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Real estate development in anticipation of the Green Line light rail transit in St. Paul

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ABSTRACT

Although previous studies have extensively explored the impacts of rail transit on economic development after its opening, few have examined its impact on real estate development before its opening. Using the building permit data of the city of St. Paul, this study investigates the effects of key announcements of the Green Line light rail transit (LRT) by employing location quotient analysis and difference-in-difference models to compare building activity in the LRT corridor and control corridors. We found that the announcement of preliminary engineering had no positive impacts on the count and value of building permits whereas the announcement of Full Funding Grant Agreement tended to increase the number of building permit by about 24% and the value by 80%. We concluded that LRT investment, in conjunction with proactive land use planning policies, public subsidies and public funded projects, increases building activity.

1. Introduction

Since 2000, many U.S. cities have begun building light rail transit (LRT) systems. These systems tend to have much higher capital costs than alternatives, such as bus rapid transit (BRT). When faced with community concern of high costs, planners and elected officials often promote the economic benefits of LRT. Thus, cities come to expect that LRT will pay for itself by supporting new real estate investment and development, revitalizing neighborhoods and enhancing the tax base. Despite these common expectations, there has been limited research on the impacts of LRT systems on economic and real estate development. In the Twin Cities of Minnesota, there has been ongoing debate over whether to build two new LRT lines, with supporters continuing to cite real estate development as a benefit of these projects. Faced with a lack of sufficient evidence to inform this debate, and similar ones around the U.S., this study seeks to help researchers, planners and policymakers better understand the impacts of LRT on real estate development.

This study analyzes the impacts of Green Line LRT project milestones on real estate development activity in St. Paul, Minnesota. It aims to answer the following questions: (1) Are two important project milestones (preliminary engineering and full funding grant agreement announcements) positively associated with the number and value of building permits along the LRT line? (2) Did the announcements have a different impact in downtown St. Paul (where the Green Line terminates) from other locations along the Green Line? (3) What role did land use and station area planning interventions by the City of St. Paul play in the relationships?

The research design and methods used enhance the literature on the relationship between LRT and real estate development. First, the study utilizes a before-after design to determine whether LRT project announcements impacted building activity. To minimize the effect of confounders (such as improvements in St. Paul's overall economy), it also uses a treatment-control approach, with high-frequency bus corridors in St. Paul acting as a control for the Green Line corridor. The before-after treatment-control design enables difference-in-difference models, which are more powerful than cross-sectional models. Second, the study explores the development impacts of LRT before its opening date; most prior studies examined systems that were already operating. Third, the authors differentiate the impacts within and outside of downtown areas as the literature suggests that rail transit may have greater impacts on downtown areas. Fourth, this study demonstrates a vital application of building permit data, which despite its usefulness (Guthrie and Fan, 2013) is not well studied in the literature. Overall, it shows positive impacts of the full funding grant agreement announcement on real estate development in St. Paul. Local planners indicated that these development impacts are supported by local land use policies and by public sector investment in transit-oriented development (TOD) projects. The results reinforce the common expectation that LRT projects can have localized impacts on real estate development activity, particularly

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when paired with proactive planning and public support for TOD.

In addition to broader research implications, this study is important for transitway planning in the Twin Cities and other regions. In its 2030 regional transportation plan, the Metropolitan Council of the Twin Cities laid out an extensive transitway network: including LRT, BRT, and commuter rail. The Green Line LRT is the largest transit project to date in the region. Its performance has important implications for the planning development of additional transitways. A better understanding of contributing factors to development impacts will also inform decision-making and planning of future transitways; and since the Green Line recently opened, planners still have opportunities to influence development outcomes along the corridor.

The paper is organized as follows: The next section reviews the literature. Section 3 describes the Green Line project, data sources, and presents analysis approaches. Section 4 discusses empirical results and the role of planning interventions. The last section reiterates key findings and discusses their implications.

2. Literature review

2.1. Rail transit and economic development

Urban economics theories suggest that rail transit investments have the potential to stimulate economic development. Accessibility is a key determinant of land rent in urban areas (O'Sullivan, 2012). Rail transit investments presumably improve accessibility and increase land rents. Many empirical studies have confirmed price premiums of residential and commercial properties due to their proximity to rail transit stations (Hess and Almeida 2007; Ko and Cao, 2013). In anticipation of growing revenues, property owners have an economic incentive to enhance the quality of their properties by remodeling and renovation. In addition, increased land costs may cause developers to substitute capital for land (factor substitution) in new development and redevelopment projects (O'Sullivan, 2012). Furthermore, development activity along rail lines is expected to support additional economic development goals such as job creation and increased local and regional competitiveness.

However, new construction and improvement to LRT service often offer only incremental improvements to accessibility (Giuliano, 2004), its impacts, if any, may not be large. First, because accessibility (particularly by automobile) is often very high in well-established areas in developed countries, the impact of many transportation (including highway) investments on accessibility is marginal (Fernald, 1999). Second, because rail transit investments often replace existing high-frequency bus services (Rubin et al., 1999; Giuliano, 2004), the net increase in accessibility may not be large. Third, since riders often walk to and from transit stations, the impact of rail transit investments on accessibility tends to be around station areas, or localized (Giuliano, 2004). The marginal and localized improvement in accessibility implies that rail transit itself may not be sufficient for regional economic development.

After reviewing empirical studies, scholars have reached some conclusions about the impacts of rail transit investments on economic development. Rail transit investments tend to have much larger impacts in areas with a strong regional economy than those with a weak economy (Cervero, 2009; Giuliano, 2004). The impacts tend to occur in central business districts or severely-congested areas (Cervero, 2009; Giuliano, 2004). Land use and transportation policies that are complementary to TOD or discourage driving are critical to facilitate economic development (Cervero, 2009; Giuliano, 2004). An integrated network of rail transit tends to have larger impacts than several isolated rail lines (Cervero, 2009). Rail transit investments could revitalize central cities when there is a persistent commitment from local governments (Cervero, 2009). Cervero's and Guiliano's reviews of research provide important context for this study, but do not separate out the specific impact of LRT on development, which is discussed below.

2.2. LRT and real estate development

Many studies have investigated the impacts of LRT on property values, particularly residential properties (Cervero and Duncan, 2002; Chen et al., 1998; Duncan, 2011). Several studies also differentiated conventional accessibility effects and nuisance effects such as noises and vibrations (Chen et al., 1998; Golub et al., 2012). Some concluded that the impacts of LRT may depend on location and social contexts of properties. For example, LRT increased property values in high-income neighborhoods but had a detrimental impact on the properties in unprivileged areas in Buffalo (Hess and Almeida, 2007). Overall, most studies have concluded positive premiums of proximity to LRT stations. However, previous studies seldom test whether the premiums result from the proximity to LRT stations or the proximity to major intersections or activity destinations where LRT stations are often located. Before-after studies are required to answer this question (Ko and Cao, 2013).

Although the growth in property values increases tax base, it does not demonstrate whether development is actually taking place. From a neighborhood revitalization perspective, planners would like LRT systems to impact real estate development by facilitating new development, infill development of greyfields and brownfields, building rehabilitation, adaptive reuse of old buildings, and so on. Real estate development can be measured by building permit activity and land use change. This body of research is much more limited than research on property values.

Some studies have reported development impacts associated with LRT. As Topalovic et al. (2012) summarized, more than $2 billion of development has happened in downtown Portland after the opening of the MAX LRT and Dallas has seen more than $1.3 billion of development since the commencement of Dallas Area Rapid Transit. However, some argue that developments in downtown areas may have very limited connections with LRT; they will happen even if LRT is not built (Lyons, 2009). Moreover, these studies cannot illustrate the extent to which the developments are due to third-party variables such as regional economic growth. Thus, control areas are needed to isolate the confounding effect. Hurst and West (2014) explored the effect of the Hiawatha LRT on land use change in Minneapolis by comparing the parcels within half mile of LRT stations with those in the whole city. They concluded that proximity to LRT stations have led to changes for single-family and industrial properties, but not for vacant parcels, multi-family and commercial properties.

Furthermore, some scholars speculate that pre-operational milestones, such as planning and construction of LRT, can impact development and land use activity prior to (Topalovic et al., 2012). Previous studies showed that in anticipation of rail transit, property values increased prior to rail operations (Knaap et al., 2001; Bae et al., 2003; Golub et al., 2012). Sometimes, the greatest increase in property values takes place before LRT opens (Cervero, 1994). Despite evidence that LRT impacts property values, rigorous empirical evidence on land speculation is scarce. One study, Hurst and West (2014) did find that industrial land use changed along the Hiawatha LRT during its construction.

This study fills the gaps and enriches the literature by examining how key LRT project announcements and planning activities contribute to real estate development.