

Pandemic Effects on the Pricing Function for Residential Buyers

Christopher Cain¹; Daniel Huerta-Sanchez²; Norman Maynard³; Bennie Waller⁴
¹University of Oklahoma, ²Florida Gulf Coast University, ³College of Charleston, ⁴University of Alabama

Abstract

This study looks at the effect of the onset of the COVID-19 pandemic on house pricing, time on market, and probability of sale using local Multiple Listing Service (MLS) data.

The pandemic not only impacted average prices, time on market, and probability of sale directly, it also caused the coefficients of some of the factors which influence these outcomes to shift while others were stable to the exogenous shock of the pandemic. The hedonic pricing, time on market, and probability of sale coefficients that did change did not do so instantaneously; the impact evolved over several months at the beginning of the pandemic.

The results should be of interest to buyers and sellers of residential properties, agents specializing in residential properties, and researchers looking to better capture the impact of exogenous events on housing prices.

Introduction

Prior research on residential real estate has emphasized sales price, time on market (TOM), and probability of sale as key outcomes for property sellers and housing researchers, and focus is often placed on how different property or sales characteristics affect these outcomes.

These relationships are not necessarily stable over time, and major events (such as a pandemic ^{[1] [2] [4]}) could shift how property and sales characteristics affect the key outcomes. This paper uses a simple structural-break approach to identify how the pandemic altered these relationships.

Data

Multiple Listing Service (MLS) Data was collected from the area surrounding Richmond, VA from January 2018-June 2021 (selected summary stats listed below)

- Data includes days on market; sales price (for sold properties); property characteristics such as size, age, bedrooms, bathrooms, parking, pool, condo/townhome, and other amenities; and sales characteristics such as if the property is vacant, tenant occupied, new construction, & foreclosed or short sale
- MLS data does not include buyer or seller characteristics such as mortgage data

Table 1. Selected Summary Statistics	Full Sample	PRE	POST
Observations (full dataset, probit model)	97,268	65,350	31,918
Observations (hedonic model)	63,595	47,114	16,481
Sale price, mean	\$299,727	\$288,663	\$331,450
Days on market, mean	55.2	63.3	37.6
Percentage of listings sold	65.7	72.5	51.7
Size in square feet, mean	2,179.9	2,185.4	2,168.8

Methodology

Probability of sale is modeled via Probit

- This method allows us to construct Inverse-Mills Ratios (IMRs) that can be included in the pricing model to adjust for selection bias

Linear Hedonic modeling is used for sales price

- Haurin (1988) atypicality ^[3] is used as an instrument for the endogenous time on market

We employ Weibull hazard modeling for time on market

- We use two-stage residual inclusion to correct for the endogeneity of sale price

Both location and time fixed effects are employed

- We test for a structural break between pre-pandemic (2018m1-2020m2) and post-onset (2020m3-2021m6)
- Because there may be a period of transition rather than a sharp break, we also consider a post-onset period that drops listings that are sold or expire from March 2020 to June 2020

Results

Our descriptive statistics show strong differences in sales price, time on market, and probability of sale pre- and post-pandemic onset, and we reject the null that only the constant term changes (i.e. the pandemic is correctly modeled using a dummy variable) in the models for probability of sale ($\chi^2=593.7$) and IV hedonic pricing ($F_{25, 63443} = 14.05$) at the 1% level.

Selected coefficient comparisons are shown below.

Table 2. Probability Of Sale	PRE	POST	Difference
Constant	3.95 (1.19)***	1.28 (1.19)	-2.68 (0.21)***
ln(SqFt)	-0.53 (0.02)***	-0.34 (0.02)***	+0.20 (0.03)***
Waterview	-0.22 (0.05)***	0.18 (0.06)**	+0.34 (0.07)***
Condo/townhouse	0.15 (0.03)***	-0.06 (0.03)**	-0.21 (0.04)***
Vacant	0.11 (0.02)***	0.16 (0.02)***	+0.05 (0.02)**

Table 3. IV Hedonic Pricing	PRE	POST	Difference
Constant	6.42 (0.06)***	7.21 (0.28)***	+0.79 (0.32)**
Age	-0.23 (0.02)***	-0.13 (0.02)***	+0.10 (0.03)***
Waterview	14.05 (2.03)***	25.92 (4.23)***	+11.87 (4.98)**
Condo/townhouse	-5.96 (3.16)*	-7.38 (1.55)***	-1.42 (2.57)
Vacant	-9.63 (3.87)**	-6.53 (3.47)*	+3.10 (1.39)**

Table 4. Days on Market	PRE	POST	Difference
Constant	-33.56 (0.59)***	-37.62 (0.67)***	-4.06 (0.18)***
Screened Porch	-0.26 (0.01)***	-0.27 (0.02)***	-0.00 (0.02)
Waterview	-0.71 (0.02)***	-1.14 (0.05)***	-0.44 (0.05)***
Condo/townhouse	0.32 (0.01)***	0.51 (0.03)***	+0.20 (0.02)***
Vacant	0.50 (0.01)***	0.39 (0.01)***	-0.11 (0.02)***

Discussion

The direct impact of the pandemic is clear: homes are less likely to sell, but those that do sell at a premium. The changes in coefficients follow understandable patterns:

- Pre-pandemic, amenities like waterfront views made a home harder to sell while condos sold more readily, but these effects are flipped post-onset
- Vacant & larger homes are more likely to sell & sell faster post-onset
- Many features, like condos or size, have a similar impact on price pre- and post
- Some amenities like waterfront views command higher premiums & sell faster post-onset, and some negatives that lowered prices & lengthened time on market pre-pandemic, like vacancy, had their effects reduced

Many of these effects become more pronounced when we drop March through June, suggesting there was an adjustment period as outlooks & preferences shifted. The changes are broadly consistent with a pandemic narrative in which occupants expect to spend much more time inside the home and favor lower maintenance and ready-to-move-in properties.

Conclusions

The COVID pandemic has altered the pricing and probability of sale functions for residential real estate. Attitudes toward certain property and sale-specific features have clearly shifted. Given this result, using pre-pandemic data to make post-pandemic predictions may lead to inaccurate conclusions.

Contact

Norman Maynard
 Department of Economics, College of Charleston
 Email: maynardna@cofc.edu

References

- Duca, John V., Martin Hoesli, and Joaquim Montezuma. "The resilience and realignment of house prices in the era of Covid-19." *Journal of European Real Estate Research* (2021).
- Francke, Marc, and Matthijs Korevaar. "Housing markets in a pandemic: Evidence from historical outbreaks." *Journal of Urban Economics* 123 (2021): 103333.
- Haurin, D. R., "The Duration of Marketing Time of Residential Housing," *Real Estate Economics*, 1988, 16:4, 396-410.
- Zhang, Lei, Tammy Leonard, and John Bitzan. "Impacts of the COVID-19 Pandemic on House Prices: Heterogeneous Impacts over Time and across the House Price Distribution." *Journal of Real Estate Research* (2022): 1-22.