Data Centers and 2023 Home Sales in Northern Virginia

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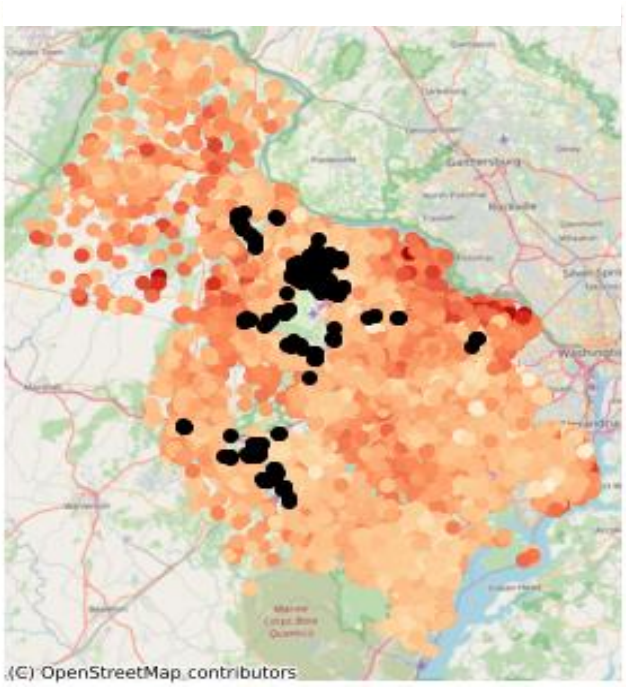
Introduction

Over the past several decades, data centers have become an increasingly important asset to Northern Virginia's regional economy. Positively, they generate substantial employment during construction as well as tax revenue after construction. However, their expansion has raised questions regarding energy usage and potential impacts on neighboring properties. This research note focuses narrowly on the impact of data centers on for-sale housing values in Northern Virginia.[1]

Descriptive Statistics

To provide a broad overview of the impact of data centers on home values, Figure 1 maps the locations of home sales and data centers. [1]. Darker reds indicate high home sale prices . In general, the areas with the highest home sale prices are North McLean, Western Loudoun County, Clifton/Farrs Corner, and Belle View. These areas generally have larger properties, larger homes, and natural amenities such as the Potomac River or country views. Data centers in contrast are generally located around Dulles International Airport in Loudoun County and between I-66 and Manassas Regional Airport in Prince William County, despite a few being located in Tysons.

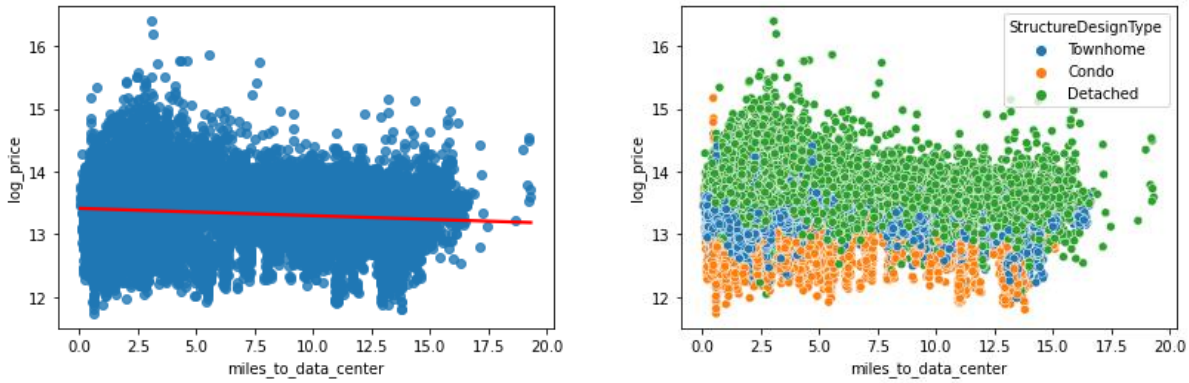
Figure 1. Housing Sales (Reds) and Data Centers (Black)



Examining the direct relationship between distance to data centers and price reveals a negative relationship. That is, the farther a home was from a data center, the lower its sales price. The overall negative relationship holds for single-family detached homes, townhomes, and condos. Despite the very high end of the market being somewhat separate, such as North McLean, simple scatter plots reveal that proximity to data centers is correlated with higher home prices for the bulk of sold homes.

[1] Data center locations are sourced from the Northern Virginia Regional Commission and reflect data center locations built or permitted by August 2024. Home sales data are sourced from BrightMLS from 2023.

Figure 2. Sales Price (log) and Distance to Data Center



Regression Analysis

In performing an analysis of factors that influence housing prices at the local level, analysts use multiple regression procedures to perform what is called "hedonic modeling." Hedonic models take into account features of a home that would impact the perceived value such as age of the home, size, number of bedrooms and location characteristics. Using data available from BrightMLS listings, we modeled the price of houses sold (dependent variable) based on the following characteristics (independent variables) with the expected effect sign. For example, we generally expect newer homes to be more valuable, so the expected sign for the age variable coefficient would be negative. Similarly, being closer to a Metro station usually adds value to a residential property, so the sign for the Distance to Metro coefficient is also expected to be negative. Conversely, the sign of the coefficient for number of bedrooms and distance to industrial land are both expected to be positive. Our hypothesis here is that being farther away from a data center would make the property more valuable (+ sign).

- Age [-]
- Number of bedrooms [+]
- Living area (square feet) [+]
- Size of lot (not applicable for multifamily) [+]
- Type of housing (single family detach, townhome, condo) [SF+, Townhome +][2]
- Distance to a Primary Road [-]
- Distance to Metro Station [-]
- Distance to Dulles International Airport [+]
- Distance to Downtown DC (measured from Farragut metro station) [-]
- Distance to Office Zoned Land [+]
- Distance to Industrial Zone Land [+]
- Distance to the Potomac River [-]
- Distance to Data Center [+]

[2] The type of housing variable is structure to compare the price of detached homes to condos and townhomes to condos.

To account for modeling perturbations, we used a Robust Regression procedure that is forgiving of many of the modeling assumptions associated with ordinary least squares analysis. The table below shows the regression output.

Table 1: Regression Analysis Findings of Factors Impacting Values of For-Sale Homes

Variable	Coefficient	T-Test	Prob Level	Significant (Y/N)
Intercept	502,657	41.288	0.000	Yes
Age	-2,951	-35.179	0.000	Yes
# Bedrooms	24,247	14.141	0.000	Yes
Living Area	156	114.041	0.000	Yes
Lot Size	29,707	27.143	0.000	Yes
Dist to Primary Road	-8,475	-10.805	0.000	Yes
Dist to Metro	-6,251	-7.717	0.000	Yes
Dist to Dulles	2,282	4.532	0.000	Yes
Dist to Downtown	-14,762	-29.869	0.000	Yes
Dist to Potomac	-71	-0.182	0.428	No
Dist to Industrial	47,523	21.376	0.000	Yes
Dist to Office	5,737	4.608	0.000	Yes
Detached Home	210,703	-18.355	0.000	Yes
Townhome	115,572	42.470	0.000	Yes
Dist to Data Center	-15,886	31.106	0.000	Yes
Model R^2	0.8672			

Findings

The model developed for this analysis explains almost 87% of the variance in homes observed in Northern Virginia in 2023. This is a strong model, though there are other factors impacting housing prices not accounted for in the model. For example, we did not include the presence of swimming pools or outbuildings that often impact housing prices. Also, the data used for this analysis has no measure for the condition of the home that is suitable for regression analysis.

The regression analysis demonstrated the expected relationships with two exceptions. The distance to the Potomac River variable, which was meant to account primarily for exclusive neighborhoods in northern Fairfax County was not statistically significant. More interestingly, while the variable denoting distance to a data center was statistically significant, the coefficient carried the unexpected negative sign meaning that the closer a home was, holding all other variables equal, to a data center, the value was higher. We structured the test as a one-tailed statistical test, which leads to the conclusion:

> **The analysis fails to demonstrate statistical evidence that proximity to a data center negatively impacts housing values. This suggests that any negative externalities associated with data centers, such as noise, do not have a systemic effect on housing values.**

In some jurisdictions, data centers are largely developed on industrial-zone property. Since we included distance to industrial properties as a variable, a strict interpretation of our findings would say: After accounting for all industrial properties, there is no marginal negative effect of being closer to a data center. To test the resilience of the regression coefficient for distance to data centers, the model was run again with all included variables except for proximity to industrial properties. In that reduced model, the R-square dropped slightly (R^2: 0.864) and the coefficient for the data center variable became smaller but was still negative (-9,745). The findings expressed above are confirmed: there is no evidence that, on average, proximity to data centers negatively impact housing values in Northern Virginia.

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