

THE IMPACTS OF SEPTA REGIONAL RAIL SERVICE ON SUBURBAN HOUSE PRICES



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EXECUTIVE SUMMARY

Fueled by raising gas prices, demographic changes and concerns over quality of life, there has been a growing recognition of the economic value that accrues to communities that benefit from access to public transportation. Housing prices reveal the degree to which access to public transportation, such as Regional Rail stations, confer benefits including improved accessibility and reduced travel costs and time to individual property owners.

Econsult Solutions, Inc (ESI) used data on single-family house transaction over the 2005 to 2012 period in Bucks, Chester, Delaware and Montgomery counties to estimate the property value premium that results from being located close to a Regional Rail station. Using a hedonic regression model, we found that proximity, service frequency and commuter parking all contribute strongly to suburban house values. All told, the property value premium generated by SEPTA Regional Rail stations range from 1% for being located within one to three miles of a station that offers no or base-levels of parking¹ and base service², to 10% for being located within one half mile of a station that provides parking for more than 100 cars and a high level of service (See Table 2).

Our analysis found that the average property value premium across Bucks, Chester, Delaware and Montgomery counties is approximately \$7,900 per transaction. Applying this average value to the over 754,000 single-family homes in the four counties results in approximately \$6.0 billion in aggregate property value impacts generated by SEPTA Regional Rail Stations. Property value premiums are distributed across all four counties.

In communities with high levels of rail service and parking capacity, the property value premiums are even larger. In these communities, the average property value premium is between \$31,000 and \$37,300 within three miles of the SEPTA Regional Rail station.³

¹ Base parking is defined as having either no parking or less than 100 parking spaces.

² Base service is defined as less than 9 AM peak trains to Center City.

³ This assumes an average house price of \$375,000, which represents the average selling price of house sold within the four suburban counties over the 2005 to 2012 period.



1.0 INTRODUCTION

Fueled by raising gas prices, demographic changes and concerns over quality of life, there has been a growing recognition of the economic value that accrues to communities that benefit from access to public transportation. House prices reveal the degree to which access to public transportation, such as Regional Rail stations, confer benefits including improved accessibility and reduced travel costs and time. Given the finite supply of houses located near stations, economic theory holds that those individuals that value access to public transportation, and the benefits provided, will bid up the prices of homes located near stations.⁴

The purpose of this report is to use data on recent house transactions in conjunction with Regional Rail service data to determine the incremental value of being located near a station. This will update previous studies that have quantified the price premium of houses with strong access to Regional Rail stations in the four suburban counties of Southeastern Pennsylvania.

Hedonic regression models are the most popular technique adopted to estimate the effects of rail transit on residential property values. Hedonic modeling estimates the relative average impact that any housing or neighborhood attribute contributes to property valuations while statistically holding all other variables constant. When executed correctly, hedonic modeling offers a lot of information about the relative contribution of property characteristics, such as access to commuter rail service, to the value of real property.

Most hedonic-price studies of transit's impacts on residential property values have recorded price premiums from being near a transit station, with commuter-rail systems operating in metropolitan areas providing some of the largest impacts. A study by Voith (1991) found that properties with commuter rail service have over 6% higher values than properties without service. A study of the Bay Area Rapid Transit (BART) system in San Francisco found that for every meter a single-family home was closer to a station in 1990, its sales price increased by \$2.29, all else being equal. Armstrong (1994) found that single-family homes located in a community with a commuter rail station have a market value about 6.7% higher than communities without a station. A more recent study of the "Coaster" system in San Diego found that single-family homes within a half-mile of a station enjoyed a price premium of \$78,000 compared to houses located further from the stations (Arndt et. al., 2008).

⁴ It is important to note that proximity to rail stations can also impose nuisance effects, such as noise and increased local congestion, on nearby neighbors. The combined effects can be mixed and it becomes a question of which one dominates.

2.0 DATA AND METHODOLOGY

This study utilizes a hedonic regression model to analyze the impact of SEPTA's Regional Rail stations on the residential property values in the suburban Pennsylvania counties of Bucks, Chester, Delaware and Montgomery. We hypothesize a positive relationship between the proximity to the rail station and the value of single-family residential parcels.

We assess the hypothesis using the following hedonic regression model:

Where:

S is the vector of structural characteristics of the house, including total square feet of the house, lot size, the number of full bathrooms, the number of bedrooms, the age of the house and whether or not the house is new construction.

L is a vector of the locational attributes of the house as measured by the distance to Philadelphia and the distance to closest secondary central business district.⁵

N is a vector of neighborhood socioeconomic characteristics measured at the Census Tract level. These include average household size, average household income and other demographics.

Rail is vector of variables that measure that proximity of the house to the closest Regional Rail stations.

The regression model was estimated using data from over 88,300 transactions of single-family detached⁶ homes in Bucks, Chester, Delaware, and Montgomery counties. The transactions cover the 2005 to 2012 period which covers the period before and the period after the housing crash in 2007. We controlled for the impact of the housing crash by including a variables that allowed us to control for the year that each property was sold. The data includes the sale price and date, the attributes of the individual house and the address of each property.

We calculated the distance of each transaction to the closest regional rail station using Geographic Information System (GIS) tools. A common method to account for the distance to a transit station is to classify each property into various distance bands, as such, we classified each transaction into one of the following five groups measured by distance to the station: less than one-half mile; between one-half and one miles, between one and two miles, between two and three miles and greater than three miles. The literature suggests that the typical "driveshed" catchment for commuter rail stations is between three and five miles. Our analysis also found that after three miles, the effect of proximity to the station becomes insignificant implying that

⁵ Secondary central business districts include Chester, Coatesville, Doylestown, Kennett Square, King of Prussia, Lansdale, Norristown, Pottstown, and West Chester in Pennsylvania and Newark and Wilmington in Delaware.

⁶ There were an additional 40,700 non-detached homes sold during this period. Preliminary findings imply similar results for those houses as well.

beyond three miles, the presence of a Regional Rail station has little or no property value impacts.

The distinct options and types of public transit service options available will have a positive correlation on property values near the stations. Those with the highest level of service will be generating the largest impacts, with *certus paribus*, than stations with base levels of service. The number of AM peak trains to Center City ranges from two to over 20, with an average of 7.8 and a median of 8. We defined “high-service” as the station being in the upper quintile of the distribution of the number of AM peak trains, or nine trains. Thirty-eight stations offer nine or more AM peak trains to Center City.

In addition, the level of parking available at the station will also have an impact on the level of property value benefits, especially for those properties located at a distance from the station. In order for parking to have a meaningful impact, the amount of parking would have to be above a certain threshold. For the purposes of this analysis we assume that the threshold level is 100 parking spots.⁷ Of the 103 suburban commuter rail stations included in the analysis, the average number of SEPTA parking spots (both permit and non-permit) was approximately 180, the maximum was 800, the minimum (for stations with parking) was 12 parking spaces and 12 stations offered no parking at all. Sixty-one stations had more than 100 parking spots.

Using service level and station data obtained from SEPTA, we were able to control for whether or not the closest station to each property had offered a high level of service and if the parking available at each station had more than 100 spaces. Table 1 shows the number of properties that fall into each distance band and the number in each distance band that are located near a station with 100 or more parking spots and the number that are located near a station that offers a high level of service.

Table 1: Number of Housing Transactions by Distance and Service Characteristics

	All Stations	Stations with more than 100 spots	Stations that offer a High Level of Service
Less than one-half mile	8,160	5,078	3,154
One-half to one miles	13,178	9,013	5,212
One to two miles	19,244	15,098	7,249
Two to three miles	13,223	11,577	4,523
TOTAL	53,805	40,766	20,138

Source: ESI Calculations

3.0 RESULTS

⁷ We tested the sensitivity using both 50 and 200 spaces as the parking threshold and found similar results.

The coefficients on the structure, location, and neighborhood characteristics have the expected signs and are all statistically significant. Of primary interest for this analysis is the relationship between the station distance bands, parking availability and service level variables and house prices. As, illustrated in the first column of Table 2, the property value benefits of the station declines as one moves farther away from the station. The coefficients suggest property value premiums of 4.0% for properties located within half a mile of station with less than 100 parking spaces and a limited level of service and declining to less than one percent for properties located between one and three miles from the station.⁸

Table 2: Station Impacts by Distance and Service Characteristics

Distance Range	Base Service/Base Parking	High Service/Base Parking	Base Service/High Parking	High Service/High Parking
Less than half a mile	4.0%	6.6%	7.3%	10.0%
Half to one miles	1.5%	5.6%	4.8%	8.9%
One to two miles	0.9%	5.8%	4.2%	9.1%
Two to three miles	0.8%	5.0%	4.1%	8.3%
Definitions: -Base/High Parking: +/- 100 Spaces -Base/High Service: +/- Nine AM Peak Trips				

Source: ESI Calculation

The results also indicate that the level of service is important, with increased service levels having a greater impact as one moves further away from the station. Increases in service levels generate an additional 2.6% in property value impacts for those properties located within half a mile of the station. The additional impact from increased service increases to 4.2% for properties located between one half and one mile from the station; 4.9% for properties located between one and two miles from the station; and 4.2% for properties located between two and three miles from the station. These impacts are over and above the station impacts that are illustrated in column 1 of Table 2.

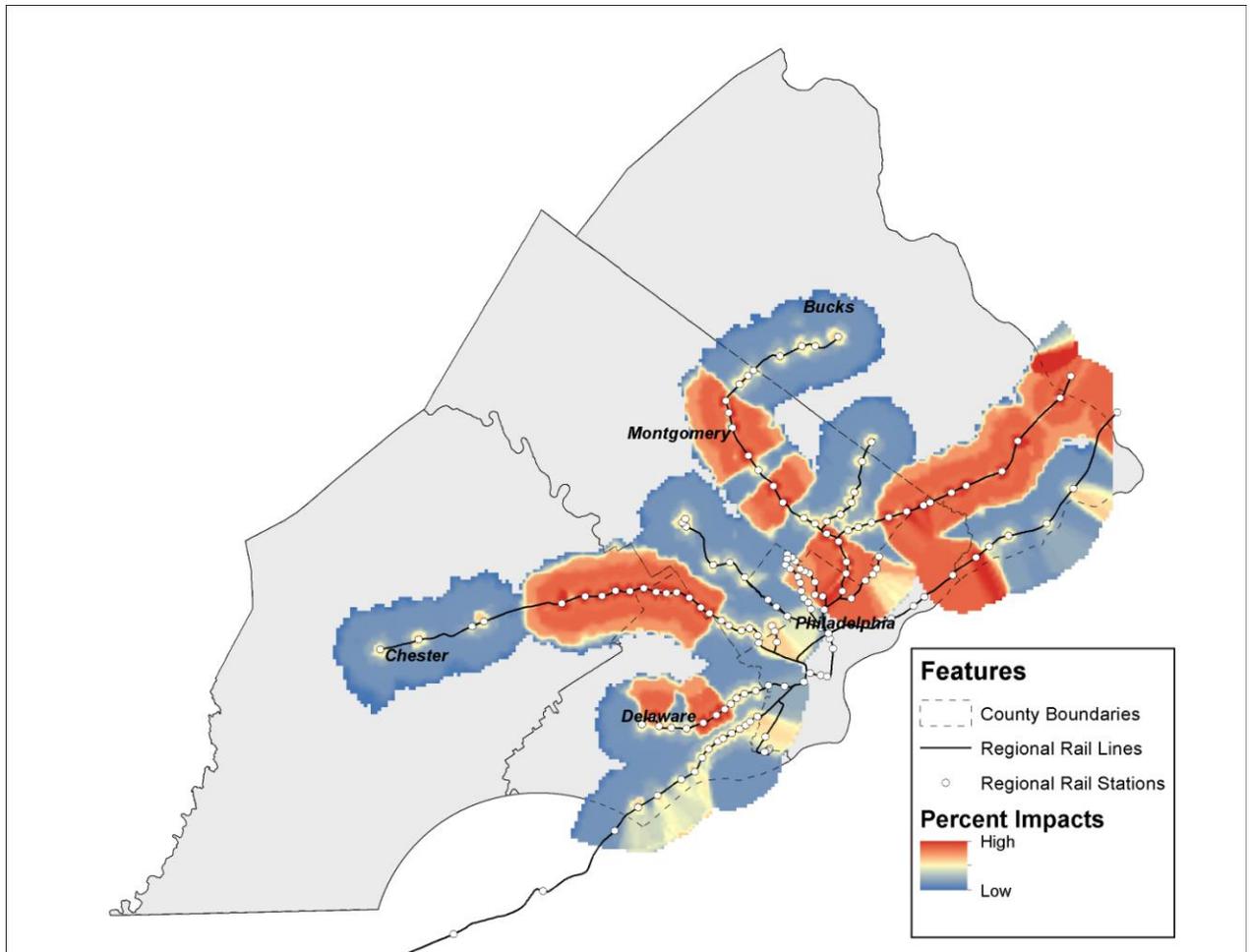
Being close to a station that has 100 or more parking spaces also generates additional property value impacts. Properties that are located near a station that offers parking spaces for 100 or more cars enjoy a property value premium of over 3.3%. This premium is in addition to the premium that results from being located near the station and the premium for having a high level of service.

All told the property value premiums generated by SEPTA Regional Rail stations range from less than 1% for being located within one to three miles of a station that has parking for less than 100

⁸ The results suggests that properties located between one to two miles from a station with less than one 100 parking spaces and offering a base-level of service experience property value impacts of 0.9% and those properties located between two and three miles experience property value impacts of 0.8%.

cars and base level of service, to 10% for being located within one half mile of a station that provides parking for more than 100 cars and offers a high level of service. As illustrated in Figure 1, stations that offer parking for more than 100 cars and also offer a high level of service generate larger percent impacts than stations. Figure 1 also shows that as one moves farther away from a station the impacts decrease, with there being no impacts for properties located more than 3 miles away from the closest station.

Figure 1: Aggregate Percent Impacts



Source: ESI Calculations

Using the average selling price of \$375,000, we can translate the station impacts in Table 2 into dollar values (See Table 3). The property value impacts generated by SEPTA regional rail stations range from \$3,100 for properties located two-three miles from a station with limited service and less than 100 parking spaces to over \$37,300 for a property located less than half a mile from a station with a high level of service and 100 or more parking spaces.

Table 3: Average Property Value Impacts

Distance Range	Base Service/Base Parking	High Service/Base Parking	Base Service/High Parking	High Service/High Parking
Less than half a mile	\$15,100	\$24,900	\$27,500	\$37,300
Half to one miles	\$5,500	\$21,100	\$17,900	\$33,500
One to two miles	\$3,400	\$21,700	\$15,800	\$34,100
Two to three miles	\$3,100	\$18,700	\$15,500	\$31,100
Average	\$6,775	\$21,600	\$19,175	\$34,000
Definitions:				
-Base/High Parking: +/- 100 Spaces				
-Base/High Service: +/- Nine AM Peak Trips				

Source: ESI Calculations

We used the results in Table 2 to calculate the property value premium resulting from being located close to SEPTA stations across for each transaction included in the dataset. Our analysis found that the average property value premium generated by SEPTA stations across Bucks, Chester, Delaware and Montgomery counties for properties that recently transacted is approximately \$7,900 per property. Applying this average value to the over 754,000⁹ single-family homes in the four counties results in approximately \$6.0 billion in aggregate property value impacts resulting from SEPTA stations.¹⁰

4.0 CONCLUSIONS

Proximity, service frequency, and commuter parking all contribute strongly to suburban house values. Elimination of SEPTA Regional Rail service would reduce single family house values in suburban Philadelphia by an average of \$7,900 for an aggregate loss of nearly \$6 billion. Note that these value impacts do not reflect commercial value impacts. This represents the value of

⁹ Source 2012 American Community Survey data for Bucks, Chester Delaware and Montgomery counties.

¹⁰ The aggregate property value impacts were estimated by multiplying the average per-property impact of \$7,900 by the total number of single-family homes, 754,000 (\$7,900 * 754,000 = \$6.0 billion).

accessibility generated by SEPTA in the suburban counties and does not value the loss associated with a diminished economy or increased congestion. As such this should be thought of as a lower bound estimate of the property value impacts resulting from elimination of SEPTA Regional Rail service.

Sources

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