Research in Transportation Economics xxx (2016) 1–15

Contents lists available at ScienceDirect

Research in Transportation Economics

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

Analysis of firm location and relocation in relation to Maryland and Washington, DC metro rail stations

Hiroyuki Iseki [a, *], Robert P. Jones [b]

[a] National Center for Smart Growth Research and Education, School of Architecture, Planning and Preservation, University of Maryland, College Park, MD 20742, USA

[b] Urban and Regional Planning Program, School of Architecture, Planning, and Preservation, University of Maryland, College Park, MD 20742, 0109 Caroline Hall, USA

ARTICLE INFO

Article history:
Received 24 May 2016
Received in revised form
7 October 2016
Accepted 17 November 2016
Available online xxx

JEL classification:
R1
R3
R5
O1

Keywords:
Firm location and relocation
GIS
National Establishment Time Series data (NETS)
Transit-oriented-development (TOD)

ABSTRACT

Transit Oriented Development (TOD) has been increasingly adopted in regional transit plans as a tool to achieve economic growth. There is a paucity of literature examining the relationship between rail stations and firm locations by industry at the transit station level.

This study seeks to address four questions about the effects of station proximity: 1) What is the overall distribution of firms in relation to metro station locations? 2) What industries, if any, are more likely to locate near metro stations? 3) How does the presence of a transit station affect firm relocation within the region? 4) Does a new transit station result in a *net gain* of firms within the station proximity and for the region *through the relocation process*? This study examines the National Establishment Time Series (NETS) dataset for Washington, DC and its suburbs in Maryland, which contains longitudinal and cross-sectional firm-level data and firm-level relocation data for the years 1990–2010.

This study contributes to the literature on the effect of transit investment and TOD on economic development by suggesting future research agendas based on the descriptive analysis results, particularly addressing the question of *net effects* for locations beyond the immediate station area.

1. Introduction

The Washington metropolitan region has been growing and will continue growing into the future in terms of both population and jobs. According to the Metro Washington Council of Governments (MWCOG), the region's population will grow by 24 percent to 6.66 million by 2040, while its employment will increase from 3.24 million in 2015 to 4.40 million in 2040 (MWCOG, 2014). These forecasted numbers pose many challenges about accessibility, sustainability, prosperity, and livability to this National Capital region that encompasses the District of Columbia, Maryland, and Virginia, including issues related to economic development, environment, housing, transportation, and social equity (Coalition for Smarter Growth, 2010). In order to address these challenges, MWCOG formed the Greater Washington 2050 Coalition in 2008 to gather opinions and concerns of public, business, civic and environmental stakeholders and identify actions with a consensus for the future. Within its nine major sets of goals, the Region Forward planning initiative includes economic prosperity and the integration of land use and transportation, emphasizing a wide range of employment opportunities, balanced growth across the region, and compact infill development with mixed land use, among others. This vision leads to an identification of *regional activity centers* for the focus of future growth, as they will be likely to capture new employment and household growth in the future. Many of these activity centers include rail transit stations, recognizing the important role of transit access, transit investments, and TOD.

Similarly, a few organizations in the region propose to use access through public transit service to stimulate economic development and form employment centers (Coalition for Smarter Growth, 2010; The Central Maryland Transportation Alliance and the Center for Transit-Oriented Development, 2009). Thus, there are many regional plans and studies in which transit oriented development (TOD) is touted as a catalyst to integrate transportation and land use,

* Corresponding author.
E-mail addresses: hiseki@umd.edu (H. Iseki), rpjones@umd.edu (R.P. Jones).

http://dx.doi.org/10.1016/j.retrec.2016.11.003
0739-8859/

promote transit and pedestrian travel, provide a good mixture of commercial and residential neighborhoods, increase property values, help local economic development, and create livable communities. However, while a few studies found that rail transit proximity and TOD are associated with a higher concentration of firms and employment in professional/high-skilled jobs and particular industries, such as finance, insurance, and real estate (FIRE) (Zimbabwe & Anderson, 2011; Belzer, Srivastata & Austin 2011), these claims need more evidence based on solid empirical research. In addition, some critics have questioned TOD as an agent for net job creation (Giuliano, 2004; Giuliano & Agarwal, 2010). While some research has used case studies and agglomerated regional datasets to examine changes in employment near transit with positive results (Cervero, 2004; Belzer, Srivastata & Austin 2011), there is a paucity of literature examining the relationship between rail stations and employment by industry at the transit station level.

In this paper, we conduct a descriptive study that seeks to address four key questions about the effects of station proximity:

1) What is the overall distribution of firms in relation to metro station locations?
2) What industries, if any, are more likely to locate near transit stations?
3) How does the presence of a transit station affect firm relocation within the region?
4) Does a new transit station result in a *net gain* of firms within the station proximity and for the region *through the relocation process*?

Following this introduction, the next section provides a review of the relevant literature on TOD, firm location, and the economic development effects of rail stations. After descriptions of the data, data processing, and methodology used, we present analysis results. The paper concludes with a summary of analysis findings, planning and policy implications, and future research agendas.

2. Literature review

Public transportation investments could have substantial impacts on the distribution of firm and employment locations, land development, and property values by changing the level of accessibility (often measured by travel time) among locations. The concept of using a transit facility as a node for development is well known as transit oriented development (TOD). Transit Oriented Development is commonly adopted in regional transit plans as a tool to achieve economic growth, sustainable land use patterns, and pedestrian-friendly communities (Calthorpe, 1993; Cervero, 1989).

While many studies examine the economic impacts of rail station presence and proximity, rail transit investments, and Transit Oriented Development, most studies address the effects on values or rents of residential and commercial properties. A few studies found that light and heavy rail have a positive effect on commercial and office properties (Weinberger, 2001; Cervero & Duncan, 2002; Ko and Cao 2013), while there is an increasing number of studies that show a positive effect on residential property values (Ryan, 1999; Hess & Almeida, 2007; Debrezion, Pels & Rietveld 2011; Duncan, 2011). Even when transit access is capitalized into property values, its effect seems to dissipate over distance; Ko and Cao 2013 found 0.9 miles from rail stations as the distance at which the effects on non-residential property values become insignificant.

An increase in land values leads to a need for higher-density development, which often induces land use changes and leads to greater accessibility and changes in modal choice over time (Higgins, Ferguseon, & Kanaroglou, 2014). In this regard, the literature is inconclusive; while several studies indicated land use intensification in relation to rail transit and related positive economic effects (Cervero et al., 2004; Arrington & Cervero, 2008), other studies showed little evidence for significant land use changes in the cases of light rail in Portland, Oregon over a ten year span (Dueker & Bianco 1999) and in Buffalo, New York (Banister and Berechman 2001). Similarly, a review by Kasraian, Maat, Stead, and Van Wee (2016) found inconclusive evidence of employment densification due to rail station proximity when examining broad studies throughout the world. Because of these mixed results, Giuliano (2004) and Giuliano and Agarwal (2010) argue that transit investment is not effective to influence land patterns, partly because the magnitude of transit investment is still marginal within the large transportation system already developed in a metropolitan area. In contrast to the extensive research on the impacts on property values and land use patterns, the current literature on transit investment and TOD lacks empirical studies on the effects on the location, densification, and distribution of firms, as well as employment, especially taking into account multiple types of industry.

The literature on firm location points out the importance of accessibility through transportation infrastructure is important for firm location decisions. Among many factors that can influence firm location decisions within an urban area or a metropolitan area (e.g., between a central business district vs suburbs, and a specific location within these areas), economic theory tells us that *transportation costs of inputs and outputs* and *agglomeration economies,* along with *differences in factor costs (rent, taxes, and labor costs)* are more important than political factors and amenities that influence the quality of life (Clapp, 1993). Starting with factor costs, cost of space is considered as one of most important firm considerations (Button, Leitham, McQuaid, & Nelson, 1995; Calzonetti & Walker, 1991). Availability and lower cost of space has helped spur suburbanization of businesses (Leinberger & Lockwood, 1986, pp. 43–52; White, Binkley, and Osterman, 1993). Taxes and costs associated with transactions (e.g., building permits) are also important in deciding firm locations where choices are among multiple jurisdictions with different taxes, laws, and regulations (Parsons Brinckerhoff, 1998).

Transportation access affects firms' costs of doing business because firms need access to materials, workers, customers, and information. Transportation has the ability to increase employment or firm density through increased access to labor and better links between companies (Venables, 2007). In particular, public transport investments potentially play an important role for the spatial densification within the proximity of transit network nodes, as some firms take advantage of travel time savings provided by good transit access in their location decision making (Chatman & Noland, 2011). Traditionally firms seeking highly skilled workers located in CBDs to have access to the widest pool of labor, but suburbanization has led some firms to realize that they can find adequate labor in the suburbs, especially educated clerical workers, professional, and technical workers (Hanson & Pratt, 1988; Ihlanfeldt & Raper, 1990). Access to highways is one of most important firm location factors, as automobiles are the dominant form of transportation in most urbanized areas (Button et al., 1995; Calzonetti & Walker, 1991; Cervero & Duncan, 2002; Lyne, 1988, pp. 868–870; Ryan, 2005). As the level of accessibility through the road network could vary depending on traffic and congestion, transit networks with exclusive uses, such as rails and bus rapid transit (BRT), may have advantages in congested urban areas (Forkenbrock & Foster, 1996).

Agglomeration economies may benefits firms through the following mechanisms (Chatman & Noland, 2011):

1) sharing consumer-side service, retail, and entertainment amenities "increasing the city size or the CBD size enabling the provision of urban amenities that are attractive to households." (by enabling city growth and densification);

Please cite this article in press as: Iseki, H., & Jones, R. P., Analysis of firm location and relocation in relation to Maryland and Washington, DC metro rail stations, *Research in Transportation Economics* (2016), http://dx.doi.org/10.1016/j.retrec.2016.11.003