THE SIDEWALK EFFECT

A STUDY ON THE DEMAND FOR HOMES IN FREDERICKSBURG, VA

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Abstract: When regressing home sales prices from two different neighborhoods, Five-Mile-Fork and Idlewild of Fredericksburg, VA, from May 2019 to September 2023, Five-Mile-Fork with few sidewalks, and Idlewild with only sidewalks, suggests adding a sidewalk to a home has a strong relationship with an increase in demand(price). The regression results show a strong relationship between price and sidewalks when comparing two neighborhoods of only sidewalks against the demand(price) of homes in a neighborhood with only a few sidewalks in the same city as the case study.

Keywords: Sidewalks, Homes, Prices, Fredericksburg, Virginia

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Introduction and Literature Review

Between May 2019 and September 2023, the neighborhood of the Five-Mile-Fork area sold $309,557,632.00 worth of real estate at an average price of $347,817.56. At the same time, the Idelwilde neighborhood area sold $113,843,856.00 of real estate at an average price of $429,599.46 (Bright MLS, 2022). Do sidewalks increase home sale prices in Fredericksburg, VA? What could be a solution to increasing demand for homeownership and attracting top professional talent to increase the total economic productivity of the city? One could start by building; in Valuing Curb Appeal (Johnson, 2020), it said that curb appeal increases the number of homes demanded when unified to a standard. The findings of the paper make economic sense due to the scarcity principle. For example, when a gated community has a high standard of police, including the property's curb appeal, the gated community home values will be higher, as addressed in An Empirical Analysis of Effect of Housing Curb Appeal on Sales Price of Newer Houses (Chen, 2013) when the neighboring community does not have the same high standards of police to include amenities as stated in Do Preferences for Amenities Differ among Home Buyers? A Hedonic Price Approach (De Araujo, 2017). Suppose the same is true when one aggregates the principle to the city level. Suppose one city holds itself to a higher state of police than another to include property curb appeal. Suppose the demand for homes will be more significant in the city with the more complimentary amenities when neighbored against a city with less uniform curb appeal. This principle explains the human behavior of an exodus from a city if one wants to build a city into a revitalized economic development with a high demand for

homeownership accompanied by the top professional talent needed to power the city's economy. One must create a sense of demand to incentivize those amongst the nation's population with the most options to choose Fredericksburg, VA. To do so, one would need to build a city that will incentivize enough economic competition with neighboring cities to draw people out of other competing cities and into Fredericksburg. So, where is an excellent place to start? One can start with sidewalks and better wastewater management due to the sidewalk's curb, a simple solution to a complex problem.

Economic Theory

The dependent variable is the sale prices of the homes in a simple linear regression. The explanatory variables are attributes of the home and property, such as whether a home has a sidewalk. Using the regression results, compare the two sides of the equation against each other to see the explanatory variables with the lowest p-values. Finding whether or not the variable in question, sidewalks, influences sales prices in the two neighborhoods during the period observed as a non-zero event.

Empirical Analysis

The above economic theory served as a template for empirical analysis. The data on housing prices were obtained from local real estate agent Barbara Reilly-Canino of Weichert Realtors, being the secondary source to get to the primary source, Bright MLS. Real estate agents have exclusive access to an all-encompassing data source for housing market sales data known as Bright MLS. Using Geospatial Analysis to assess neighborhoods by what neighborhood had the most and the least number of sidewalks in Fredericksburg with similar homes, Idlewild had the most, and Five-Mile-Fork had the least. Once the communities of interest were isolated, Bright

MLS collected sales data. Then, after saving the compiled sales data into Excel sheets, a regression analysis was executed for each neighborhood's home sales data from May 2019 to September 2023. The analysis results showed from the regression on pooled data with price logged that the variable "Is neighborhood Idlewild" represents the variable sidewalks due to the co-linearity of the two variable's data. For every one percent increase of "Is neighborhood Idelwilde" or clearly stated as **a home with sidewalks**, the estimated sale price is positively affected by an 17.55% (0.1755) change with a p-value smaller than .001. The regression observation count is 1155 home sales, with 1149 degrees of freedom.

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \epsilon_i$$

In the theoretical model, the dependent variable Y_i represents the log sale price of a home, for the "i" -th observation. The variable X_{1i} is the "i" -th observation of the binary indicator (dummy variable) denoting whether a neighborhood is Idlewild (1 = Idlewild and 0 = Five-Mile-Fork) (representing sidewalks), while X_{2i} corresponds to the "i" -th observation of the number of bedrooms in the home. X_{3i} is the number of photos in the Bright MLS system, X_{4i} is a binary indicator (dummy variable) indicating whether the sale occurred post the "lift-off" from near the zero-bound date of March 16th 2022 (1 = post the "lift-off" and 0 = pre the "lift-off"), X_{5i} is the"i" -th observation of the fed rate. The intercept, denoted as β_0, and represents the expected sale price when all independent variables are zero. The $\beta_{\#}$ values have a number; the number corresponds to a matching variable's $X_{\#i}$ number representing the coefficient for each of the variables list above. Lastly, ϵ_i represents the error term, which accounts for unobserved factors or

random variations affecting the home sale price for the "¡"-th observation. N represents the

number of observations in the data set 1155.

Table 1. Summary statistics of the data set.

Variables	Obs	Mean	Standard Deviation	Min	Max
Log Price	1,155	12.77	0.28	11.51	14.35
Sidewalks	1,155	0.23	0.42	0	1
Beds	1,155	3.6	0.83	0	7
Number of Photos	1,155	34.58	18.43	0	105
Post Lift-off	1,155	0.25	0.43	0	1
Fed Rate	1,155	0.02	0.01	0.0025	0.055
N		1155			

Table 2. OLS Regression Model

ln_Price	Coefficient	Std. err.	t	P>|t|	[95% conf. interval]	
Sidewalks	.1755839	.0161645	10.86	0.000	.1438687	.2072991
Beds	.0833048	.0085027	9.80	0.000	.0666223	.0999874
Number of Photos	.0041443	.0003786	10.95	0.000	.0034016	.0048871
Post Lift-off	.2215944	.0169259	13.09	0.000	.1883853	.2548035
Fed Rate	-3.341917	.5938442	-5.63	0.000	-4.507058	-2.176777
Cons	12.2905	.0317411	387.21	0.000	12.22822	12.35278

Table 3. Regression Results of the OLS regression

Variables	*Coefficients*	*P-Values*
Sidewalks	.18***	0.000
	(0.02)	
Beds	0.08	0.000
	(0.008)	
Number of Photos	.004***	0.000
	(0.0003)	
Post Lift-off	.22***	0.000
	(0.02)	
Fed Rate	-3.34***	0.000
	(0.59)	
Intercept	12.29***	0.000
	(0.03)	
Adj R^2	0.3806	
R^2	0.3833	
N	1155	

Legend: * p<.05;   *Standard Error*
**p<.01; *** p<.001   in parenthesis

Conclusion

The regression analysis results suggest that with a high degree of confidence, one could assume the addition of a sidewalk to a home's property would raise the sale price. When coupled with the literature review, the regression findings suggest that emphasis would increase when the entire neighborhood has a pattern of uniformity to the homes having sidewalks. Due to all the homes having an attractive curb appeal presentation, there is a scarcity of high curb appeal homes in all other neighborhoods that do not have sidewalks. The homeowner's incentive is to raise the collective values of the homes in the neighborhood competing in the market. The effect spreads to the neighboring community, where the incentive is to participate actively in the competition. The cycle repeats in larger and larger communities, cities, counties, and states. Having sidewalks is also helpful in managing wastewater. Homes that contend with managing rainfall buildup in the spring and fall months now have an added convenience, a luxury; therefore, adding additional utility units to the homeowner. The utility units multiply when there is a complete system of sidewalk curbs for the wastewater to follow to the storm drains, which poses an excellent opportunity for future research.

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