

Introduction

Housing prices and access to public transit are two big factors that shape cities. People usually want to live somewhere convenient and neighborhoods with easy transportation options might be more attractive. My project looks at whether neighborhoods in Pittsburgh with more public transit options tend to have higher median house values. Does having more bus stops mean homes are worth more? A first look suggests there might be a slight positive relationship. Neighborhoods with more Port Authority bus stops seem to have higher median home values. This makes sense because better access to transit can make a neighborhood more desirable and when a neighborhood is desirable, home values often go up.

Data and Methods

For this project, I accessed data on the number of bus stops in Pittsburgh from the Pittsburgh Regional Transit (PRT) Open Data. The dataset provided all active bus stops with a column for specific neighborhood location, so in Excel I found each unique neighborhood using the UNIQUE function and counted how many stops were in each using COUNTIF within the columns range. For the median home value in each Pittsburgh neighborhood, I could not find a dataset available that had the necessary information and was accessible/free. So, for each point in my research, I found the median home value of each specific neighborhood using Zillow. Median home values are shown in U.S. dollars, and bus stop counts come from the city's transit data.

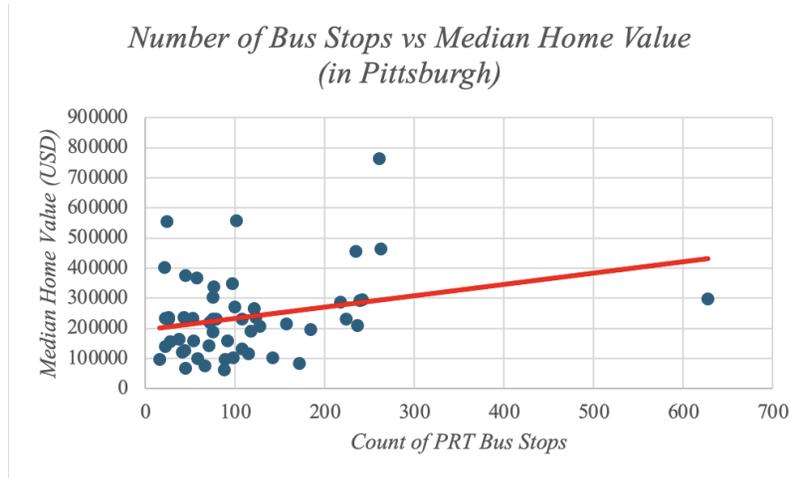
I made a scatterplot showing each neighborhood with the number of bus stops on the horizontal axis and the median home value on the vertical axis. I also added a straight line to show the general trend. Most neighborhoods have only a few bus stops, while a few have a lot, and home values vary across the city.

Statistical Methods

To answer the main research question, I used a regression model to predict a neighborhood's median home value based on the number of PRT bus stops in that neighborhood.

$$\text{MedianHomeValue} = B_0 + B_1 \text{ BusStops} + e$$

The figure below shows the scatterplot of median home values against the number of bus stops, along with a linear trend line highlighting the positive relationship between transit access and home values.



Results

The linear regression produced the following output.

Regression Statistics	
Multiple R	0.2738153
R Square	0.0749748
Adjusted R Square	0.0568371
Standard Error	134256.26
Observations	53

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	7.451E+10	7.451E+10	4.1336333	0.0472594
Residual	51	9.193E+11	1.802E+10		
Total	52	9.938E+11			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	195785.01	27701.145	7.0677586	4.254E-09	140172.64	251397.37	140172.64	251397.37
X Variable 1	374.91292	184.40149	2.0331339	0.0472594	4.7114772	745.11437	4.7114772	745.11437

The regression results show that each additional bus stop in a neighborhood is associated with an increase in median home value of about \$374.91. This relationship is statistically significant at the 5% level ($p \approx 0.047$), meaning it is unlikely to have occurred by chance. The R-squared value is about 0.075, which indicates that the number of bus stops explains a small but meaningful portion of the variation in neighborhood home values.

Conclusion

Neighborhoods in Pittsburgh with more bus stops tend to have higher median home values, with each additional stop linked to about a \$375 increase. While the effect is smaller, it suggests that access to public transit makes neighborhoods more desirable. Future research could include other factors like schools or safety to get a fuller picture.

Sources

- PRT Open Data
- Zillow.com