The Jahangirnagar Review: Part II: Social Science, Vol. 46, No. 2, 2022
ISSN 1682-7422 © Jahangirnagar University

A Scoping Review of Transit Impacts on Residential Rents

Afsana Haque[1]

Abstract: Increases in property values near mass transit investments, particularly rail or BRT, is often viewed as a success, indicating preferences for transit access and development potential. Increases in residential rents near transit are important to look at, to measure changes that may be connected to displacement of lower-income households, and to shed light on preferences of a different population than the most frequently studied homeowners or investors. This paper conducts a Scoping review of literature to identify the literature evidence about the impact of transit on residential rents. In order to most accurately capture these effects, this review specifically searches for literature using longitudinal, or repeat-transaction, methods. While the field of research on transit impacts on property values is vast, the review only found two articles meeting these specifications. The literature results indicated that there is a significant difference between results with hedonic rather than longitudinal or repeat rental data. More research is needed globally to better understand differences between capitalization of transit access in rental and housing markets, and to better inform the relationship between housing affordability and transit access for lower-income residents.

Keywords: Transit, Accessibility, Hedonic price, Longitudinal data.

1. Introduction

Access to affordable housing near public transit is very important, for many reasons. Low-income households are more likely to be transit-dependent and less likely to own a car than wealthier ones, and improvements in public transit can provide essential access to jobs and other life activities. However, public transit investments often are accompanied by increases in property values and housing cost, threatening affordability and housing stability and meaning that residents who would benefit most from access may not be able to see improvements from it (Chapple & Loukaitou-Sideris 2019).

There is an extensive literature of empirical studies investigating the impacts of public transit, traditionally rail, in the context of United States especially, however. Changes in property values are often used for making inferences about land use and economic development impacts (Stokenberga, 2014). The majority of research, however, has been on single-family homes as opposed to multifamily units, and relies on home sales as opposed to looking at rental housing (Stokenberga 2014).

The relative lack of research on the impacts of transit investments on residential rents is a concern for equity reasons. Over a quarter of renters have severe housing cost burdens, far more than the ten percent of homeowners who do (Goodman & Ganesh, 2017). There is far more housing instability among renter households: they are more prone to displacement when property values do increase, and few renters globally have rental protections

[1] Associate Professor, Department of Urban and Regional Planning, Jahangirnagar University, Savar, Dhaka. Email: afsana@juniv.edu

(Chapple & Loukaitou-Sideris 2019). In addition to the equity considerations, renters are an important group to study preferences for, as it is likely that renters may value access to transit differently than homeowners. This paper aims to fill this gap in the literature by conducting a review of empirical research using longitudinal or repeat transactions to study the impacts of transit on residential rents.

2. Methods

Scoping reviews are exploratory, and they typically address a broad question. Researchers conduct them to assess the extent of the available evidence, to organise it into groups and to highlight gaps. This study uses the PRISMA statement (Moher et al. 2009), as adapted by Benmarhnia (2014), to develop and report a Scoping literature review using predefined keywords and criteria. This study involved a grouping of four sets of keywords to comprehensively identify studies both pertaining to the impact of transit on residential housing rents, which also use longitudinal or repeat rental data. Keywords, abstracts, and papers were searched in two databases: TRID, and EBSCO Host (all databases). All results were filtered for only printed materials (TRID) or journals (EBSCO Host), and for materials printed before December 2019. The keywords used for the literature search were: ("transit" OR "transport*" OR "rail*" OR "bus" or "BRT" or "subway" or "train") AND ("rent*") AND ("hous*" or "home") AND ("impact" OR "effect*") AND "Repeat*" or "Longitudinal". In the final TRID search, all phrases were used as keywords (there was no option to specify search areas). In the final EBSCO search, all phrases were searched in Abstracts. Specifications were added in stages to ensure they were not too restrictive. In the second stage, articles were reviewed for relevance. There were six studies meeting final review from the TRID search, and two studies in the EBSCO Host search. Due to the small number of studies meeting the final criteria, abstracts for all studies at this stage were reviewed for their relevance to the impacts of transit on residential rents. Final article reference lists were reviewed as well, though no new articles were added from the literature lists.

3. Results

In total, 278 articles were reviewed through the search process in both databases. Due to differences in search specification options across the two databases, the two searches used different components, with a keyword search in the TRID search, and abstract search in the EBSCO Host database. The first specification for inclusion was a Boolean phrase describing components of the primary topic, relating to transport, rental housing, and impacts. The majority of articles (170) were rejected after the secondary abstract search, which specified repeat or longitudinal to select for this form of analysis. Finally, eight articles had their abstracts reviewed by the author for direct relevance to the topic of looking at the impact of transit on residential rents. In the final review stage, two of the TRID results and one of the EBSCO Host results met these criteria; the other articles were irrelevant or did not focus on or have empirical results on transit and residential rents. A final duplicate check revealed that the article found through EBSCO Host was the same as one of the TRID articles, so in total two articles met the criteria. The author double checked the EBSCO Host database search to ensure that the article found from the TRID search was not missed during the search process; the article was not available through EBSCO Host.

Sun et al use repeat-rental transactions to study the capitalization of access to the Beijing metro in home prices in the late 2000's. With a dataset of close to 12,000 units and 43,500 transactions (from 2005-2011), as well as locational and unit attributes for each housing unit, they compare results from a cross-sectional hedonic model to those from a repeat-rentals model. Transactions were spatially distributed across the city, and inclusions of spatial regressions are very similar to ordinary least squares, indicating little bias from spatial autocorrelation. Metro access is measured with linear distance to the nearest subway station: the Beijing metro was undergoing They find significant differences across the two models, with a rent-distance elasticity of -0.02 for the repeat-rentals model and -0.07 in the hedonic model. This indicates that the actual rent premium is two-thirds less when accounting for the effect of unobserved neighborhood characteristics and sample selection problems (related to subway site planning). The rent-distance elasticity found in their hedonic model was very similar to an estimate of -0.066 in previous research on Beijing (Zheng et al, 2014), indicating that the important distinction may be the use of a longitudinal or repeat transaction dataset instead of a difference between rental versus ownership markets.

Lee et al (2018) use a repeat-rental model to measure the difference in rent capitalization in housing that is seeing an increase in network accessibility compared to those that are not affected by network expansion. They compare the rent gradients across both sets of subway stations, using rental housing data in Seoul from 2000 to 2012. Their goal is to examine the network expansion effect, by examining rent increases in apartments whose closest transit stations did not change (but are connected to the expanding network) and relative changes in accessibility to three main employment centers. They find that the marginal value of being 100m closer to the nearest subway station increased by 0.6% due to the network improvements over time. This value unfortunately does not have an equivalent hedonic measure for rental housing or network effects in Seoul to compare to.

However, researchers have periodically conducted reviews of the many studies looking at the impact of transit on housing cost (Vessali, 1996; Debrezion et al, 2007; Stokenberga, 2014) as well as selected summaries of these works (Bartholemew & Ewing, 2011; Giuliano & Agarwal, 2017). The vast majority of literature describes a positive increase in home values in areas closest to transit improvements, with a large premium within a small radius (e.g., ½ mile of light rail stations) and a lower but still positive premium for homes within a larger radius (e.g., 1-1.5 miles of transit) (Giuliano & Agarwal, 2017). These results hold across the majority of studies, with many reporting higher home values in municipalities with rail stations (e.g., 10% higher) and a decline in property value as distance to transit investment decreases (e.g., 1.5% decrease in property values with every additional minute of drive time to a station) (Armstrong & Rodriguez, 2006; Rodriguez & Mojica, 2009). Additionally, there may be network effects across transit systems: the addition of, say, a new BRT line may increase values of homes near other (older) transit stops, as the expansion results in greater accessibility (and a reduction of transportation costs) of having access to the transport network (Rodriguez & Mojica, 2009; Stokenberga 2014). These price advantages of accessibility seem to face difficult market conditions, though the lack of a strong regional economy can limit the ability of rail to revitalize neighborhoods (Hess & Almeida 2007). However, results are mixed.

A small number of studies show a negative relationship between accessibility increases and house values (Ewing & Bartholemew, 2010). Other researchers have found a small negative effect in areas directly proximate to new rail stations, in 'disamenity zones', which have been attributed to crime and other negative externalities (Bowes & Ihlanfeldt, 2001; Ewing & Bartholemew, 2010). However, not all research consistently points to the conclusive, positive impact of transit on house values (Chatman et al, 2012). Particularly with regard to BRT, researchers have included a nuisance variable to explicitly look at the capitalization of negative externalities into land values (Rodriguez & Mojica, 2009, Deng & Nelson, 2010). In order to explain the non-uniform conclusions, Debrezion et al (2007) conducted a meta-analysis of studies, using variables that differ across study settings, including type of property, type of railway station, type of model, presence of specific accessibility measures, demographic features, and time of data. They find that these measures for the most part describe the variation between studies. Specific results include higher (property value) impacts of transit on commercial properties, of commuter rail over light or heavy railway/metro, and a negative impact of proximate highways (which are only sometimes accounted for). Other factors may also include relative accessibility of the transit network, including frequency, geographic extent, the distance from the station to the CBD (and measures of this distance), connectivity, and congestion on parallel streets, as well as particulars like asking price versus assessed price, and factors like evidence of permanence for BRT (Bartholemew & Ewing 2010; Debrezion et al 2007; Stokenberga 2014; Hess & Almeida 2006).

In addition to research method differences that account for different results, different populations have different preferences around housing choice. Rental markets have been shown to be different from housing markets (Boeing & Waddell, 2016). This can be related to land use: for example, the types of people who choose certain forms of housing type and neighborhood also may have different values of proximity. For example, research has found that condominiums have transit-access capitalization benefits over 10%, while single-home properties are largely under 10% (Duncan, 2008). Certain transit-dependent or interested populations may have a higher willingness to pay for proximity to transit. Using rent also focuses on value of access as opposed to market expectation inherent in property values. The method most commonly used for analysis of property value capitalization of transportation investments is hedonic price modeling. Hedonic price models attempt to quantify the different factors bundled together in a housing unit, including, for example, structural characteristics (e.g. number of rooms, age of building, housing type), location with respect to transit and the CBD, and amenities in the area, often accounted by jurisdiction (e.g. schools, parks, crime). The variables controlled for within the model allow for comparisons using cross-sectional data at each time period: it is difficult to match individual housing unit data to measure changes in units over time. Almost all studies have used cross-sectional data (Chatman et al. 2012). The use of cross-sectional instead of longitudinal data results in endogeneity issues, and a longitudinal model is needed to treat rail service as a natural experiment (Meyer 1995; Duncan 2011). Many public goods are determined in ways that involve correlation between local amenities, housing characteristics, and neighborhood attributes, resulting in missing variable bias when comparing neighborhoods nearer and further away from transit (Chatman et al. 2012, Sun et al 2015). The repeat sales model was originally used by Baily,

Muth, and Nourse to construct a housing price index (1963), and involves comparing sales of the same property over time, assuming that housing characteristics are unchanged, and therefore being able to measure the marginal value of housing characteristics that changed during the time between sales (Lee et al 2018).

A few recent studies have used this approach, including: Gatzlaff and Smith (1993), McDonald and Osuji (1995), McMillen and McDonald (2004), Gibbons and Machin (2005), Billings (2011), Chatman et al. (2012), and Kim and Lahr (2014). A longitudinal, or repeat-transactions approach is more robust, reducing omitted variable bias and endogeneity problems, and for that reason this paper focuses on this approach. Increased house values are often viewed as a positive factor by planners, some of whom even describe a lack of increase in housing prices as problematic (Chatman et al, 2012). While increasing house values can be part of the intention behind TOD projects (Rayle 2015), this impact also has negative impacts. Increased house values can in theory both signal a housing shortage, and a need for more (and potentially smaller) units in an area due to demand for its accessibility and other attributes, and in particular can result in the displacement of current residents, due to unaffordable housing costs (including rents) and other cost increases (e.g. in local stores). On the whole, empirical studies find little evidence of displacement, while advocacy groups take the opposing view. This could be for many reasons, including a lack of studies precisely focusing on displacement, a reduction in transportation costs, and a difficulty of studying displacement (Rayle 2015; Chapple & Loukaitou-Sideris 2019). Studies on displacement impacts are inconclusive and dependent on context: for example, sometimes displacement may be mitigated by local policies or construction of new housing (both market-rate and subsidized) (Chapple & Loukaitou-Sideris, 2019).

5. Discussion and Conclusions

The primary finding of this review was the need for more rigorous, empirical research on the impacts of transport investments on residential rents. Only two articles emerged from a comprehensive search of transportation-related literature on the topic, meeting qualifications of studying residential rents using longitudinal or repeat-transaction data. More research is needed for the sake of equity. Low-income people are more likely to rent and are also more likely to use transit. Renters are also those at the most risk of displacement due to transit impacts. Other reasons are more research-oriented: renters do not value transit access before it is usable, better capturing the true preferences for transit.

There are several possible reasons for this lack of research on renters, largely related to data availability. Many studies use home price data for the ease of measurement, and single-family homes are often used in the United States in order to compare like properties. Both of these articles were on East Asian mega-cities, where the number of rental transactions may allow for different methods than hedonic pricing. Both studies received their data from private sources; perhaps we can do this elsewhere too.

This review reveals the need for more methods than just hedonic pricing. Cross sectional analyses may significantly overestimate additional revenue from investments in rail transit (Sun et al, 2015). The significant differences found in the comparison study indicates that these two methods should be compared where possible, and we need more longitudinal

data. However, while repeat-transactions removes some endogeneity biases due to missing variables, there may still be error if time-variant factors correlate with model errors, and missing variables if there are significant differences between units with high rates of turnover from others, especially if using a shorter time period or fewer transactions than those included in these two studies.

Finally, there are many literature reviews on this topic, some more comprehensive and others summary. This article demonstrates the use of a Scoping review mechanism, that could be applied further in this field.

References

Bartholomew, K., & Ewing, R. (2011). Hedonic Price Effects of Pedestrian and Transit Oriented Development. Journal of Planning Literature, 26(1), 18–34. https://doi.org/10.1177/n0885412210386540.

Benmarhnia, T., Rey, L., Cartier, Y., Clary, C. M., Deguen, S., & Brousselle, A. (2014). Addressing equity in interventions to reduce air pollution in urban areas: A Scoping review. International Journal of Public Health, 59(6), 933–944. https://doi.org/10.1007/s00038-014-0608-0.

Billings, S. B. (2011). Estimating the value of a new transit option. Regional Science and Urban Economics, 41(6), 525–536. Retrieved from https://econpapers.repec.org/article/eeeregeco/v_3a41_3ay_3a2011_3ai_3a6_3ap_3a525-536.htm.

Boeing, G., & Waddell, P. (2017). New Insights into Rental Housing Markets across the United States: Web Scraping and Analyzing Craigslist Rental Listings. Journal of Planning Education and Research, 37.

Bowes, D. R., & Ihlanfeldt, K. R. (2001). Identifying the Impacts of Rail Transit Stations on Residential Property Values. Journal of Urban Economics, 50(1), 1–25. https://doi.org/10.1006/juec.2001.2214.

Chapple, K., & Loukaitou-Sideris, A. (2019). Transit-Oriented Displacement or Community Dividends?: Understanding the Effects of Smarter Growth on Communities. MIT Press.

Chatman, D. G., Tulach, N. K., & Kim, K. (2012). Evaluating the Economic Impacts of Light Rail by Measuring Home Appreciation: A First Look at New Jersey's River Line. Urban Studies, 49(3), 467–487. https://doi.org/10.1177/0042098011404933.

Debrezion, G., Pels, E., & Rietveld, P. (2007). The Impact of Railway Stations on Residential and Commercial Property Value: A Meta-analysis. The Journal of Real Estate Finance and Economics, 35(2), 161–180. https://doi.org/10.1007/s11146-007-9032-z.

Deng, T., & Nelson, J. D. (2010). Can Bus Rapid Transit Stimulate Land Development? Evidence from Beijing Southern Axis BRT Line 1. Presented at the European Transport Conference, 2010Association for European Transport (AET). Retrieved from https://trid.trb.org/View/1117439.

Duncan, M. (2008). Comparing Rail Transit Capitalization Benefits for Single-Family and Condominium Units in San Diego, California. Transportation Research Record, 2067(1), 120–130. https://doi.org/10.3141/2067-14.

Duncan, M. (2011). The Impact of Transit-oriented Development on Housing Prices in San Diego, CA. Urban Studies, 48(1), 101–127. Retrieved from https://www.jstor.org/stable/43081599.

Gatzlaff, D. H., & Smith, M. T. (1993). The Impact of the Miami Metrorail on the Value of Residences near Station Locations. Land Economics, 69(1), 54–66. https://doi.org/10.2307/3146278.

Goodman, L., & Ganesh, B. (2017). Low-income homeowners are as burdened by housing costs as renters. Retrieved from Urban Institute website: https://www.urban.org/urban-wire/low-income-homeowners-are-burdened-housing-costs-renters.

Gibbons, S., & Machin, S. (2005). Valuing rail access using transport innovations. Journal of Urban Economics, 57(1), 148–169. Retrieved from https://econpapers.repec.org/article/eeejuecon/v_3a57_3ay_3a2005_3ai_3a1_3ap_3a148-169.htm.

Giuliano, G., & Hanson, S. (Eds.). (2017). The geography of urban transportation (Fourth edition). New York: The Guilford Press.

Hess, D., & Almeida, T. (2007). Impact of Proximity to Light Rail Rapid Transit on Station-Area Property Values in Buffalo, New York. Urban Studies, 44, 1041–1068. https://doi.org/10.1080/00420980701256005.

Kim, K., & Lahr, M. L. (2014). The impact of Hudson-Bergen Light Rail on residential property appreciation. Papers in Regional Science, 93(S1), S79–S97. https://doi.org/10.1111/pirs.12038.

Lee, C.-M., Ryu, K.-M., Choi, K., & Kim, J. Y. (2018). The dynamic effects of subway network expansion on housing rental prices using a repeat sales model. International Journal of Urban Sciences, 22(4), 529–545. https://doi.org/10.1080/12265934.2018.1487331.

MacDonald, J., & Osuji, C. (1995). The Effect of Anticipated Transportation Improvement on Residential Land Values. Regional Science and Urban Economics, 25, 261–278. https://doi.org/10.1016/0166-0462(94)02085-U.

McMillen, D. P., & McDonald, J. (2004). Reaction of House Prices to a New Rapid Transit Line: Chicago's Midway Line, 1983–1999. Real Estate Economics, 32(3), 463–486. https://doi.org/10.1111/j.1080-8620.2004.00099.x.

Meyer, B. (1995). Natural and Quasi-experiments in Economics. Journal of Business & Economic Statistics, 13(2), 151–161. Retrieved from https://econpapers.repec.org/ article/besjnlbes/v_3a13_3ay_3a1995_3ai_3a2_3ap_3a151-61.htm.

Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., … PRISMA-P Group. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Systematic Reviews, 4, 1. https://doi.org/10.1186/2046-4053-4-1.

Rayle, L. (2015). Investigating the Connection Between Transit-Oriented Development and Displacement: Four Hypotheses. Housing Policy Debate, 25(3), 531–548. https://doi.org/10.1080/10511482.2014.951674.

Rodríguez, D. A., & Mojica, C. H. (2009a). Capitalization of BRT network expansions effects into prices of non-expansion areas. Transportation Research Part A: Policy and Practice, 43(5), 560–571. https://doi.org/10.1016/j.tra.2009.02.003.

Rodríguez, D. A., & Mojica, C. H. (2009b). Capitalization of BRT network expansions effects into prices of non-expansion areas. Transportation Research Part A: Policy and Practice, 43(5), 560–571. https://doi.org/10.1016/j.tra.2009.02.003.

Rodríguez, D. A., & Mojica, C. H. (2009c). Capitalization of BRT network expansions effects into prices of non-expansion areas. Transportation Research Part A: Policy and Practice, 43(5), 560–571. https://doi.org/10.1016/j.tra.2009.02.003.

Stokenberga, A. (2014). Does Bus Rapid Transit Influence Urban Land Development and Property Values: A Review of the Literature. Transport Reviews, 34(3), 276–296. https://doi.org/10.1080/01441647.2014.902404.

Sun, W., Zheng, S., & Wang, R. (2015). The capitalization of subway access in home value: A repeat-rentals model with supply constraints in Beijing. Transportation Research Part A: Policy and Practice, 80(C), 104–115. Retrieved from https://ideas.repec.org/a/eee/transa/v80y2015icp104-115.html.

Vessali, K. V. (1996). Land Use Impacts of Rapid Transit: A Review of the Empirical Literature. Berkeley Planning Journal, 11(1). https://doi.org/10.5070/BP311113054.

Zheng, S., Sun, W., & Wang, R. (2014). Land Supply and Capitalization of Public Goods in Housing Prices: Evidence from Beijing. Journal of Regional Science, 54(4), 550–568. https://doi.org/10.1111/jors.12095.