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Residential property valuations near transit stations with transit-oriented development

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ABSTRACT

Access to train stations is highly valued and this is reflected in the premium price of residential property near train stations. Transit-oriented development (TOD) and the amenities provided by mixed-use development may also provide value to consumers. The analysis presented here evaluates the median property valuations surrounding eight transit stations with TOD using residential property valuation data provided by Zillow™, an on-line real estate listing firm. A hedonic regression analysis was used to evaluate the association between median block-group-level residential property valuations and the distance to the station with TOD and other stations with direct, non-stop access to New York City, while controlling for demographic and housing variables. Spatial econometric software and techniques are used to control for spatial autocorrelation. Results suggest that while the mixed-use development typically found with TOD is likely valued, proximity to stations with direct access to New York City leads to higher relative property valuations.

1. Introduction

The New Jersey Transit (NJT) rail system provides direct access to New York City, where many people are employed, and also to urban centers within the state, in particular Newark and Hoboken. NJT is the largest rail network by track-mileage in the U.S., with over 160 stations and nearly 300,000 daily customers. Development around and near rail stations is seen as a way to increase ridership and provide greater access to employment centers. In New Jersey, transit-oriented development (TOD) can be one solution that satisfies a range of goals that may vary by municipality. TOD commonly refers to individual developments, but also to general efforts to intensify mixed commercial and residential developments and improvements to the walkability of station areas. Some municipalities view TOD as spurring urban redevelopment and revitalizing older towns with commuter rail stations. Poorly utilized land near some rail stations provides an opportunity for more intense development, and many New Jersey planners and developers are very enthusiastic about the potential of TOD (Noland et al., 2013).

The access provided by the rail system and the amenities associated with redevelopment should result in residential properties near stations having more value than those further afield. The research presented here evaluates this question through an analysis of proximity to selected stations targeted for TOD and nearby stations with direct access to New York City. This is done by developing a hedonic regression analysis based on block-group average property value estimates obtained from Zillow™ (2013a). These are linked to various block-group level census data and municipality data on school quality, crime, tax rates, and other factors known to influence residential property valuations. The main contribution of this work is to evaluate the variation in residential property valuations associated with rail access using spatial-econometric techniques. An additional contribution is to evaluate the efficacy of using aggregate spatial housing price data provided by Zillow™ (2013a) for the purpose of decomposing property values. The analysis here is distinct from many other studies in that the evaluation is based on stations that have existed, in many cases, for over a century. Thus, most of the towns have well-established centers often built and developed in response to the original rail lines. Some of the cities are much older, dating to colonial times (e.g., New Brunswick and Morristown).

2. Property valuation

Hedonic regression modeling typically is used to examine the effect of rail access on residential housing prices. Recent work in New Jersey has evaluated residential property value appreciation associated with new light rail lines, specifically the RiverLine in

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South Jersey (Chatman et al., 2012) and the Hudson-Bergen Light Rail line along New Jersey's "gold coast" across the Hudson River from Manhattan (Kim and Lahr, 2013). The analysis of the River-Line found that price appreciation of home values occurred in lower-income neighborhoods, while no effect was found when all neighborhoods were included. There was evidence of a redistribution of the gains in property value; those areas further from the stations lost relative value while some nearer to the station gained (Chatman et al., 2012).

Construction of the Hudson-Bergen Light Rail line was found to lead to appreciation in residential property values (Kim and Lahr, 2013). In particular, appreciation was larger around those stations that were in the least accessible areas initially (i.e., most distant from the Jersey City central business district where good rail service to Manhattan already existed (via PATH trains). Kim and Lahr (2013) used data on changes in property values, but these were limited in that housing attributes were generally unavailable, a problem inherent with New Jersey property sales data that are publically available. Previous work in New Jersey also examined whether state support for transit-oriented development had an impact on municipal property values (Noland et al., 2012). Results suggested that the designation of a municipality as a "transit village" had little impact; the main impetus for property value appreciation was strong local support for enhanced planning and development around the station areas (the New Jersey Transit Village Initiative is discussed further below).

Beyond New Jersey, studies throughout the U.S. similarly indicate that home owners are generally willing to pay a premium to be located near a transit station in order to reduce commute times. Several studies show that TOD has a synergistic effect on property values. A review of the literature by Bartholomew and Ewing (2011) suggests that compact development can generate a premium of 40–100% compared to houses in nearby single-use subdivisions. Duncan (2011) examined condominiums in San Diego and found that distance to a transit station could become a significant predictor of property values, given a pedestrian-oriented environment – specifically, a favorable intersection density and a considerable amount of practical commercial establishments. However, it has also been found that, while they wish to be close, home owners may prefer not to be too close to stations as some negative characteristics, such as noise, may outweigh the locational advantages. For example, single-family homes in the Atlanta region closest to stations (within 1/4 mile) were found to be selling for 19% less than properties located more than three miles from stations, after controlling for the physical characteristics (size, number of bedrooms, number of bathrooms) of the housing and for neighborhood characteristics (crime, noise, pollution, aesthetics) (Bowes and Ihlanfeldt, 2001). In addition, specific rapid transit modes have been found to affect property values differently: positive effects on property values are greater for stations served by commuter rail than by heavy rail, and Bus Rapid Transit generally decreases nearby property values (Bartholomew and Ewing, 2011; Debrezion et al., 2007). Effects on property values also depend on the frequency, geographic extent, and speed of the transit service provided, as well as the extent of nearby traffic congestion (Bartholomew and Ewing, 2011). Recent studies have accounted for different housing forms (single-family vs. multi-family), parking availability, and amenities offered by TOD locations (Song and Knaap, 2003).

Some studies focus on new rail systems and how the changes in access affect property valuations. A good example is an analysis of light-rail in Houston, Texas, which found that there was a significant increase in property values following the announcement that the light-rail line would be constructed (Pan, 2013). Thus, consistent with theories in urban economics, the expected change in accessibility triggered demand for housing more proximate to the new rail stations. However, similar to Bowes and Ihlanfeldt (2001), those properties closest to the rail stations suffered negative effects due to externalities (such as increased noise or traffic). A study in New Zealand of a major commuter rail upgrade also found some disamenity effects near some stations but, in general, found positive effects associated with proximity beyond a certain distance (Grimes and Young, 2013). This study found that redevelopment around one station reduced the negative external effects of being directly proximate to the station.

Separating the pure accessibility benefits and the neighborhood effects associated with being near a rail station is an issue not typically analyzed. A review of the literature by Bartholomew and Ewing (2011) pointed out that most studies do not account for the better mix of land uses or improved urban design features that are often found around rail stations with TOD, but those that do find a premium associated with access to locations with good amenities (such as a mix of retail establishments). A study using data from Oregon found that the design features of TODs also have significant value to residents. These features included street connectivity, smaller block sizes, an even mix of land uses, better pedestrian access to commercial areas, and proximity to light rail stations. Different forms of housing (single vs. multi-family) were also found to be a significant predictor of home values (Song and Knaap, 2003).

Mathur and Ferrell (2009) explored whether expressed opposition to TOD would affect housing prices. They examined single-family home prices near four suburban San Francisco TODs, believing that TOD development should affect housing prices. Opposition to TOD may be voiced but true negative effects of such development should be seen in lower housing prices of property close to new TOD. Increases in housing prices, however, would indicate that TOD had a positive effect on surrounding neighborhoods. Mathur and Ferrell (2009) found a positive effect from one TOD and no effect from the remaining three TODs. Further to this work, an examination of the amenity value of TODs was conducted for one station in San Jose. This was aimed at evaluating whether the perceived negative aspects (such as more traffic) were outweighed by the amenity of having various retail and other services in a nearby mixed-use development (Mathur and Ferrell, 2013). While controlling separately for access to the light-rail station and to the TOD, it was found that the TOD amenities had an association with increased property values, suggesting that residents (and potential residents) value these.

Nearly all of the hedonic studies reviewed used individual housing transactions data, obtained either from tax records or multiple-listing services. One study used census data on average housing values to estimate a hedonic model at the block-group level (Shultz and King, 2001). Results were generally comparable to those of other studies, although there was some discrepancy in parameter estimates based on the spatial unit used for analysis; block-groups were found to be preferred. Very few studies, to date, have also applied spatial econometric techniques to account for clustering effects. One exception is a study by Haider and Miller (2000) of housing values in Toronto, whose analysis, however, did not report whether the spatial lag model they estimated resulted in differences in proximity to transit variables.

Our study attempts to disentangle the effects of proximity to a station while accounting for TODs that are near stations. While we do not examine explicitly the amenities associated with TODs, instead we evaluate the difference in housing-price gradients from stations with TODs and those with direct train service to Manhattan. Methodologically, we estimate spatial econometric models along with block-group-level property data. This is due to limitations in our data, but also provides a means for controlling for other area-based measures that affect housing values. These are crime rates, school quality, and access to green space, measures that most other studies do not include.