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Using principles of justice to assess the modal equity of regional transportation plans

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ABSTRACT

While equity has been an important consideration for transportation planning agencies in the U.S. following the passage of Civil Rights Act of 1964 (Title VI specifically) and the subsequent Department of Transportation directives, there is little guidance on how to assess the distribution of benefits generated by transport investment programs. As a result, the distribution of these benefits has received relatively little attention in transportation planning, compared to transport-related burdens. Drawing on philosophies of social justice, we present an equity assessment of the distribution of accessibility in order to define the rate of "access poverty" among the population. We then apply this analysis to regional transportation plan scenarios from the San Francisco Bay Area, focusing on measures of differences between public transit and automobile access. The analysis shows that virtually all neighborhoods suffer from substantial gaps between car and public transport-based accessibility, but that the two proposed transportation investment programs reduce access poverty compared to the "no project" scenario. We also investigate how access and access poverty rates vary by demographic groups and map low-income communities within access impoverished areas, which could be the subject of further focused investments.

1. Introduction

Transportation planning decisions inevitably yield costs and benefits which vary across different communities within an urban area. Much thought and effort has gone into understanding and addressing these differences, though much of this work focuses on the distribution of costs or burdens, like air and noise pollution or exposure to risks from transport of hazardous materials (see Forkenbrock and Schweitzer, 1999; Schweitzer and Valenzuela, 2004; Sanchez et al., 2003 for great syntheses of the issues along a variety of dimensions). At the same time, while the regional planning process evaluates long-range regional transportation plans (RTP) according to several "net effects" such as total vehicle-miles travelled (VMT), total hours of delay, or total emissions, the treatment of the distributions of benefits or costs is much less developed. These indicators used to evaluate regional plans are important to the decision process – after all, as the saying goes: "You fix what you measure." We feel distributional concerns should also play an important role in plan evaluation, and indeed, there is extensive legal and procedural requirements for considering the fairness of plans. In this research we explore how distributional measures of benefits can be incorporated into the evaluation process for RTPs.

In previous work, we claim that access or accessibility[2] is, though imperfect, the most appropriate measure of benefits from transportation plans and investments, and thus should be the focus of any effort to understand and measure the impacts of transportation investment programs (Martens, 2012; Martens et al., 2012). Acknowledging the importance of access, we developed an explicit equity standard for the assessment of its distribution as generated by transportation investment programs, focusing in particular on the equity between access by automobiles and public transport.

In this paper, we employ these standards to evaluate a regional transportation plan involving several investment plan scenarios which affect differently the geography of mobility and access in

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[2] We use the words access and accessibility interchangeably, with both words referring to the ease with which persons can reach important destinations such as employment.

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the region. We will see how these differences in effects intersect with the social geography of the region, enhancing or reducing inequities in access between various population groups. We begin with some background on equity issues in transportation and review our previous efforts to define "just distributions" of access in a metropolitan area. We then introduce our measures of access and distributions of access and define unfair distributions of access in terms of "access poverty." The specific case study of the San Francisco Bay Area regional plan is then described. We apply our measures of access poverty to this case as a "proof of concept." These measures reveal the differences in access poverty rates among the proposed plan scenarios. We conclude with a discussion of implications for regional transportation planning practice.

2. Background

Transportation shapes the spaces around us and creates a geography of opportunity to access important destinations beyond our immediate surroundings. In modern urban settlements where important land uses and residences are dispersed in space, a lack of transportation can mean a lack of opportunities for work, school, recreation, and social interaction, profoundly impacting the prospects for communities and individuals (Ong and Blumenberg, 1998; Ihlanfeldt and Sjoquist, 1998; Taylor and Ong, 1995; Sanchez et al., 2003; Lucas, 2006). Like many other aspects of urban infrastructure and services, access to essential destinations is unequally distributed – often significantly along class and racial dimensions and stemming from a long history of political marginalization and physical segregation (Bullard et al., 2004). Obligations to address these distributions in access are included in Title VI of the Civil Rights Act of 1964, the 1994 "Environmental Justice" (EJ) Executive Order 12898 entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," and in the various federal guidances which clarify those obligations (DOT, 2012; FHWA, 2012; FHWA and FTA, 1999; FTA, 2012a, 2012b). Echoing Title VI, the DOT Order 5610.2(a) prohibits actions that cause "the denial of, reduction in, or significant delay in the receipt of, benefits of DOT programs, policies, or activities" (DOT, 2012, Appendix 1(f)). We make the claim elsewhere that accessibility is, though imperfect, the most appropriate measure of benefits from transportation plans and investments, and thus should be the focus of any effort to understand and measure the distributions of the benefits of regional transportation plans (Martens et al., 2012; Martens, 2012; Martens and Golub, 2012). Even after resolving that access is of a central concern, there is little guidance in official regulations to answer the question – what distribution of access is fair? According to the FHWA (2009): "Consistent with the U.S. DOT Order on Environmental Justice... adverse impacts should be mitigated.... Beyond this mitigation requirement, there is no presumed distribution of resources to sustain compliance with the Environmental Justice provisions." Justice-related guidance does not establish standards for deciding how to measure the distribution of access generated by a transportation plan, nor how to determine whether a particular distribution is fair.[3]

In earlier work, we have addressed this issue and proposed an explicit equity standard for the assessment of the distribution of accessibility improvements generated by transportation plans or investment programs (Martens, 2012; Martens et al., 2012). Drawing on major theories of social justice and recognizing certain constraints of urban access which will always prevent perfect equality between neighborhoods and modes, we identified a set of principles that, in our opinion, could define a just distribution of access. In this piece we build on two conclusions from that work: (1) the gap between car-owning (or available) and car-less households residing in the same area should remain within a maximum level, and (2) within that constraint, the average accessibility for everyone should be maximized.[4]

We feel that these simple equity principles, though abstractly formulated, can be used to shape the practice of transportation planning. While others have investigated inter-modal differences in access and changes in these differences over time (Benenson et al., 2011; Kawabata, 2009; Kawabata and Shen, 2007; Grengs, 2010; Cervero et al., 2002; Foth et al., 2013), we propose to introduce an explicit normative standard to evaluate these differences and thus, the fairness of a plan. Obviously, setting a maximum range that is deemed acceptable is a highly political issue. Some directions can be derived from other policy domains in which setting of standards is part and parcel of policymaking. The most obvious example is the domain of income and poverty. Here, standards abound, some framed in absolute terms (e.g., the federal government in the United States defines poverty rate incomes depending on household size (USDHHS, 2013)) and some framed in relative terms (e.g., European Union defines the official poverty rate income as 60% of median income (European Commission, 2013), while the OECD defines it as 50% of median income (OECD, 2013)). The use of a fixed fraction of the median income means that as the distribution of income changes, so will the share of the population with income below the poverty line. Similarly, we can define such a standard to determine the fairness of a transportation system – an "access poverty line" – and we can compare plans for their relative shares of population with "access impoverishment."

The setting of this access poverty line is both a political issue (what differences in access levels are deemed acceptable?), and an empirical issue (what differences in access levels are correlated with significant differences in levels of activity participation and well-being?). It is beyond the scope of this paper to address these issues (see Lucas, 2012 for a brief overview of more quantitative approaches to understanding the effects of social exclusion). For reasons of illustration, we will employ here an "access poverty line" based on the notion of a gap between transit and car accessibility. The access poverty line is then defined as a maximum acceptable gap. Such a measure is thus robust for changes in overall access, because as improvements are made to the transportation system, the transit and automobile-based accessibility are always being compared, in analogy to the EU and OECD income poverty lines. A decrease in the share of the population that falls below the 'transport poverty line' suggests that a transportation investment scenario closes the gaps in access levels between population groups dependent on transit and those with access to a car. Hence, such an investment improves the fairness of the transportation system. By using this approach, transportation investment programs can be compared directly for how they affect the population of "access impoverished."

In this paper we focus on evaluating the effects of RTP investment scenarios. Scholars and regional planning agencies have investigated the unequal nature of benefits from such plans (e.g. SCAG, 2008; MTC, 2004, 2009; Purvis, 2000; ARC, 2011; Pfeffer

[3] The implications of this ambiguity are many; the authors in other work reviewed the equity analyses created as part of RTP evaluations by the ten largest MPOs and found widely varying approaches to the evaluation with often indecipherable results (Martens and Golub, 2014).

[4] While we acknowledge that inter-modal equity, or equity between automobile and transit users, is not recognized as a concern within the civil rights law mentioned above, it is an essential starting point to understanding larger justice issues. This is because, firstly, access to automobiles is strongly related to income which is, in turn, related to ethnicity and race (Pisarski, 2006, xxi). Secondly, issues of spatial segregation and spatial mismatch between jobs and residents strongly affect minority populations because of the history of job and housing discrimination (Ihlanfeldt and Sjoquist, 1998). This means that understanding the inequalities of access by modes are highly relevant to a justice analysis.