THE EFFECT OF RAIL TRANSIT ON PROPERTY VALUES:
A SUMMARY OF STUDIES

Research carried out for Project 21439S, Task 7
NEORail II, Cleveland, Ohio

D R A F T

February 27, 2001

INTRODUCTION

A good transit system provides a high level of access to work and other activities for households and to customers and employees for businesses. The monetary value of this access will be reflected in the value of a home or a business, in addition to the value of other features such as the specific physical attributes of the building and neighborhood characteristics. This paper reviews recent studies on rail transit's effect on property values. A matrix with the key findings of the major studies carried out over the last ten years can be found in the last section.

The impact of rail transit on property values has been studied from many perspectives, including analyses of different types of systems (e.g., rapid, commuter, light rail), of residential versus commercial impacts, and studies that have attempted to isolate both positive and negative effects. The varied approaches make it difficult to compare the results of one study to another. Further, some of the contradictory results over the years have often been due to differing methods of analysis, data quality, and regional differences. Nevertheless, it is clear that in most cases access to rail systems is valued by property owners and there is little support for the suggestion that proximity to rail actually *decreases* property values.

TYPES OF IMPACTS

Evidence for rail's influence on residential property values has been demonstrated more clearly than for commercial uses (Nelson 1998). However, this is due more to data and analysis difficulties than to a lack of effect. Landis et al. (1995) note three reasons for the problem: (1) a lack of comprehensive and reliable data; (2) a smaller zone of impact that limits the number of observations; and, (3) while housing values are determined in the marketplace, the values of individual commercial transactions may represent only the value of one pair of buyers and sellers. More recent studies have attempted to correct earlier analysis problems (Weinberger 2001 and 2000, FTA 2000) and have found statistically significant and positive impacts of light rail (Weinberger) and rapid rail (FTA) on commercial properties. It is likely that the magnitude of the impact on commercial property values will vary according to:

- How much accessibility is improved,
- The relative attractiveness of the locations near the station area, and
- The real estate market in the region (Parsons Brinckerhoff 1999).

It has been theorized that proximity to a rail *line* would have a negative impact on residential property values, due to nuisance effects such as noise and vibration. The nuisance effect has not been conclusively supported, however. Two separate studies, one that focused on proximity to Portland, Oregon's light rail line (Chen et al. 1998), and one that looked at proximity to BART lines (Landis et al. 1995) did not find statistically significant nuisance effects. However, Landis et al. did find an indication of a nuisance effect for houses adjacent to the CalTrain commuter line in San Mateo county. The authors speculate that the disamenity for CalTrain was "probably a function of noise levels that are much higher than BART's" (pg. 38). Further, they suggest that because the "CalTrain trackbed is minimally separated from adjacent uses, and given that the CalTrain train cars are not specifically designed for quiet operation, this is not a surprising finding" (pg. 42). Thus, the problem of nuisance effects is one that can be minimized or negated through good system design.

There is evidence that rapid and commuter rail systems have a greater impact on property values than do light rail transit (LRT) systems (Cervero 1984), due to rapid and commuter rail's higher speeds and greater regional access. The increase in service characteristics gives rapid and commuter rail a greater "sphere of influence" while for LRT, "fewer land parcels can turn gains in accessibility into higher land values" (pg. 134). However, Landis et al. (1995) found equally strong impacts on housing values for

BART (a rapid rail system) and for the San Diego Trolley (a light rail system) due to the equally high quality of service these two systems provide. Thus, capitalization benefits depend on "reliable, frequent, and speedy service" to a large market area (pg. 42).

In one of the few analyses to look at commuter rail in particular, Armstrong (1994) studied the impact of Boston's Fitchburg line on residential property values, both in terms of amenity and nuisance values. Armstrong found that homes located within census tracts that have rail stations commanded a 6.7 percent premium for home sale prices. When he looked at the effect of proximity to the rail line itself (measured as a home being within 400 feet of the line), Armstrong found an approximate 20 percent decrease in value. He cautions that firm conclusions cannot be drawn from this finding due to the fact that the commuter rail line shares right-of-way with a freight system along this line. "The fact that both freight rail service and commuter rail service operate upon the Fitchburg line . . . makes it difficult if not impossible to accurately differentiate between the two separate sources of proximity impacts. Therefore, the findings concerning the effects of commuter rail generated proximity impacts, independent of freight rail generated proximity impacts, are inconclusive" (pg. 26).

As noted above, property value impacts tend to be highly localized around rail stations (particularly for commercial uses), which suggests that great attention must be given to the location of stations and the policies that guide development around them. The next section reviews these policies.

OTHER INFLUENCES

Development does not occur automatically. Importantly, policy and institutional factors, the land market, and the overall economic climate will ultimately determine whether or not transit will positively impact property values and land development. Previous work has identified a veritable laundry list of important policies and tools, and we suggest that the following deserve special emphasis:

Regional tools:

- Keeping urban growth and development in desired areas with such tools as urban growth boundaries, agricultural reserves, and greenbelts will help to increase the amount and intensity of development in station areas, which will in turn help to increase ridership.
- Development guidelines that locate major activity centers, government facilities, and residential uses on transit lines will support higher levels of ridership.
- Development of a regional vision that puts transit first.
- Automobile restraint programs, such as restricting parking supply will encourage transit use by increasing the cost of using automobiles.

Station-area tools:

- Innovative zoning, such as density bonuses, mixed-use zoning, and transfer of development rights will facilitate the type of development that will best serve a transit-using public.
- Design guidelines that emphasize a pedestrian-friendly (and pedestrian-interesting) and a "human-scaled" environment are crucial to the creation of station areas that people will enjoy being in.
- Strategic selection of station areas that will take full advantage of land availability, development and/or redevelopment potential and local demand.

SUMMARY of STUDIES: RAIL TRANSIT'S EFFECTS ON PROPERTY VALUES

Rapid/Commuter Rail

Location, (Author, Year Published)	Rail System	Type of Property Studied	Result	Comments[1]
Washington, D.C. (FTA 2000)	Rapid rail: Metro	Commercial	Price per square foot decreases by about $2.30 for every 1,000 feet further from station.	City-wide analysis of over 2,800 commercial properties. Access measured as ground distance to nearest Metro station.
Atlanta (Nelson 1998)	Rapid rail: MARTA	Commercial	Price per square meter falls by $75 for each meter away from transit stations. Price rises by $443 for location within special public interest districts.	City-wide analysis measuring access as ground distance to a MARTA station. Study also looked at the effects of special policy districts.
San Francisco (Lewis-Workman and Brod 1997)	Rapid rail: BART	Residential	Average home prices decline by about $1,578 for every 100 feet further from station.	Study area defined as one-mile radius from a single station area (Pleasant Hill). Access measured as ground distance to station
New York (Lewis-Workman and Brod 1997)	Rapid rail: New York City MTA	Residential	Average home prices decline by about $2,300 for every 100 feet further from the station areas.	Study area defined as one-mile radius from three different station areas (Forest Hills, 67 Avenue, and Rego Park). Access measured as ground distance to station.
San Francisco Bay Area (Landis et al. 1995)	Rapid rail: BART	Residential and Commercial	1990 single family home prices decline by $1.00 to $2.00 per meter of distance from a BART station in Alameda and Contra Costa Counties. Found no effect for commercial property.	For residential study, measured ground distance to BART stations. Also looked at nuisance values of being adjacent to line and found none. Commercial property observations have significant data problems
San Francisco Bay Area (Landis et al. 1995)	Commuter rail: CalTrain	Residential	Did not find a significant impact on house values from proximity to a rail station. Houses within 300 meters of a CalTrain right-of-way sold at a $51,000 discount.	Access measured as ground distance to nearest station.

Rapid/Commuter Rail, continued

Location, (Author, Year Published)	Rail System	Type of Property Studied	Result	Comments[1]
Washington, D. C. (Benjamin and Sirmans 1996)	Rapid rail: Metro	Residential, Apartment Rents	Rents decrease by 2.4 to 2.6% for each one-tenth mile increase of distance from a Metro station.	Study looked at over 250 rental observations from 81 apartment complexes. Access measured ground distance to nearest station.
Boston (Armstrong 1994)	Commuter rail: MBTA, Fitchburg Line	Residential	Single family residences located in communities that have a rail station have a market value approximately 6.7% greater than those that do not. Also found a property value loss of about 20% for properties located within 400 feet of a commuter or freight rail right-of-way.	Study area was defined as municipalities that fell more than 50% within an area approximately 10 miles from line. Study focused on station areas as well as right-of-way (nuisance) impacts. The nuisance impact may be the result of proximity to freight rail rather than commuter rail.
Los Angeles (Fejarang et al. 1994)	Rapid rail: Metro Rail	Commercial	Commercial space within ½-mile of the rail corridor had an additional $31 increase in mean sale price per square feet over the mean sales price of a comparable control group outside of the rail corridor, between 1980 and 1990.	Studied the effects of the announcement of coming rail service using a test and control group method to compare properties within the corridor to similar ones without.
Philadelphia (Voith 1993)	Rapid rail: SEPTA	Residential	Finds a premium for single family homes with access to rail stations of 7.5 to 8.0% over the average home value.	Access to rail defined according to proximity of a given house to train service, measured in census tracts.

Light Rail Transit

Location, (Author, Year Published)	Facility Characteristics	Type of Property Studied	Result	Comments[1]
Santa Clara, County (Weinberger 2001, 2000; Cambridge Systematics, Inc. 1999)	LRT: Guadalupe line	Commercial	Commercial space within a ¼-mile of a station received an average of 2.3¢ to 5.0¢ more per square foot than space located more than ¾-mile from a station. Office space sold within a ¼-mile of a station received an average of $4.87 per square foot more per gross building square foot compared to space located more than ¾-mile from a station.	County-wide analysis. Access to transit measured as ¼-mile distance rings.
Portland (Dueker and Bianco 1999)	LRT: MAX, Eastside line	Residential	Median house values increase at increasing rates as move toward an LRT station. The largest price difference ($2,300) occurs between the station and 200 feet away.	Study used a test and control group method to compare property values along a parallel bus corridor to those along the rail line.
Portland (Chen et al. 1998)	LRT: MAX, Eastside line	Residential	Beginning at a distance of 100 meters from the station, each additional meter away from decreases average house price by $32.20.	Update of the 1993 study, with a slightly altered study area (including extending the area of influence to 1000 meters)
Portland (Lewis-Workman and Brod 1997)	LRT: MAX, Eastside line	Residential	On average, property values increase by $75 for every 100 feet closer to the station (within the 2,500 ft. – 5,280 ft. radius).	Study area defined as the area within a one-mile radius, but 2,500 feet away, from three station areas (148th Ave., 162nd Ave., and 172nd Ave.). Access measured as ground distance to stations.
Portland (Knaap et al. 1996)	LRT: MAX, Westside line	Residential	The values of parcels located within ½-mile of the line rise with distance from the lines, but fall with distance from the stations.	Study looked at property values in advance of the Westside LRT beginning operations. Study area included land within two to three miles of the line in Washington County. Access measured as ½-mile distance ring.
San Diego (Landis et al. 1995)	LRT: San Diego Trolley	Residential and Commercial	The typical home sold for $272 more for every 100 meters closer to a light rail station. No effect found for commercial impacts	City-wide analysis, access based on ground distance to station

Light Rail Transit, continued

Location, (Author, Year Published)	Facility Characteristics	Type of Property Studied	Result	Comments[1]
Sacramento (Landis et al. 1995)	LRT: Sacramento Light Rail	Residential	No effects found	City-wide analysis, access based on ground distance to station
San Jose (Landis et al. 1995)	LRT: San Jose Light Rail	Residential	The typical house was worth $197 less for every 100 meters it was closer to light rail.	City-wide analysis, access based on ground distance to station. Light rail located in commercial, industrial area. Nearby homes are older and serve a lower income households.
Portland (Al-Mosaind et al. 1993)	LRT: MAX, Eastside	Residential	The typical house sold for $663 more for every 100 feet nearer a light rail station.	Study conducted in suburban residential area with seven stations. Only home sales within walking distance (1/4-mile) of stations were analyzed.

[1] Three methods of measuring distance are referred to in this column. "Ground distance" refers to the distance traveled on the ground (i.e., by walking, riding a bike, or driving). This is contrasted to "air distance" which measures a straight-line from the property in question to the transit station. This second method is less precise in measuring actual access to stations. A third method involves the use of rings circling a transit station (usually divided into ¼- and ½-mile segments). All properties within each ring are considered as having the same access.

REFERENCES

Al-Mosaind, Musaad A., Kenneth J. Dueker, and James G. Strathman. 1993. *Light Rail Transit Stations and Property Values: A Hedonic Price Approach*. Portland, OR: Center for Urban Studies. Preprint, Transportation Research Board, 72nd Annual Meeting.

Armstrong, Robert J. 1994. *Impacts of Commuter Rail Service as Relected in Single-Family Residential Property Values.* Preprint, Transportation Research Board, 73rd Annual Meeting.

Benjamin, John D. and G. Stacy Sirmans. 1996. "Mass Transportation, Apartment Rent and property Values." *The Journal of Real Estate Research*, Vol. 12, No. 1.

Cambridge Systematics, Inc. 1999. *Quantifying the Impacts of a Light Rail Transit Station on Adjacent Property Values.* Unpublished manuscript.

Cervero, Robert. 1984. "Light Rail Transit and Urban Development." *Journal of the American Planning Association*, 50: 133-147.

Chen, Hong, Anthony Rufulo, and Kenneth Dueker. 1998. *Measuring the Impact of Light Rail systems on Single-Family Home Prices: A Hedonic Approach with GIS Applications.* Prepared for the Transportation Research Board, 77th Annual Meeting.

Dueker, Kenneth J. and Martha J. Bianco. 1999. *Light Rail Transit Impacts in Portland: The First Ten Years.* Presented at Transportation Research Board, 78th Annual Meeting.

ECONorthwest. 1991. *The Economic Impacts of Transit Improvements.* Unpublished. Prepared for Tri-Met, Portland, Oregon.

Federal Transit Administration. 2000. *Transit Benefits 2000 Working Papers: A Public Choice Policy Analysis.* Washington, D.C.: Federal Transit Administration, Office of Policy Development.

Fejarang, Robert A. 1994. *Impact on Property Values: A Study of the Los Angeles Metro Rail.* Preprint, Transportation Research Board, 73rd Annual Meeting, Washington, D. C., January 9-13.

Knaap, Gerrit, Lewis Hopkins, and Arun Pant. 1996. *Does Transportation Planning Matter? Explorations into the Effects of Planned Transportation Infrastructure on Real Estate Sales, Land Values, Building Permits, and Development Sequence.* Lincoln Institute of Land Policy Research Paper.

Landis, John, Robert Cervero, Subhrajit Guhathukurta, David Loutzenheiser, and Ming Zhang. 1995. *Rail Transit Investments, Real Estate Values, and Land Use Change: A Comparative Analysis of Five California Rail Transit Systems*. Monograph 48, Institute of Urban and Regional Studies, University of California at Berkeley.

Lewis-Workman, Steven, and Daniel Brod. 1997. *Measuring the Neighborhood Benefits of Rail Transit Accessibility.* Transportation Research Record 1576, pp. 147-153.

Nelson, Arthur C. 1998. *Transit Stations and Commercial Property Values: Case Study with Policy and Land Use Implications.* Presented at Transportation Research Board 77th Annual Meeting.

Parsons Brinckerhoff. 1999. *Land Use Impacts of Transportation: A Guidebook.* NCHRP Report 423A. Washington, DC: National Academy Press.

Voith, Richard. 1993. "Changing Capitalization of CBD-Oriented Transportation Systems: Evidence from Philadelphia, 1970 – 1988." *Journal of Urban Economics,* 33: 361-376.

Weinberger, Rachel. 2001. *Light Rail Proximity: Benefit or Detriment?: The Case of Santa Clara County, California.* Presented at Transportation Research Board 80th Annual Meeting, Washington, D.C. January 7-11.

Weinberger, Rachel. 2000. *Commercial Property Values and Proximity to Light Rail: Calculating Benefits with a Hedonic Price Model.* Presented at Transportation Research Board 79th Annual Meeting, Washington, D.C. January 9-13.