

The effect of freight railroad tracks and train activity on residential property values.

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abstract

This study evaluates the impact of freight railroad tracks on housing markets. A hedonic price model is used to estimate reduction in the sale price of residential properties near freight railroad tracks in Cuyahoga County, Ohio for 1996 and 1999. The findings indicate an average loss in value between \$3,800 and \$5,800 (5%-7%) for houses under 1,250 square feet located within 750 feet from a railroad track. Larger houses showed mixed results. After substantial publicity about a freight train company merger, freight trip counts showed a negative and statistically significant impact on the sale price of smaller houses, and some larger houses, for each additional daily freight train trip.

The benefits of transportation in linking markets and generating positive externalities are well established in economic theory. Access to transportation links, such as highway interchanges, airport hubs, train stations, and boat landings, is a positive factor. However, being too close to transportation uses that are far away from access links can have a negative effect on property values due to the nuisance and potential problems of accidents. This is particularly true for railroads that crisscross the country carrying freight and have very few access points. For freight railroads, the access points are not directly used by residential property owners. In addition, there is train noise and whistle blowing as the trains pass by, the fear of accidents exists, and potential for other related nuisances. The main questions addressed by the research here are how much markets discount houses near railroad tracks and whether the discount decreases with distance from the track and less freight trip volume.

Variables Related to Railroad Freight Lines

Periodically, train companies merge and consolidate track activity; sometimes this can lead to changes in trip volumes on specific segments. Because proximity to train tracks is considered a nuisance, nearby property values can be affected. The effect could be related solely to proximity or to the volume of activity (e.g., freight train cars passing by the property). Effects may also be more pronounced on properties adjacent to where the freight lines cross streets. Also, if trip counts change due to rerouting, would there be any differential effect on property values? This study finds that rail traffic, as opposed to simply proximity to tracks, makes a difference in the sale price of residential properties. Further, publicity is found to increase public awareness of this issue.

In the Cleveland, Ohio area in the mid- to late-1990s, CSX Corporation (CSX) and Norfolk Southern Corporation (Norfolk Southern) decided to reorganize and acquire another railroad, Consolidated Rail Corporation (Conrail). An environmental impact statement (EIS) was done to determine track reconfiguration. Freight trip counts on various segments were scheduled to change. Beginning in 1997, there was a lot of publicity regarding the reconfiguration, and the railroad lines negotiated with various cities about the impacts of the train reconfiguration on property values. Cities received millions of dollars, but none of the money went toward property damage awards. By 1999, the EIS process had been completed and changes to track volumes had been implemented.

This study examines the "before" and "after" of the reconfiguration in freight railroads in Cuyahoga County, Ohio, and comments on the inclusion of property damage awards in a process of this type. The study focuses on the effect of freight-carrying railroad tracks on single-family housing in Cuyahoga County, Ohio, which includes a total of 15 rail segments with over 50 miles of track. After a review of the extant literature, this article discusses the study area, data collection, and variables. Size-stratified hedonic regression models of the county residential real estate market are developed, and the proximity to railroad tracks is tested in various forms. The results are presented, as well as conclusions and implications for appraisers.

Overview and Literature Review

This study was inspired, in part, by a project done in a graduate urban planning class on the factors affecting the desirability of an urban neighborhood. A questionnaire was administered in person to 105 prospective homebuyers of inner-city homes on the near-west side of Cleveland, Ohio, during the summer of 2000. The questions mainly related to neighborhood characteristics that could have a positive or a negative effect on housing values. Residents were asked to weigh their willingness to live close to various urban factors (e.g., an auto junkyard, interstate, railroad tracks, city park) on a seven-point scale, where -3 was strongly negative and +3 was very desirable. The results of the questionnaire are shown in Table 1.

The least desirable site characteristics were junkyard (-2.81), leaking underground storage tank (LUST) (-2.71), and factory (-2.60). Living next to a train track had the next most negative score of -2.07, closely followed by proximity to a highway and main street (both about -1.9). Scores ranged up to +2.2 for lake views. (1)

Effects of Other Linear Urban Uses on Residential Property

Roads are a linear land use similar in some ways to railroad tracks. Hughes and Sirmans found a significant 1% negative change in residential property values for each 1,000 annual average daily traffic (AADT) in city areas, and a 0.5% change per 1,000 AADT in suburban areas in Baton Rouge, Louisiana. (2) A related study by the same authors showed an 11% decrease in value for houses on high traffic streets, compared with low traffic streets. (3) However, this study did not explicitly control for street design. This same research also showed an average reduction of 0.8% in property values per 1,000 AADT. (4) For a typical collector street with 5,000 to 10,000 more trip counts per day than a purely residential street, this would equate to a 5%-10% reduction in property values, holding all else constant.

Another linear and visible type of land use that is somewhat similar to railroad tracks is high-voltage overhead electrical transmission lines (HVOTL). Studies by Colwell, and Kinnard and Dickey showed a significant reduction of 5%-8% in residential property values within a few hundred feet of the transmission lines. (5) Another use similar to trains in its linearity is pipelines. In a study of the effect of a pipeline rupture on non-contaminated residential property on the pipeline easement in Fairfax County, Virginia, Simons estimated that single-family housing experienced a loss in value of 4%-5% after the rupture. (6)

Rail Impact Studies

Noise, especially from train horns, is the primary negative externality generated by train traffic. A study by Rapoza, Rickley, and Raslear (7) found that residents living within 1,000 feet of a railroad track were severely annoyed by train horns. Consistent with this unsurprising finding, many communities have enacted regulations to ban the use of train horns especially during nighttime hours to reduce the interference of train noise with the comfort of local residents. However, numerous studies funded by the Federal Railroad Administration (FRA) have proven that banning train horns increases fatalities and that the bans are costly to both residents and railroad companies. (8)

The FRA's numerous studies on the impact of noise on communities have also evaluated the effectiveness of warning systems, specifically the wayside train horn at crossing sections. A study conducted by the U.S. Department of Transportation and the FRA indicated that the use of railroad horns in addition to wayside horns could reduce accidents by 69%. The same study surveyed actions taken by residents to reduce the interference of noise with their daily activities. While most residents, as reported by the study, would stop talking or close windows, 14% considered moving. (9)

Most studies measure the frequency and level of noise to assess their impact on residents or property values. Few studies have examined the effect of proximity to a railroad track in terms of distance. Clark used distance from a railroad track to measure loss in property values for the mostly rural districts of Middletown and Niles in Ohio. (10) The findings indicate property values decreased by 2.1% in Middletown and 2.8% in Niles for every additional rail line within a buffer of 1/4 mile. The loss is

even higher for properties located near a crossing section where the use of train horns is more frequent. Another study in Oslo, Norway, looked at the relationship between tracks and residential sale price, based on pure proximity. Residential sale price decreased by up to 7%-10% within 100 meters (about 330 feet) of a railroad track. (11) These results were derived from both hedonic modeling and a type of contingent valuation analysis done by real estate salespeople.

To summarize, the benefits of railroad transportation in connecting markets are well established in economic theory but there is still a tension between the need for safety and the need to reduce the level of annoyance generated by railroad activities. Based on previous train studies and the negative effect on property values from other similar urban land uses, property value decreases in the single digits are expected from trains and train traffic.

Railroad Merger in Cleveland

Railroads sometimes merge and consolidate. As previously noted, in Cleveland this began in 1997 as CSX and Norfolk Southern sought to combine operations, acquire Conrail, and streamline and consolidate track utilization in Cuyahoga County. The negotiations were accompanied by an environmental impact statement that examined reconfiguring lines and train volumes. Trip counts on various segments ranged from 0-75 trips per day before the merge, with 15-30 trains per day being typical. The reconfiguration was finalized and operational by 1998. As a result, some lines experienced substantial reductions in traffic (e.g., from 50 per day down to 5 per day), some increased (10 to 45 per day), while other segments remained the same. (12)

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