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Real Estate Development in Anticipation of the Green Line Light Rail in St. Paul



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Real Estate Development in Anticipation of the Green Line Light Rail Transit in St. Paul

Final Report

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Executive Summary

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 building permit data from 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 impacts on the count and value of building permits, whereas the announcement of Full Funding Grant Agreement tended to increase the number of building permits by about 30% and the value by 80%. We concluded that in addition to LRT investment, proactive land use planning policies, public subsidies, and public funded projects are important contributors to building activity.

Chapter 1: Introduction

Light rail transit (LRT) appears to dominate transit investments in the U.S. in the next few decades. Many LRT systems have begun operating in U.S. cities since 2000. Many more LRT systems have been proposed in different regions. Local and regional planners expect LRT investments to produce economic impacts, and often cite these impacts to justify the substantial costs of new systems. Despite these common expectations limited studies have explored the impacts of LRT on real estate development.

1.1 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, rail transit investments seem to offer only incremental improvements to accessibility. First, because accessibility (particularly by automobile) is often very high in well-established areas in developed countries, the impact of most transportation (including highway) investments on accessibility is marginal. However, this may not be true in the areas with sparse transportation infrastructure. Second, because rail transit investments often replace existing high-frequency bus services (Rubin, Moore, and Lee 1999), 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 economic development, and the impacts, if any, may not be large.

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 the areas with a strong regional economy than declining areas (Cervero 2009, Giuliano 2004). The impacts tend to occur at central business districts or severely-congested areas (Cervero 2009, Giuliano 2004). Land use and transportation policies that are complementary to transit-oriented development 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. We discuss it below.

1.2 LRT and real estate development

Many studies have investigated the impacts of LRT on property values, particularly residential properties (Cervero and Duncan 2002, Chen, Rufolo, and Dueker 1998, Duncan 2011). Some studies also differentiated conventional accessibility effects and nuisance effects resulting from noises and vibrations (Chen, Rufolo, and Dueker 1998). 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 (Ko and Cao 2013). The latter means that there are price premiums in the locations even before the introduction of LRT. Before-after studies help address this uncertainty.

Although the growth in property values increases tax base, it does not demonstrate whether development is actually taking place. From the perspective of neighborhood revitalization, 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. However, 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 were 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, scholars speculate that real estate development occurs even before LRT service opens (Topalovic et al. 2012). Previous studies showed that in anticipation of rail transit, property values increased before its commencement (Knaap, Ding, and Hopkins 2001, Bae, Jun, and Park 2003). Sometimes, impacts may be larger before LRT opens (Cervero 1994). If impacts on property contribute to real estate development, local

governments interested in maximizing development should create supportive policy environments and develop plans for transit-oriented development before the opening of rail transit projects. Although Hurst and West (2014) did find that developers have changed industrial land uses around the Hiawatha LRT during its construction, rigorous empirical evidence on land speculation is in scarce.

1.3 The objective and contribution

This study employs location quotients and difference-in-difference models to examine real estate impacts of the announcements of the Green Line LRT in St. Paul. It attempts to collectively fill several gaps. First, the number and value of building permits are our variables of interest, which are not well studied in the literature. Second, to minimize the effect of confounding variables, we adopt a treatment-control research design, by choosing high-frequency bus corridors in the city of St. Paul as the control for the Green Line corridor. Third, we explore the impacts of LRT before its opening. In particular, we use a before-after design to test the effects of two key announcements of LRT plans on building activity. Fourth, we differentiate the impacts within and outside of downtown areas. Overall, our analysis demonstrates positive impacts of the Full Funding Grant Agreement announcement on real estate development in St. Paul. Local planners indicated that the development impacts have been supported by local land use policies and by public sector investment in transit-oriented development projects.

In addition to its contribution to the field, this study is important for transitway planning in the Twin Cities as well as other regions. In its 2030 regional transportation plan, the Metropolitan Council of the Twin Cities has laid out an extensive transitway network: including LRT, bus rapid transit (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 development of the transitway network. Since it just opened, planners still have opportunities to affect development outcomes along the corridor. A better understanding of contributing factors to development impacts will also inform decision-making and planning of future transitways.

The report is organized as follows: Section 2 (Methodology) describes the Green Line project, data sources, and presents analysis approaches; Section 3 (Results and Discussion) discusses results. The last section (Conclusions) reiterates key findings and discusses their implications.

Chapter 2: Methodology

The following project facts provide context for our research. The Metropolitan Council's Central Corridor Project Facts showed that the LRT was recently branded as the Metro Green Line. The 11-mile line connects Downtown Minneapolis and Downtown St Paul along the University of Minnesota and University Avenue. It has 18 new stations (14 in St. Paul) and overlaps with the Hiawatha Blue Line at five stations in Downtown Minneapolis. The Green Line cost \$957 million and half was federally funded. Construction began in 2010 and ended in 2013. LRT service began on June 14, 2014, with a projected ridership of 40,000 per weekday by 2030.

2.1 Research design and data

Research design

This study adopts a before-after research design and compares building activities of treatment and control corridors before and after two key announcements. The treatment is the Central Corridor where the Green Line operates. We study only the segment of the Green Line in the city of St. Paul (referred as the Green Line for simplicity) although it runs in both Minneapolis and St. Paul. The controls are four corridors (Snelling Avenue, West 7th Street, Payne-Maryland Avenue, and a small section of Marshall Ave.) in St. Paul (Figure 1). Control corridors were recommended by local planners for the following reasons: all four corridors have the most frequent transit service in St. Paul and they are more or less mixed-used corridors. The choice of the control corridors allows us to compare areas with comparable levels of transit service to the Central Corridor.

To understand the implications of our before-after research design, it is important to review the history of the Green Line. According to the Metropolitan Council, initial planning activities date “as far back as 1981,” with a more recent milestone in 2001 when the Ramsey County Regional Railroad Authority began preparing an Alternative Analysis and Environmental Impact Statement for the Central Corridor. After completing those first phases of the project and receiving substantial public input, project authority was transitioned to the Metropolitan Council in June 2006. At this point, the project's approximate route was public, but the project did not have any assurance of federal support. A number of key announcements and milestones took place after this date and before commencement of LRT service.

We choose two key announcements: preliminary engineering (PE) and full funding grant agreement (FFGA). They represent significant progress toward construction and operation of the Green Line. The PE announcement on December 13, 2006 indicated that a locally preferred route for the Green Line was amended into the regional transportation plan and the Federal Transit Administration (FTA) started to fund its planning. This announcement coincided with additional media coverage for the project, and residents and businesses in the Central Corridor began to experience extensive planning activities such as station area planning. However, it was still uncertain whether and when the Green Line would be approved and constructed. The FFGA announcement in April 2011

indicated that the FTA was committed to fund half of the Green Line and it was expected to open in 2014. We assume that the different levels of certainty associated with each of these two dates will produce different impacts on building activities in the Central Corridor.

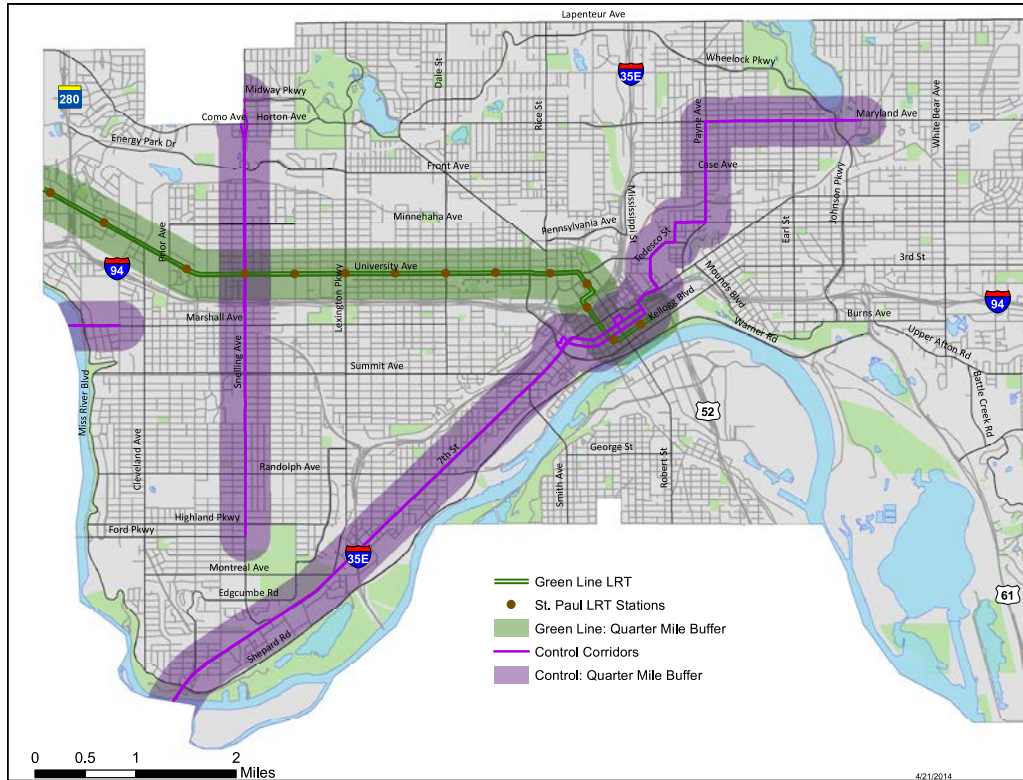


Figure 1: Green Line and Control Corridors

We do not consider several steps in the development of the Green Line. Two of the most notable include a decision to include three additional stops in St. Paul and the beginning of heavy construction on the project. First, in May 2010 after a significant local advocacy effort, the Metropolitan Council voted to include three additional stations along University Avenue at Western Ave., Victoria St., and Hamline Ave. Second, construction began in late 2010, several months prior to the receipt of the Full Funding Grant Agreement. The approval to include additional stations increases the number of parcels with rail access, and the start of construction can be considered a visible signal that the project is moving forward. Although these dates are beyond the scope of our analysis, they should be considered when interpreting our results.

Data

This research is based on building permit data maintained by the city of St. Paul Planning and Economic Development Department and tax parcel data maintained by the Ramsey County Assessor’s office. The building permit dataset includes the following information for each permit: property name, type of permit, building type, permit value, building

address, property identification number (PIN), and x-y coordinates. In some cases, there appeared to be quality-control issues. In a few cases, there were duplicate entries for certain permits. We made every effort to clean the data. A small number of permit entries were missing x-y coordinate data. In these cases, the building address or PIN fields were used to geocode the location of the permit.

We isolated permit data we believe to be most indicative of development activity. We eliminated permits directly associated with LRT such as construction of station platforms since they represent direct investment on the LRT, not additional development activity taking place as a result of the LRT investment. We then included permits for remodels, additions and new construction, and excluded permits for repairs and express repairs.

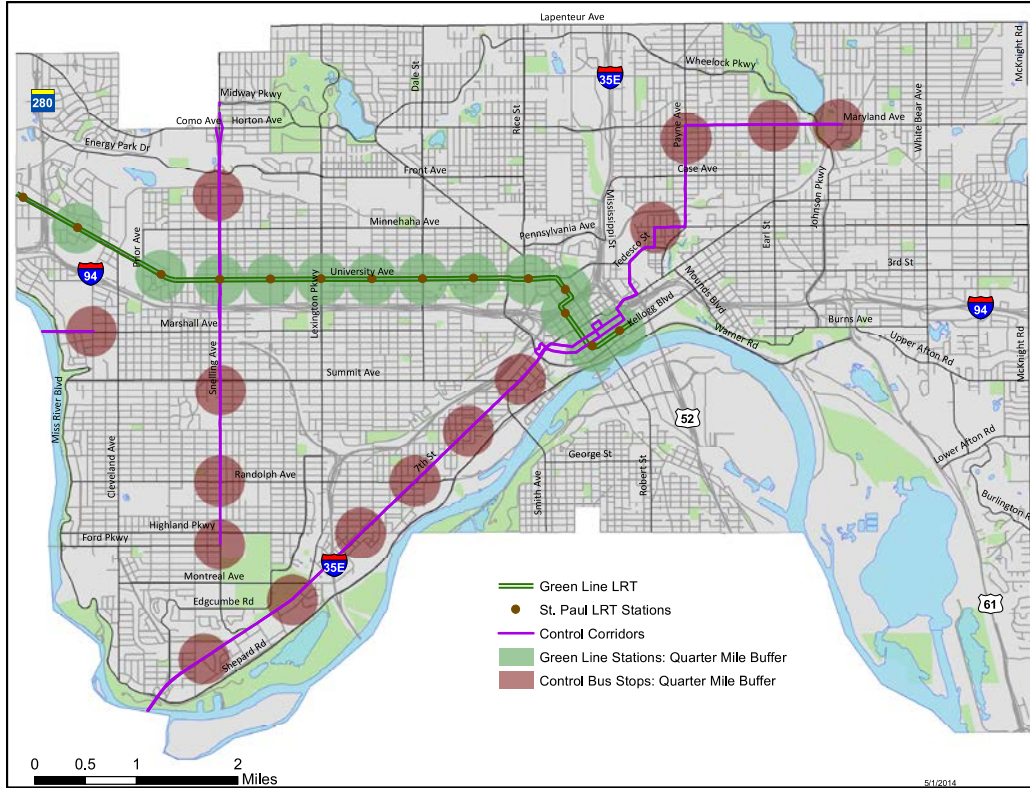
After assembling and processing building permit and parcel data, we used ArcMap 10.1 to extract data for the geographic areas of interest. We created quarter mile buffers for the Central Corridor and control corridors for location quotient (LQ) analysis. We also created quarter mile buffers for stations in the Central Corridor and bus stops in the control corridors for difference-in-difference (DID) models.

The panel data include monthly counts and values of building permits along all the corridors and for station areas of 13 stations in the treatment corridor and 15 intermediate bus stops in the control corridors (Figure 2). Three treatment stations are in downtown St. Paul. The data span from January 2003 to January 2014, including 48 months of building activities before PE, 33 months of building activities after FFGA, and 52 months of building activities in between.

2.2 Location quotients

We used LQ to compare the relative concentration of building activity in the LRT corridor within the city and to the control areas. This allows us to understand the relative strength of the treatment and control corridors, and also helps us contextualize overall building activity trends with respect to the PE and FFGA announcements. Location quotients are a “spatial analysis technique that measures concentration or dispersion of a given activity across space, with values greater than 1 demonstrating concentration and values less than one demonstrating dispersion” (Cidell and Beata 2009) (p.143). We calculated LQ for the total number of building permits and total permit value for the treatment and control corridors, using the city of St. Paul as the reference area. The formula is expressed as follows:

$$LQ = \frac{\# \text{ or } \$ \text{ value of permits within } x \text{ distance of study area}}{\text{total \# of parcels within } x \text{ distance of study area}} \div \frac{\text{Total \# or \$ value of permits in Saint Paul}}{\text{Total \# of parcels in Saint Paul}}$$



*Note that the DID analysis includes an analysis of all station areas and an analysis of station areas outside of downtown. The latter excludes the three LRT stations in downtown (the easternmost stations on this map).

Figure 2: Treatment and Control Station areas

2.3 Difference-in-difference model

The DID model is expressed as follows:

$$Y_{it} = \beta_0 + \beta_1 T_i + \beta_2 PE_t + \beta_3 FFGA_t + \beta_4 (T_i * PE_t) + \beta_5 (T_i * FFGA_t) + e_{it}, \quad (1)$$

where Y_{it} denotes the count (or value) of building permits at station (or stop) i in time period t ; T_i is a dummy variable indicating whether the station i is in the treatment corridor; PE_t is a dummy variable indicating whether the time period t is after the PE announcement; $FFGA_t$ is a dummy variable indicating whether the time period t is after the FFGA announcement; e_{it} is the error term; $(T_i * PE_t)$ and $(T_i * FFGA_t)$ are policy variables in this study. β_1 , β_2 and β_3 are main effects whereas β_4 and β_5 are interaction effects. Specifically, β_1 represents the impact of the Central Corridor on building activities, which may not be related to the Green Line. β_2 and β_3 show temporal impacts on building activities, which reflect regional economy over time. β_4 and β_5 indicate the impacts of the Green Line on building activities after the PE and FFGA announcements, respectively. If interaction effects are significant, main effects cannot be interpreted as independent effects. The DID model accounts for the effects of any time-invariant variables such as access to freeway. Because the data include an excessive number of

zeros and our variables of interest are overdispersed, we develop zero-inflated negative binomial regression in Stata 12.0 (<http://www.ats.ucla.edu/stat/stata/dae/zinb.htm>, accessed on April 25, 2014).

Chapter 3: Results and Discussions

This section presents empirical results. It should be kept in mind that location quotient analysis focuses on the whole corridor whereas DID models are for station areas (quarter mile buffers) only.

3.1 Location quotients

Table 1 presents descriptive statistics and location quotients of building activities in the Central Corridor and the control corridors for three periods. The periods include: before the PE announcement (*Jan. 2003 - Dec. 12th 2006*), after the PE announcement but before the FFGA announcement (*Dec. 13th 2006 – April 26th 2011*), and after the FFGA announcement (*April 27th 2011 – January 31st 2014*). We report the following normalized descriptive statistics: the number (or value) of permits divided by the number of parcels in a corridor and then divided by the number of years in the time period. These statistics provide a sense of the magnitude of activity in the Central Corridor and control corridors with respect to the size of the corridor and the length of the time period examined.

Table 1: Descriptive statistics and location quotients of building activities

	All			Non-Downtown		
	Green Line	Controls	Difference	Green Line	Controls	Difference
Ratio of permits/#parcels						
<i>Count</i>						
Before PE	0.035	0.030	0.005	0.034	0.030	0.004
After PE	0.030	0.024	0.006	0.027	0.023	0.004
After FFGA	0.042	0.033	0.009	0.037	0.031	0.006
<i>Value (Thousands)</i>						
Before PE	\$21.6	\$8.4	\$13.2	\$10.3	\$5.3	\$ 5.0
After PE	\$12.2	\$6.3	\$5.9	\$8.4	\$5.5	\$2.9
After FFGA	\$19.1	\$12.5	\$6.6	\$5.5	\$7.7	\$(2.2)
LQ						
<i>Count</i>						
Before PE	1.21	1.03	0.18	1.18	1.02	0.15
After PE	1.35	1.08	0.27	1.22	1.05	0.18
After FFGA	1.37	1.07	0.31	1.21	1.01	0.21
<i>Value</i>						
Before PE	4.08	1.58	2.50	1.96	1.00	0.96
After PE	3.51	1.80	1.70	2.42	1.58	0.84
After FFGA	4.25	2.79	1.46	1.22	1.72	-0.50

We have a few key observations. First, all location quotients are larger than one, which means there were concentrated building activities along the corridors compared to the city as a whole. This makes sense because all are major corridors in the city. Second, for all but one entry (value-after FFGA-non-downtown), the location quotients for the Central Corridor are larger than those for the control corridors. Thus, there were more concentrated building activities in the Central Corridor than the control corridors. Finally, for the number of building permits, the difference between the Central Corridor and control corridors grew over the three periods. In contrast, the difference in the value of building permits seemed to shrink over time. Although location quotient analysis offers intuitive results, it is unable to distinguish the impact of the Green Line from economic trend in the region. Accordingly, multivariate analyses are in order.

3.2 Difference-in-difference models

For all DID models presented in this section, the overdispersion factor, Alpha, is statistically significant. Therefore, negative binomial regression is better than Poisson regression.

Table 2 presents the impacts of the PE and FFGA announcements on permit counts. For the stations outside of downtown St. Paul, since $T*PE$ is insignificant, the PE announcement of the Green Line has no significant impact on the number of permits. T is insignificant in the model. PE is significantly and negatively associated with permit counts. That is, the number of permits went down after December 2006, due to the economic recession. These relationships can be approximately illustrated in Figure 3(a). $T*FFGA$ has a positive association with permit counts, with a p-value of 0.07. Therefore, after the FFGA announcement, the Central Corridor has experienced more building activities than control corridors. Since we have controlled for FFGA – a temporal effect, the growth can be attributable to the FFGA announcement of the Green Line. Because T and FFGA are insignificant, the relationships can be approximately illustrated in Figure 3(b). For all stations in St. Paul, PE and $T*FFGA$ are also significant at the 0.1 level. Furthermore, T is positively associated with permit counts. In other words, there were more building activities in the Central Corridor than the control corridors during the whole study period. The other two variables are insignificant. The relationships can be approximately illustrated in Figure 3(c) and 3(d), respectively. Overall, the FFGA announcement of the Green Line increased the number of permits for all stations of the Green Line and that for the stations outside of downtown areas.

Table 3 illustrates the impacts on permit values. For the stations outside of downtown areas and all stations, T , PE, and $T*PE$ are significant. The significant and negative coefficient of $T*PE$ indicates that the Central Corridor relatively performed worse than control corridors after the PE announcement. This is likely due to the uncertainty associated with commercial properties as explained later on. However, the net values in the Central Corridor were not worse than those in control corridors (see Figure 3(e) and 3(g)). $T*FFGE$ is significant in the model for all stations but insignificant in the model for the stations outside of downtown areas. This suggests that the Green Line strengthened building activities in downtown St. Paul. This is consistent with the

literature (Cervero 2009, Giuliano 2004). Since FFGA are insignificant, the relationships can be approximately illustrated in Figure 3(f) and 3(h), respectively.

Table 2: The Impacts of LRT on permit count

	Non-downtown		All	
	Coefficient	P-value	Coefficient	P-value
Intensity model				
Treatment (T)	-0.047	0.590	0.440	0.000
PE	-0.254	0.010	-0.261	0.013
FFGA	0.042	0.708	0.110	0.277
T*PE	0.109	0.381	0.119	0.333
T*FFGA	0.252	0.070	0.217	0.076
Constant	0.137	0.049	0.035	0.628
Alpha	0.423	0.000	0.637	0.000
Inflation model				
Treatment (T)	-23.753	1.000	-14.440	0.995
PE	0.159	0.745	0.289	0.824
FFGA	-1.561	0.364	-13.498	0.987
T*PE	10.075	1.000	-3.929	1.000
T*FFGA	-10.524	1.000	7.150	1.000
Constant	-1.777	0.000	-2.879	0.005
Vuong test		0.034		0.245
N of observations	3325		3724	

Overall, the FFGA announcement increased building activities in the station areas of the Green Line. How big are the impacts? Based on the coefficients of T*FFGA, the FFGA announcement increased the number of permits around all station areas by about 24% and its impact on permit value is at the magnitude of 80%. These impacts are substantial.

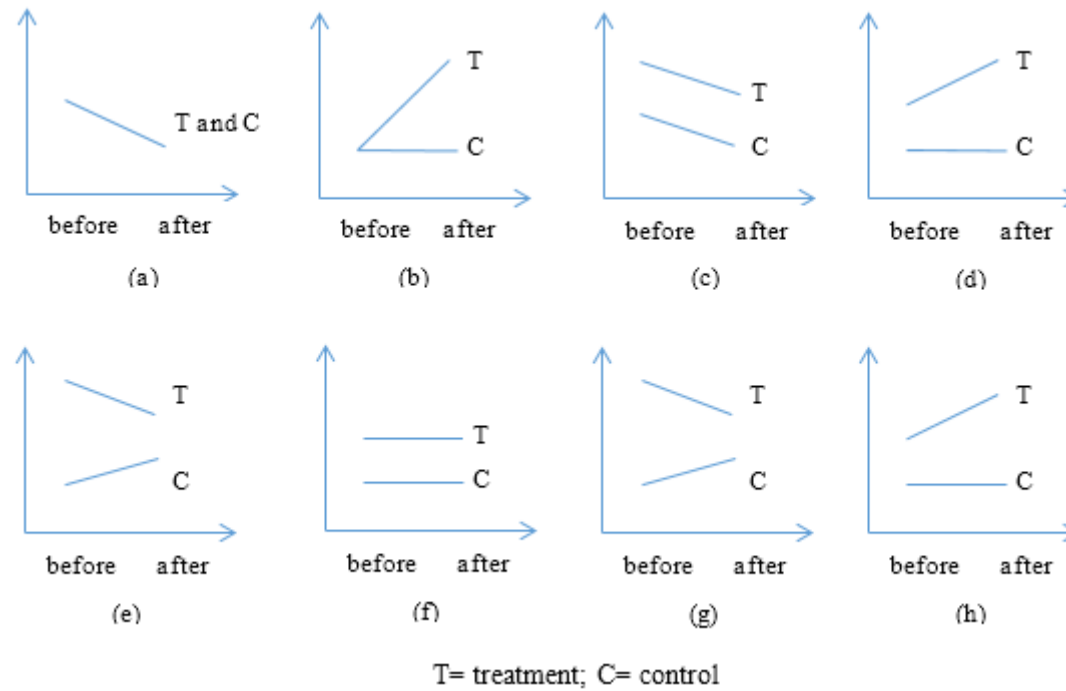


Figure 3: The Approximate Relationships of Key Announcements and Building Activity Related to Tables 2 and 3.

Table 3: The Impacts of LRT on permit value

	Non-downtown		All	
	Coefficient	P-value	Coefficient	P-value
Intensity model				
Treatment (T)	1.155	0.000	1.642	0.000
PE	0.679	0.000	0.679	0.000
FFGA	-0.033	0.851	-0.033	0.847
T*PE	-1.047	0.000	-1.478	0.000
T*FFGA	0.067	0.793	0.588	0.010
Constant	12.798	0.000	12.806	0.000
Alpha	4.619	0.000	4.342	0.000
Inflation model				
Treatment (T)	-0.330	0.009	-0.645	0.000
PE	0.336	0.002	0.332	0.002
FFGA	-0.330	0.006	-0.327	0.006
T*PE	-0.209	0.230	-0.229	0.163
T*FFGA	-0.149	0.454	-0.121	0.522
Constant	0.176	0.027	-0.159	0.043
Vuong test		0.000		0.000
N of observations	3325		3724	

We further test the impacts on commercial (including mixed-use and industrial) properties and residential properties (both single and multifamily properties) because they are important tax bases. Table 4 summarizes key findings (model results available from authors upon request).

Table 4: The impacts of LRT on residential and commercial properties

	All		Non-Downtown	
	After PE	After FFGA	After PE	After FFGA
Count				
Commercial	Insig.	Insig.	Insig.	Insig.
Residential	Insig.	Insig.	Insig.	Insig.
Value				
Commercial	Negative	Positive	Insig.	Positive [#]
Residential	Insig.	Negative	Positive	Negative

Insig.=insignificant at the 0.10 level

For all stations and non-downtown stations, the PE announcement of the Green Line had no impact on the number of permits for both residential and commercial properties. In contrast, it negatively affected the value of commercial property permits for all stations but positively influenced the value of residential property permits for non-downtown stations. The PE approval from the FTA was right before the recession. The negative

impact on commercial property permit values reflects developers' hesitance to make new investments, and the Central Corridor was particularly hit due to its strong performance before the PE announcement (see Table 1). Further, local planners indicated that retailers along the Central Corridor were not happy with LRT planning because they did not know what was going on and worried about the impacts of future construction on their businesses. On the other hand, the positive impact on residential property permit values may reflect the increasing popularity of location-efficient housing in the Central Corridor during the recession.

The FFGA announcement of the Green Line increased the values of commercial property permits for stations outside of downtown St. Paul and all stations although it had no impacts on permit count. Local planners stated that commercial property owners conducted substantial building improvements simultaneously with the LRT construction in order to mitigate the impacts of the construction on business activities. For residential properties, the Green Line had no impacts on the number of permits but decreased the values of permits for all stations and non-downtown stations. This implies that building activities occurred in low-cost housing.

Again, the FFGA announcement increased the value of building permits of commercial properties in LRT station areas, whereas the impacts of the PE announcement are either insignificant or negative. This pattern is consistent with the findings of another study on the Green Line. Fan and Guthrie (2013) interviewed 24 developers in the Twin Cities and found that only one developer made speculative commercial development. The developer stated that "we want to look at something that's been true, tested, that's already here, not something that's on a wish list that may or may not occur." Furthermore, developers also indicated that it is difficult to get funding for speculative development and to lease the properties once they are built. The outcome of the project was much more certain after FFGA than after PE, so it is natural that the FFGA has greater impacts on building activity.

3.3 The roles of planning interventions

Role of land use planning

Supportive development regulations have contributed to the significant impacts on building activity in LRT station areas. Although it is difficult to quantify the exact impact of public engagement, local planners believe that planning and public participation efforts between 2006 and 2011 have created a permissive and encouraging policy environment for real estate development later on. From August 2006 to April 2007, two citizen task forces created the Central Corridor Development Strategy (CCDS), which outlined the vision and strategy for the growth in the Central Corridor in the next 20-25 years due to the potential LRT investment. Right after the adoption of the CCDS, the city of St. Paul started to develop station area plans. These plans were adopted in October 2008, which is almost six years before the opening of the Green Line. By contrast, station area plans of the Hiawatha LRT were adopted a few years after its opening. The pro-active planning sets up a foundation for a mutual understanding about future transit-supportive development among city and transit planners, residents, business owners and developers.

Conversations with residents who participated in the processes have at the very least helped generate awareness about transit-oriented development. The public release of maps pinpointing development opportunities may have helped to draw attention to opportunities both in downtown and along the line.

The new land use planning regulations implemented in April 2011 (coinciding with the FFGA) appear to have had important impacts, although most policy changes took place outside of downtown St. Paul. Zoning code amendments include the adoption of a “Traditional Neighborhood 4” zoning district which allows for additional height and density along the corridor. Furthermore, the new regulations give additional flexibility for mixed-use development, eliminate minimum parking requirements, and emphasize pedestrian-friendly design. Based on our results, these regulations seem to have helped facilitate a greater volume of all permits, and have supported increased value of commercial permits.

Although there have not been policy changes in downtown during our period of study, public realm improvements in downtown may have also contributed to development activity. Beyond the highly visible LRT station platforms in downtown, local planners noted that the city of St. Paul has made substantial public realm improvements since 2011. These include ornamental paving along the line in downtown St. Paul and the building of a “vertical connection” between LRT and St. Paul’s skyway system. These improvements may have helped support the positive impact of the LRT on downtown St. Paul. In conjunction with the LRT investment, public realm investments may be contributing to a more positive image for downtown St. Paul. Overall, positive impacts of the LRT on downtown St. Paul are particularly notable given that the area has lagged far behind downtown Minneapolis in terms of its public perception, employment levels and residential population for many years.

Role of public subsidies and publicly funded real estate projects

Publicly-funded real estate projects have also been at least partly responsible for the impacts we have identified above. Most notably, there have been a number of very large publicly-developed projects in downtown St. Paul after FFGA. The most expensive and high-profile project is a \$243 million renovation of the Union Depot led by the Ramsey County Railroad Authority (RCRRA). Progress on the Union Depot project began prior to the FFGA announcement, but a majority of the permit dollars pulled for the project were after the FFGA announcement. It is worth noting that permits for the Union Depot project are considered “commercial” although the facility was renovated as a multi-modal transportation hub with commercial uses. It is worth noting that since high speed rail will not come in the short term, the Union Depot project may not have happened if the Green Line was not available. In addition, the “Penfield” mixed-use project including apartments and retail was developed by the St. Paul Housing and Redevelopment Authority (HRA) with local and federal funding.

Development subsidies from various levels of government have also been instrumental in some of the impacts along the Green Line. Subsidized housing has been built along the University Ave. and near downtown (e.g. Episcopal Homes project). These projects have

been funded through a variety of sources, such as the Minnesota Housing Finance Agency and the Department of Housing and Urban Development (HUD). In addition, privately-funded projects along the Green Line have benefited from tax increment financing (TIF) and other financial incentives to promote development. Finally, small businesses that were negatively impacted by construction along the Green Line received subsidized loans and grants from the city of St. Paul and from other organizations. These funds could be used for façade improvement and business expansion. These incentives may have helped facilitate improvements to commercial buildings along the line. Overall, these subsidies may have redistributed some real estate developments within the city or region. On the other hand, the Green Line becomes a magnet for neighborhood revitalization in the central city.

Because of public investments and subsidies, this research cannot clearly demonstrate the impact of the Green Line LRT on private real estate market. With that said, many projects in central city areas tend to have some sort of public support because they are much more complex than greenfield projects due to the difficulty and uncertainty associated with brownfield and greyfield sites.

Chapter 4: Conclusions

This study explores the impacts of the PE and FFGA announcements on building activities along the Central Corridor where the Metro Green Line LRT operates. Overall, we found that the PE announcement had few positive impacts on the number and value of building permits, whereas the FFGA announcement produced substantial impacts on building activities 0.25 mile around the LRT station areas. The results suggest that developers and property owners are risk-averse since FFGA is much more certain than PE. On the other hand, they are somewhat speculative because the Green Line has yet to open and its accessibility impact is to be confirmed. The study also showed that results somewhat vary when downtown stations are included or excluded in the analysis. Proactive planning could play an important role in stimulating real estate development along the LRT corridor.

This study shows that real estate development grew along the Central Corridor in anticipation of the Green Line LRT. However, it cannot tell whether the building activities represent a net growth in the region or just a redistribution of growth within the region. In fact, rail transit is more likely to direct/redistribute growth instead of generate growth in a region (Cervero 2009, Giuliano 2004, Handy 2005). Nevertheless, the Green Line seems to revitalize neighborhoods in the Central Corridor and creates location-efficient neighborhoods. This is helpful for the city of St. Paul and the region as a whole.

This study also suggests that municipal building permit data is a vital resource for assessing the impacts of major transit projects on real estate development. As local planners have commented, building permit data help them understand development impacts in ways that may not be possible with aerial photographs or other data sources. For example, this study was able to demonstrate significant impacts of the FFGA on the number of permits. This suggests that many projects associated with the LRT may be small scale in nature, such as improving a storefront or remodeling a single-family home. These projects are not highly visible to the public, and do not result in significant land use change. However, small projects do represent signs of physical revitalization in central city areas that are already highly developed. This particular result indicates the potential of building permit data to help us answer questions about urban development that may be difficult to answer with other sources.

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