# Right to the city: Applying justice tests to public transport investments

Saeid Nazari Adli [a], Stuart Donovan [b,*]

[a] School of Architecture and Planning, National Institute of Creative Arts and Industries, University of Auckland, Private Bag 92019, Auckland 1142, New Zealand
[b] Department of Spatial Economics, Vrije Universiteit Amsterdam, De Boelelaan 1105, 1081HV, Amsterdam, The Netherlands

## ARTICLE INFO

## ABSTRACT

Many policy-makers are grappling with the twin challenges posed by growing travel demands and persistent socioeconomic inequality. To address these issues, numerous studies propose and apply "justice tests", which relate the effects of transport policies to prevailing socioeconomic deprivation. While the theoretical foundations of justice tests are well-established, there exists less agreement on methodological aspects and empirical specifications. In this paper, we propose a new criterion for evaluating the results of justice tests—namely the correlation coefficient—and explore its sensitivity to empirical assumptions by way of a case study of a major public transport investment. In comparison to other criteria identified in the literature, our proposed criterion appears to generate relatively stable results while being simple to calculate, interpret, and communicate.

## 1. Introduction

The sustained growth of cities is placing increasing pressure on urban infrastructure (United Nations, 2014; World Bank, 2014). In response, policy-makers in many jurisdictions have proposed major investments in public transport (PT) infrastructure and services.

At the same time, persistent socioeconomic inequality has received increasing attention (Glaeser et al., 2008). Organisations such as the World Bank, the International Monetary Fund (IMF), and the Organisation for Economic Co-operation and Development (OECD) have adopted policies designed to mitigate socioeconomic inequality (International Monetary Fund, 2014; OECD, 2013; World Bank, 2013).

Growing travel demands and persistent inequality give rise to new policy questions. Ideally, major PT investments would be efficient—in that their economic benefits exceed their costs—and equitable—in that they disproportionately benefit the less well-off. Several studies propose the use of accessibility-related "justice tests" to analyse the effects of PT investment on inequality (Lucas et al., 2016; Martens, 2012; Soja, 2010). While their theoretical basis is well-stablished, evidence suggests justice tests have had only limited influence on policy.

In this study, we seek to build on the existing literature in two ways. First, we propose a new criterion for determining "just" outcomes: The correlation coefficient between the *change in accessibility* and *prevailing*

*socioeconomic outcomes.* Second, we use a case study to explore the sensitivity of our criterion to its empirical specification. Compared to other criteria identified in the literature, we find the correlation coefficient is relatively stable, while being simple to calculate, interpret, and communicate.

The following sections of this paper are structured as follows: Section 2 reviews the literature; section 3 outlines our research methodology; section 4 introduces our case study; sections 5 and 6 present and discuss our results, respectively; and section 7 concludes.

## 2. Literature review

Our paper draws on a broad and rich body of literature from fields as diverse as economics, sociology, geography, and public policy. In the interests of succinctness, here we focus on findings that are most relevant to our research methodology.

### 2.1. Urban economics – Attraction and segregation?

The urban economics literature suggests that cities can simultaneously *attract* and *segregate* low-income households. Low-income households are attracted to urban areas due to the socioeconomic advantages they confer, such as agglomeration economies (Glaeser et al.,

* Corresponding author.
*E-mail addresses:* saeid.nazari-adli@auckland.ac.nz (S. Nazari Adli), s.b.donovan@vu.nl (S. Donovan).

2008).[1] Within cities, however, high-income households will—holding other factors constant—tend to out-bid low-income households in areas with higher amenity, leading to spatial segregation of households by income (Mieszkowski and Mills, 1993; Roback, 1982). The heterogeneous spatial distribution of households by income and amenity levels is a common feature of cities globally (Fujita et al., 2001; Massey and Eggers, 1993). If "accessibility" is an amenity that people generally value, then, ceteris paribus, we expect low-income households to be concentrated in areas that have less of it, and vice versa.

### 2.2. Sociological concepts of spatial justice – "The Right to the city"

While concepts of justice date back to Greek city-states, it is largely in the last two centuries that legal systems have mandated justice at the individual level (Johnston, 2011, pp. 3-4). A theoretical milestone was reached with John Rawls' "Theory of Justice" (1971), which argues that policy settings should be based on how they affect the least fortunate. A large body of literature expounds sociological concepts of spatial justice. Lojkine (1972), for example, argues that urban policies tend to increase distances between working class jobs and housing, an issue potentially compounded by inequitable access to transport systems. Harvey (1973) identifies the risk of dynamic effects: Policy settings may—either intentionally or unintentionally—reinforce prevailing socioeconomic inequalities.

Lefèbvre first coined the "right to the city" concept in *Space and Politics* (Lefèbvre, 1973), which he expanded on in subsequent publications, namely, *The Right to the City* and *The Production of Space* (Lefèbvre, 1991; Lefèbvre, 1986). In the latter, Lefèbvre calls for a focus on understanding the political economy of cities and the effects of policies implemented therein. Dikec (2001) treats similar issues. Recent work by Soja (2010) recommends "amplifying and extending the geographical approach to justice into new areas of understanding and political practice" (p. 5). Space is not, in Soja's view, an "empty void", but is rather "filled with politics, ideology, and other forces shaping our lives" (p. 19). Notably, Soja (2010) advocates for the use of a "justice test" to measure whether policies benefit more deprived areas.

Several recent studies consider how to reflect sociological concepts of spatial justice within transport policy settings. Martens (2012) focuses on accessibility and explores principles for determining an ethical distribution. After eliminating several well-known distributive principles, including a Rawlsian approach, Martens (2012) recommends maximising average accessibility subject to a constraint on the maximum allowable range between the most and least well-off. A focus on accessibility is supported by Van Wee and Geurs (2011), which recommends complementing utilitarian welfare economics with egalitarian ethical principles. Similarly, Lucas et al. (2016) blend "egalitarianism" and "sufficientarianism", as measured by Gini coefficients and accessibility thresholds, respectively.

Our methodological approach adapts and extends Martens (2012) and Lucas et al. (2016). We diverge from Martens (2012) in two key respects. First, we disregard the latter's goal of maximising average accessibility, which we consider to be an indicator of effectiveness rather than equity. Second, instead of focusing on the *range in accessibility* between the most and least well-off, we consider the *change in accessibility* across the entire distribution of socioeconomic deprivation. Our methodology is perhaps closest to Lucas et al. (2016), but differs in the use of correlation coefficients rather than Gini coefficients. The former is, in our view, simpler to calculate, interpret, and communicate.

### 2.3. Geographic concepts of accessibility – mobility and opportunity

Our study is heavily influenced by the large body of literature on geographic concepts of accessibility. Following Hansen (1959), we interpret accessibility as people's overall ability to reach socioeconomic opportunities.[2] Abley and Halden (2013) identify three distinct components of accessibility: namely, *transport mobility*, which defines the area one can reach in a certain travel-time or distance; *socioeconomic opportunities*, which relates to an indicator, such as employment, in a defined area; and *personal capability,* which describes one's financial and physical ability to use the transport system.[3] We define transport mobility and socioeconomic opportunities using travel-time and employment, respectively.[4][5]

Numerous studies relate PT accessibility to socioeconomic outcomes. Delbosc and Currie (2011) use Gini coefficients to measure access to PT services in Melbourne, where access is defined in terms of the number of PT services per day utilising nearby stops. In contrast to Delbosc and Currie (2011), we measure access to employment opportunities provided by PT services, rather than the number of PT services themselves. We agree with Manaugh et al. (2015) that PT service is merely a "means to an end" (p. 174).

Bocarejo and Oviedo (2012) investigate PT accessibility in Bogota using distance-decay, or impedance, models that take travel-time and travel-cost as inputs. For each zone, model parameters are estimated by way of regression analysis. Using these models, the authors assess the effects of transport policies, such as changes in PT fares and new PT infrastructure, on accessibility for each zone. The approach of Bocarejo and Oviedo (2012) is somewhat novel, and informs some aspects of our empirical testing. Compared to Bocarejo and Oviedo (2012), however, we focus on the criterion used to determine whether an outcome is just. Our empirical specification also avoids the need for micro-data or regression analysis and, moreover, we devote considerable attention to understanding the sensitivity of our results to our chosen specification.

Foth et al. (2013) relate socioeconomic deprivation to changes in the distribution of PT accessibility in Toronto in the period from 1996 – 2006, and find that the most deprived areas enjoy high levels of accessibility. El-Geneidy et al. (2015) also consider the distribution of PT accessibility in Toronto. Two employment-based accessibility measures are computed for each census tract, where employment is segmented into low and high wage jobs. El-Geneidy et al. (2015) conclude "residents in socially disadvantaged areas have equitable if not better transit accessibility to jobs than socially advantaged groups …" (p. 17). While both Foth et al. (2013) and El-Geneidy et al. (2015) inform our study, we note

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[1] "Agglomeration economies" is a general rubric used to describe the (net) socioeconomic benefits of physical proximity (Glaeser et al., 2001; Head and Mayer, 2004). Agglomeration economies exist in both consumption and production, and operate via several microeconomic channels, such as knowledge spill-overs, labour market frictions, and input/output linkages (Anas et al., 1998; Glaeser et al., 2009; Glaeser, 2011).

[2] A large number of studies relate transport accessibility to various socioeconomic outcomes (see, for example, Cervero, 2001; Currie and Delbosc, 2010; Gibbons and Machin, 2005). Åslund et al. (2010) present a novel longitudinal analysis of accessibility and employment for refugees in Sweden and find that those initially housed in locations with lower levels of accessibility (measured in employment) are more likely to be unemployed nine years later. Such studies suggest accessibility is relevant to socioeconomic outcomes and tend to support Soja's contention that— in the absence of policy intervention— spatial inequalities may persist over time.

[3] Transport policy has typically emphasized mobility, as exemplified by investments designed to reduce travel times (Metz, 2008). In contrast, land use policy has tended to focus on increasing socioeconomic opportunities by influencing the location and intensity of development (Aldous, 1992; Calthorpe, 1993; Dantzig and Saaty, 1973; Leccese and McCormick, 2000; Meck, 2002). Finally, social policy has traditionally sought to mitigate differences in personal capability, for example by offering discounts (Asensio et al., 2003; Jones et al., 2012).

[4] Travel-times using PT comprises three distinct components, namely, walking to/from stops, time spent waiting at the stop for PT services, and time spent travelling in the PT vehicle itself (Walker, 2011).

[5] For detailed discussions of accessibility metrics see El-Geneidy and Levinson (2006); Geurs and van Wee (2004); and Handy and Niemeier (1997).