Research in Transportation Economics xxx (2016) 1–9

Contents lists available at ScienceDirect

Research in Transportation Economics

journal homepage: www.elsevier.com/locate/retrec

Deprivation and access to work in Dublin City: The impact of transport disadvantage

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ARTICLE INFO

Article history:
Received 2 November 2015
Accepted 10 June 2016
Available online xxx

Keywords:
Transport
Deprivation
Accessibility
Commute

ABSTRACT

Ireland's economy underwent a period of rapid expansion between 1995 and 2007, accompanied by a boom in construction. The subsequent decade saw a rapid decline in construction as Ireland went through an unprecedented recession. This paper examines how this boom and bust has influenced deprivation and accessibility in Dublin. The paper examines, through a logit model, links between transport disadvantage, deprivation and employment accessibility in the city. The paper concludes that links exist between deprivation and accessibility in the city, in particular in the newer peripheral suburbs, leaving these areas open to risk of transport poverty.

1. Introduction

Ireland underwent a period of rapid economic expansion between 1995 and 2007, followed by an unprecedented economic crash in 2008. As Ireland now emerges from that period of recession, the impacts on deprivation and social exclusion need to be assessed. In this paper, the relationship between transport disadvantage, deprivation and employment accessibility in Dublin are examined.

The paper describes patterns of transport disadvantage in Dublin City by examining the spatial distribution of accessibility to employment and deprivation in the city. An accessibility model is used to generate accessibility scores at the electoral district level. The research then uses the All-Ireland Deprivation Index (Haase & Pratschke, 2012) to compare levels of deprivation and access to employment across Dublin electoral districts. Following on from this, districts in Dublin are categorized by accessibility and deprivation levels and a multinomial logit model is estimated using data from the 2011 Census of Population of Ireland. The model estimates the relationship between the level of accessibility to employment and a number of socio-economic and land use variables including deprivation, car ownership, and public transport accessibility amongst others. The research presented in this paper adds to the growing body of work in the field of transport disadvantage by combining a number of methodologies, namely, accessibility and regression analysis with unique national datasets. Previous studies in this field have used surveys and case studies to examine the issue of transport disadvantage and its relationship with other socio-economic variables (Preston, 2009). This paper is one of the first to use national census data to determine these relationships over a large metropolitan area that has just emerged from an economic crisis. Research in this field has also tended to focus on particular social groups, whereas in this paper the focus is on all individuals living in Dublin.

The paper is structured as follows: Section 2 will briefly describe existing studies of transport disadvantage and social exclusion, including the definitions that are being used in this research for both of these terms and gives a context for the study. Section 3 outlines the accessibility model used in the study. Section 4 describes the multinomial logit model, while Section 5 gives an overview of results and analysis. Section 6 outlines the conclusions of the paper.

2. Transport disadvantage and social exclusion

Research into the relationships between accessibility, transport disadvantage and social exclusion is an important area (Jones & Lucas, 2012; Markovich & Lucas, 2011; Preston, 2009; Rock, Ahern, & Caulfield, 2016). However, some researchers (Markovich & Lucas, 2011; Rock et al., 2016) would argue that the social

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http://dx.doi.org/10.1016/j.retrec.2016.06.009
0739-8859/

impacts of transport and the impacts of accessibility on deprivation have been less widely studied than the impacts of transport on the environment or on the economy. A lot of the research in the area, as pointed out by both Rock et al. (2016) and Delbosc and Currie (2011) has tended to focus on particular groups which are seen as socially disadvantaged (for example lone parents or older people) or on areas that have particular geographical characteristics that make transport more difficult (for example rural areas or urban peripheries).

Lucas (2012) points out that transport disadvantage and transport related social exclusion can be related but are not the same thing. Lucas states that it is possible to have good access to transport, but be socially excluded, and vice versa (Lucas, 2012). However, if one is both transport and socially disadvantaged this can, according to Lucas, lead to transport poverty and poor accessibility to services and jobs, and to social exclusion. In this paper, we look at areas in Dublin and categorise them according to accessibility and deprivation to assess if those areas which are both transport and socially disadvantaged experience the greatest difficulties in accessing employment.

In their seminal paper, Kenyon, Lyons, and Rafferty (2002) introduce a mobility dimension to social exclusion and provide the definition as the process by which people are prevented from participating in the economic, political and social life of the community due to reduced accessibility to opportunities, including employment (Kenyon et al., 2002). Access to employment constitutes a key structural factor that influences the (re)production of mobility-related transport disadvantage (Rau & Vega, 2012). The concept of accessibility, that is, the availability of opportunities for face-to-face social interaction and economic activity, is of particular relevance in this context (Preston & Rajé, 2007). Handy and Neimier (1997) suggest that the concept of accessibility is determined by a number of elements: the spatial distribution of opportunities at the destination, their magnitude, quality and character, and the characteristics of the transport system in terms of the ease of reaching the destination. Accessibility is thus determined by the patterns of land use and the nature of the transportation system (Handy and Neimier, 1997). However, it is the individual dimension of accessibility, which reflects the needs, abilities and opportunities for a particular individual, what makes accessibility measures vary across individuals and social groups (Geurs & Van Wee, 2004; Rau & Vega, 2012).

Jones and Lucas (2012) state that there are 3 scales of accessibility: micro which is concerned with access to vehicles (for example of disabled people or those travelling with children), meso which is concerned with network connectivity and strategic which is concerned with access to employment at a sub-regional level. It is the latter that this paper is concerned with. However, as Jones and Lucas (2012) point out for people to enjoy good accessibility there must be good performance at all scales.

Currie and Delbosc (2013) describe the existence of transport disadvantage and poor accessibility in the suburbs of Australian cities, and state that in those suburbs evidence exists of “Forced Car Ownership”. This is where poor access to alternatives modes and low levels of accessibility have led to those who cannot afford to own a car being forced to own a car in order to be able to access employment and activities. Car dependency is high as access to services can only be achieved through car ownership and car use. Currie et al. (2009) argue that low income households need to be located near public transport and in activity centres (for example near jobs) to reduce the need to own a car and to reduce transport disadvantage. Currie et al. (2009) also found that in fringe suburbs residents had poor access to social and leisure activities, to a greater extent than that to work activities.

The previous literature in this growing field is very rich and points to some of the global trends emerging in this field. This paper adds to this field in two ways, firstly it examines using census data the relationships between deprivation and accessibility. Secondly, the paper examines Dublin, a city that has just emerged from an economic crisis, and the case study area provides interesting insights into the relationships between transport and inequality.

3. Accessibility model

There is a wide range of methodologies and approaches to the measurement of accessibility (see comprehensive reviews in Handy and Neimier, 1997; Geurs and Ritsema van Eck, 2003; Halden, 2002; Geurs & Van Wee, 2004; Martin & Reggiani, 2007; Willigers, Floor, & Van Wee, 2007). Overall, the definition and mathematical formulation of accessibility depends on the objectives of the particular study for which the accessibility measure is intended for (Borzacchiello, Nijkamp, & Koomen, 2010). Several formulations of accessibility may lead to different results for the same transport network and land use context (Reggiani, Bucci, & Russo, 2011; Borzacchiello et al., 2010).

From the broad range of existing methodologies, a modified version of the traditional gravity-based model – also known as economic potential - is used in this paper for the computation of accessibility indicators. The gravity model is a well-established methodology in accessibility research. Based on a model of social behaviour that predicts that the interaction between residential and employment locations decline with increasing travel distance, time or cost, gravity-based measures of accessibility weight opportunities by travel impedance, which means that accessibility decreases as the travel time or distance to the opportunity increases. The accessibility scores obtained can be interpreted as the volume of economic activity to which an area has access to, after the cost/time of covering the distance to that activity has been accounted for (Dundon Smith & Gibb, 1994). The mathematical function used to represent the spatial separation between origins and destinations, also known as the travel impedance function, plays a crucial role in computing accessibility measures. Some studies use exponential functions (Wilson, 1971) or Gaussian functions (Ingram, 1971). The negative exponential function is most closely associated with travel behaviour theory and has been widely used in international transport studies (Handy and Neimier, 1997).

Some of the theoretical limitations of the gravity model for accessibility analysis relate to the exclusion of competition effects regarding access to employment (Geurs & Van Wee, 2004). To overcome this limitation, a modified version of the gravity model is used in the paper. Shen (1998) suggests that the traditional gravity-based accessibility measure is only useful when either one of the following conditions is satisfied: (1) the demand for available opportunities is uniformly distributed across space and (2) the available opportunities have no limitation in capacity. As regards to employment opportunities, neither the first nor the second condition holds. Employment is characterised by its non-random spatial distribution and jobs are limited to one worker accessing them, which represents a clear limitation in capacity.

Shen (1998) thus proposes a modified version of the traditional gravity-based accessibility measure to account for both the uneven spatial distribution of jobs and the effect of competition for jobs at each location. The advantage of Shen's (1998) proposal is that it considers not only the number of available employment opportunities at the destination, but also the number of job seekers by occupation type or demand potential. In this paper, the spatial unit of analysis is the electoral district.

Please cite this article in press as: Ahern, A., et al., Deprivation and access to work in Dublin City: The impact of transport disadvantage, *Research in Transportation Economics* (2016), http://dx.doi.org/10.1016/j.retrec.2016.06.009