is to define an equalizandum that lies between resources and welfare, between (primary) goods and utility. However, he argues that Sen’s conceptualization of capabilities was imprecise. Rather than capabilities, he introduces the term ‘midfare’, because it falls midway between goods and utility. Midfare ‘is constituted of states of persons produced by goods [or resources], states in virtue of which utility levels take the values they do. It is “posterior” to “having goods” and “prior” to “having utility’” (Cohen, 1993). The concept of midfare includes capabilities as coined by Sen, but is broader. It is a heterogeneous set:

because goods do categorically various things for people: (1) they endow them with capabilities . . . which they may or may not use; (2) through people’s exercise of those capabilities, goods contribute to the performance of valuable activities and the achievement of desirable states; and (3) goods cause further desirable states directly, without any exercise of capability on the part of their beneficiary: an example would be the goods which destroy the insects that cause malaria’. (Cohen, 1993, p. 19)

Cohen distinguishes the last category to emphasize that capabilities are only a part, albeit an important one, of midfare and that some goods can provide welfare without giving a person a certain capability.

The concept of midfare emphasizes that, in the enterprise of assessing a person’s well-being, we must look at their condition in abstraction from its utility for them. For example, in the case of food, we should look at the nutrition level obtained by a particular person and not at the food supply (as the resource approach suggests), nor at the utility a person gets out of eating food (as the welfare approach argues). A person’s utility level is only evidence of a person’s well-being, and the goods at their disposal are only causes of that well-being.

There are two powerful motivations for focusing on something between resources or utilities in a comprehensive characterization of a person’s well-being: (1) possessions of goods and enjoyment or utility are not the only actual states that matter; and (2) it is not only actual states, but the range of states the agent could attain, that matter (Cohen, 1993). The latter contrasts with the welfare approach, the former with both the resource and welfare approach.

The concept of midfare can also be translated to transport, although it is by no means a simple exercise. A broad set of circumstances shape a person’s ability to turn goods or resources into capabilities or welfare. More than in the case of food, a wide set of factors can be distinguished that determine the ‘level of nutrition’ a person can derive from a particular level of transport resources or potential mobility. Note that welfare is
ultimately related to activity participation; midfare can thus be defined as the extent to which a person is able to translate transport resources into the possibility to participate in activities. As it is a ‘matching’ between the person and the activity being accessed, at least two factors determine this ability:

- Land use patterns. The ability of a person to translate a transport resource (defined as potential mobility, or the speed at which a person can travel given mode availability and the transport network) into a capability depends first and foremost on the spatial distribution of various types of land uses and how they correspond to the needs of the person in question. Here, we enter into questions of the types and affordability of the services and the types of jobs available at different locations.

- Personal circumstances. The ability to turn a resource into a capability also depends on personal circumstances, among which are financial means, education and skill level, caring obligations (for example children) and long-term commitments (notably job obligations or life-phase, which shape the ability to participate in certain types of activities).

Possibly, other factors need to be taken into account when assessing a person’s well-being based on midfare. What is clear is that we need to address the particular needs and spatial contexts of the communities if we are carrying out an equity analysis in the field of transport using midfare as the equalizandum.

11.6 INTERPRETATION FOR ACCESSIBILITY MEASURES

Above, we have distinguished three egalitarian approaches, each with a different equalizandum: equality of welfare, equality of resources and equality of midfare. Each approach calls for a different way to compare a person’s situation vis-à-vis others and thus implicates a certain type of equity analysis. Table 11.1 briefly summarizes the different positions. Translated to transport, they also imply the use of different types of accessibility measures.

In line with the resource–midfare–welfare sequence distinguished by Cohen (1993), it is now possible to position a number of widely used access or accessibility measures. We have attempted to do so in Figure 11.1, based on the accessibility measures distinguished by, among others,
Table 11.1 Focus of different egalitarian or equity approaches and application to food

<table>
<thead>
<tr>
<th>Author</th>
<th>Equalizandum</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rawls</td>
<td>Goods</td>
<td>Amount of food received</td>
</tr>
<tr>
<td>Dworkin</td>
<td>Resources</td>
<td>Amount of food received, corrected for disabilities</td>
</tr>
<tr>
<td>Cohen</td>
<td>Midfare</td>
<td>Nutrition level acquired from food matched to nutritional needs of person</td>
</tr>
<tr>
<td>Sen</td>
<td>Capability</td>
<td>Health from diet which allows for important activities</td>
</tr>
<tr>
<td>Bentham/Mill</td>
<td>Welfare/utility</td>
<td>Preference satisfaction or enjoyment (utility) derived from eating</td>
</tr>
</tbody>
</table>

**Resources**  

- infrastructure-based measures  
- distance measures  

<table>
<thead>
<tr>
<th>Midfare</th>
<th>doubly constrained accessibility measure</th>
<th>space–time measures based on actual behaviour</th>
</tr>
</thead>
</table>

**Welfare**  

- utility-based measures

Figure 11.1 Position of various accessibility measures in the resource–midfare–welfare sequence

Handy and Niemeier (1997), Geurs and Ritsema van Eck (2001) and Geurs and van Wee (2004) (Figure 11.1).

Two types of access or accessibility measures can be distinguished that are clearly in line with the resource approach to equity: infrastructure-based measures and distance measures. The first focuses on travel speed or level of service provided by a transport system. While it tends to be applied...
at the level of transport networks, this measure could easily be used to compare the resource levels between individuals, groups, or neighbourhoods. The second measure is defined as the travel distance or travel time between an origin and a specific destination, for example, between a person’s home and a hospital, a school or a public park. Both these measures ignore the large differences between persons and their circumstances, even if transport modalities are taken into account.

A range of accessibility measures can be linked to the midfare approach, including cumulative opportunities measures and gravity-based measures, doubly constrained accessibility measures, and some types of space–time measures. The first two measures are closely related. The cumulative opportunities measure indicates the total number of opportunities that can be reached within a given travel time or travel distance. Gravity-based measures also focus on opportunities, but use a distance impedance function rather than a fixed travel time or distance to calculate accessibility. Both measures only address a limited part of what could constitute a midfare approach, as they only account for two particular circumstances of persons: mode availability and spatial distribution of destinations. Note that the former is not always taken into account as it depends on the particular specification of the measure. This is important, because from a midfare perspective, a distinction by transport mode (or set of transport modes, depending on a person’s abilities, for example walking, cycling and transit; walking and transit; or car driving only) is of crucial importance, as persons and households differ substantially in mode availability.

The doubly constrained accessibility measure is derived from spatial interaction models using balancing factors (Geurs and Ritsema van Eck, 2001). In line with these models, the measure accounts for job-seekers’ competition for jobs and employers’ competition for job-seekers. The doubly constrained measure more fully captures the midfare approach than the cumulative opportunities and gravity-based measures, as it takes into account the probability of a person to translate a resource (accessible job opportunities) into welfare (an actual job). However, doubly constrained measures typically do not take into account personal travel mode availability, although this could relatively easily be added. Furthermore, applications of the doubly constrained measures often do not match the skills of workers to the characteristics of jobs, while the midfare approach suggests that this, too, is an important element in the assessment of accessibility. More important is the fact that the measure does not account for the space–time constraints that may inhibit a particular person from engaging in a particular activity. Note that this discussion also suggests that cumulative opportunities and gravity-based measures are still
relatively close to a resource-approach to accessibility, albeit a resource of a different kind than that captured by the transport network.

Space–time measures do take into account personal circumstances that may influence a person’s ability to turn a resource into a capability or welfare, most notably persons’ limitations following from non-discretionary, fixed activities and from coupling constraints related to life in a multi-person household. Although many space–time accessibility measures relate to actual travel behaviour (see below), some relate to travel and activity participation as a potential, that is, they do not focus on actual, realized travel, but on the possibilities for travel and activity participation given the time–space constraints of a person (e.g., Kwan, 1998). Such measures take home location and non-discretionary activities as given and subsequently calculate the feasible opportunity set of a person. That is, they assess to what extent a person can turn resources (the transport system and the spatial distribution of opportunities) into a capability or welfare, given personal limitations. However, as these measures consider certain activities to be fixed (most notably the workplace), they do not capture an important dimension of accessibility to opportunities, that is, job accessibility.

Finally, two types of measures can be distinguished that belong to a welfare approach to equity, as both relate to actual travel behaviour rather than to opportunities. The first type consists of utility-based accessibility measures, which interpret accessibility as the outcome of a set of transport choices. In line with the welfare approach to equity, the utility-based approach asserts that accessibility should be measured at the individual level and that the computation of accessibility should account for users’ characteristics (for example income) in addition to characteristics of the transport system (for example travel speed and costs) (Geurs and Ritsma van Eck, 2001). Accessibility is subsequently defined as the set of activities and transport choices that maximizes a person’s utility (see, for an excellent example, Dong et al., 2006). The second type consists of space–time measures that apply a utility-based approach. These measures estimate the maximum utility that can be derived from participating in a particular activity set, given a person’s space–time constraints (e.g. Burns, 1979). Like the utility-based approach, the focus is on identifying an optimal set and the utility that is derived from carrying out that set, rather than on defining a feasible opportunity set as is the case for the space–time measures discussed above.

The above discussion reveals several important conclusions regarding access measures to reflect midfare as our desired equalizandum. Firstly, we can dismiss all access measures that focus on the actual travel behaviour of individuals. From a perspective of equity, not actual travel behaviour but
possible behaviours are what count in comparing individuals. This relates to the idea of ‘freedom’ motivating Sen’s work (Cohen, 1993). Secondly, we can dismiss indicators that measure access in terms of the utility a person derives from travel and activity participation. While possibly relevant from an economic or efficiency perspective, these utilities are not relevant from an equity perspective, for the reasons given in section 11.3. Finally, we can also dismiss infrastructure-based measures, based on the argument provided in section 11.4. Translated to accessibility to employment, for example, we could paraphrase the argument regarding food and nutrition: we should look at the set of available jobs for a particular person and not simply at the transport supply, as the resource approach suggests, nor at the utility a person gets out of a particular job, as the welfare approach argues.

11.7 CONCLUSIONS AND NEXT STEPS

In this chapter we have explored what type of access or accessibility measures are suitable for an equity analysis in the field of transportation. We have built an argument around an exploration of different egalitarian traditions to social justice, each with a different equalizandum: equality of welfare, equality of resources and equality of midfare. We argue that the extremes in the resources–midfare–welfare sequence can be rejected as the proper metric for the assessment of the distribution of access. A resources-only focus would ignore a person’s particular circumstances as well as their particular setting. A welfare-only focus, in turn, would lead to undesirable distributive responses. Translated to access or accessibility measures, this implies that two types of measures can be considered unsuitable as equity indicators. Firstly, measures that only take a person’s ability to travel, or potential mobility, into account can be dismissed as appropriate measures from an equity perspective. This would include all infrastructure-based measures, including measures that build on the level-of-service concept but translate it to a personal or group level. Secondly, it implies that utility-based accessibility measures are not relevant from an equity perspective, for the reasons outlined above (notably the expensive tastes argument). Furthermore, the analysis suggests that any type of accessibility measure that focuses on actual travel and activity participation of persons is not suitable as an equity indicator.

This leaves us with midfare as the proper equalizandum of access or accessibility. However, as we have argued, midfare is a multidimensional concept that still allows for a wide variety of interpretations. Furthermore,
A justice-theoretic exploration of accessibility measures

A wide set of accessibility measures complies with some of the components that are encompassed by the concept of midfare. This includes cumulative opportunities, gravity-based and doubly constrained accessibility measures, as well as some types of space–time measures. More research is necessary to explore which of these measures would be most suitable as a performance indicator for equity analyses in actual practice. Apart from well-known evaluation criteria like interpretability, communicability and data availability, the research should also follow philosophical lines and address issues of personal responsibility and collective provision, as well as choice (e.g., Stark, 2002).

As we outlined in our introduction, this exercise has tackled only the first of three steps. Two steps remain in our theoretically based exploration of equity measures of accessibility. Firstly, we must define the distributive goal that transport (and land-use) policies should strive for, if justice, as reflected by measures of midfare, is a central aim of public action (see also Martens, 2012; Martens et al., 2012). Secondly, we must work out the proper measures to reflect the meaning of access as midfare. While we have made some first steps in this direction above, this arguably demands more attention and detail.

ACKNOWLEDGEMENTS

Earlier versions of this chapter were presented at the NECTAR-NARSC Conference, 9–13 November 2010, Denver, USA and the European Transport Conference, 10–12 October 2011, Glasgow, UK. We would like to thank the participants in these sessions, as well as two anonymous reviewers, for their comments and insights, which have helped to improve the chapter considerably.

REFERENCES

Accessibility analysis and transport planning


