From Bubbles to Basics:

A Study of Housing Price Dynamics in the U.S.

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Abstract

In the preceding years, between 2000 and 2014, the United States witnessed substantial volatility in housing prices, commonly characterized as housing bubbles. During these periods, house prices surged dramatically only to subsequently plummet. These fluctuations were often attributed to speculation by investor homebuyers who sought to profit from buying and reselling homes rather than residing in them. Notably, from 2019 to 2023, there has been a renewed surge in housing prices, prompting an investigation into whether this upswing is driven by speculative forces or grounded in fundamental factors such as low supply and heightened demand. Is the recent increase in housing prices driven by speculative buyers? This paper aims to understand speculative buyers' effects on the sale price of residential real estate and their impact on the recent housing market price action.

Introduction

The U.S. housing market has undergone numerous cycles characterized by ascending prices until reaching a peak, followed by a sharp decline. Such price fluctuations can adversely impact consumers, making homeownership unaffordable when prices rise too high. Purchasing a home at its price zenith can lead to subsequent wealth erosion as prices decline. Furthermore, housing price fluctuations can cause or contribute to moral hazards within the economy (as seen in 2008), potentially advancing recessions.

Beginning in 2020, the U.S. residential housing market experienced a pronounced price upturn. This economic shift, propelled by exceedingly low interest rates, was pivotal in driving housing prices, alongside a migration from densely populated cities triggered by the COVID-19

pandemic. Prices have continued to ascend since 2020, prompting concerns about a potential bubble and conjecture regarding being in the "boom" phase of a housing cycle. My exploration delves into whether the ongoing housing price boom is a byproduct of investors' speculation.

Currently, interest rates are at all-time highs due to the Federal Reserve's attack against inflation. In turn, the rate hikes have caused the 30-year mortgage to reach 7%. The considerably high interest rates have made obtaining a mortgage prohibitively expensive, encouraging homeowners who have refinanced their mortgages when rates were low to remain in place and enjoy their low mortgage rates. A reluctance to move would naturally drive bids higher as obtaining a home becomes more difficult.

Literature Review

This paper extends the inquiry initiated by DeFusco et al. (2022), where the authors delve into the influence of speculative buyers on housing market cycles spanning from 2000 to 2014. DeFusco et al. (2022) reveal a pivotal role played by speculative buyers in the price and transaction volume fluctuations within the U.S. residential housing market. Their findings underscore that the volume of speculative buyers precedes regular home buyers in ascending and descending market conditions. Noteworthy is the identified trend wherein volume peaks and diminishes before price, indicating a sequence in the housing market dynamics. DeFusco et al. (2022) categorize these cycles into three distinct stages: the boom, characterized by rising prices and volume; the quiet, where prices continue to ascend but volume diminishes, leading to an accumulation of unsold listings; and the bust, marked by both a plummet in housing prices and transaction volume.

The role of speculators is integral to this research, and DeFusco et al. (2022) consider two indicators. The first approach, as defined by Bayer et al. (2020), identifies speculative buyers as those holding homes for a short period purely as investments. DeFusco et al. (2022) categorize these short-term buyers as those purchasing and subsequently listing homes within a three-year timeframe. The second approach, outlined by Chinco and Mayer (2015), designates speculative buyers as non-occupants, which is discerned when the buyer's mailing address differs from the purchased property. While acknowledging that non-occupant buyers may sometimes not list purchased homes as their mailing addresses for tax reasons, valuable insights can still be derived from this approach.

Within the current housing cycle, interest rates emerge as a prominent factor. Himmelberg et al. (2005) observe that rising interest rates, post-refinancing, lead to an increase in home values as owning the same property becomes costlier at a higher rate. Gleaser and Gyourko (2018) analyze the correlation between rising interest rates and a diminished housing supply, consequently driving up home prices. Nathaniel Baum-Snow (2023) postulates that when interest rates rise, builders are less inclined to undertake the costly investment of constructing homes, and homeowners are less willing to relinquish their low mortgage rates.

Data

The primary data source for this analysis is CoreLogic, a private company specializing in analyzing information assets and data extracted from public records in the United States. CoreLogic provides an extensive repository of residential real estate data encompassing every

city nationwide. I will be using CoreLogic's "owner transfer" data, which contains information on transfers of homes from seller to buyer by zip code.

The dataset comprises all independent transactions involving single-family homes, condos, or duplexes with a non-zero price. Critical information extracted for each property listing includes a unique ID for each home, the name or names of the buyer, the address of the buyer, the address of the purchased home, the date of the sale, whether the house was purchased with cash or a mortgage, and the price the home sold for.

I excluded observations with unusually low sale or purchase prices and those lacking any sale or purchase price information. Additionally, entries lacking either a seller's or buyer's address were omitted, and entries missing a value for the buyer's full name. Duplicate entries were also removed from the dataset. Some issues in the data arose while working with it. Certain states lack observations or have inconsistencies in the data that could not be reasonably explained. Texas, Vermont, and Minnesota were among these states. These states had price averages that were far too high during specific years. I opted to focus on select states of the U.S. to avoid incomplete representation from all states. Only some states with complete data were consistent with the FRED database. I utilized the FRED database as a secondary resource to verify the accuracy of my data. Among these were Florida, Ohio, Arizona, and Virginia. Additionally, the data for 2023 is not complete, so firm conclusions should not be drawn from any information given in the year 2023.

The criteria I used to pinpoint states with sufficient data were those with four gigabytes or more of data. I set this line because states with four or more gigabytes have enough observations to work with after dropping missing values. These states produce the most consistent data. Only about 25% of stats reach this standard.

Speculative buyers are primarily identified as individuals who buy homes but list an alternative mailing address different from the purchased property's address. I created a dummy variable indicating if the address of the purchased home was the same as the buyer's mailing address. Short-term buyers, defined as those holding homes for less than three years, serve as an additional measure. However, caution is necessary for this strategy, considering that the primary period of interest spans from 2020 to 2023. The current housing cycle, still in its boom phase, may result in an underestimation of short-term buyers due to the abbreviated observation period. Using the ratio of total transactions to investment transactions, I created a variable representing each year's percentage of investment buyers. Additionally, I made a first differences variable for investment buyers, indicating the year-to-year change in investment buyers.

I created two variables for corporate buyers. One variable identifies the number of corporate buyers per year. This was obtained by looking at the names of the buyers. The other identifies the number of corporate buyers that made three or more transactions per year. This was obtained by looking at repeated corporate names. I made this variable to get rid of numerous one-off corporate buyers.

Framework

The Previous Housing Environment

In Appendix Figure 1, DeFusco et al. (2022) make several observations. The most notable one is that transaction volume leads price. Home sale transactions hit their peak and then fell before prices did. They find that prices fall two years after transaction volume falls. The second observation, seen in Appendix Figure 2, is that speculative buyer volume, that is, short-term and non-occupant buyers, significantly increases overall transaction volume when prices and transaction volume rise. Similarly, speculative buyer volume leads overall transaction volume when prices and transaction volume fall. Speculative buyers exaggerate the direction of transaction volume and consequently affect the sales price of homes.

The Current Housing Environment

The current housing environment exhibits a heightened degree of exaggeration compared to the period of 2000 to 2014. Appendix Figure 3 illustrates a more pronounced price growth from 2019 to 2022 than observed during the 2002 to 2005 period. Simultaneously, Appendix Figure 4 depicts a noteworthy decline in transaction volume for existing homes from 2021 to 2023, resembling the dramatic decrease witnessed from 2005 to 2008. Upon initial scrutiny, the lead-lag observation posited by DeFusco et al. (2022) may hold; the number of home sales per year (transactions) decreases while prices continue to ascend. Consequently, 2023 could be characterized as being in the "quiet" phase of the housing cycle, meaning a crash could be looming.

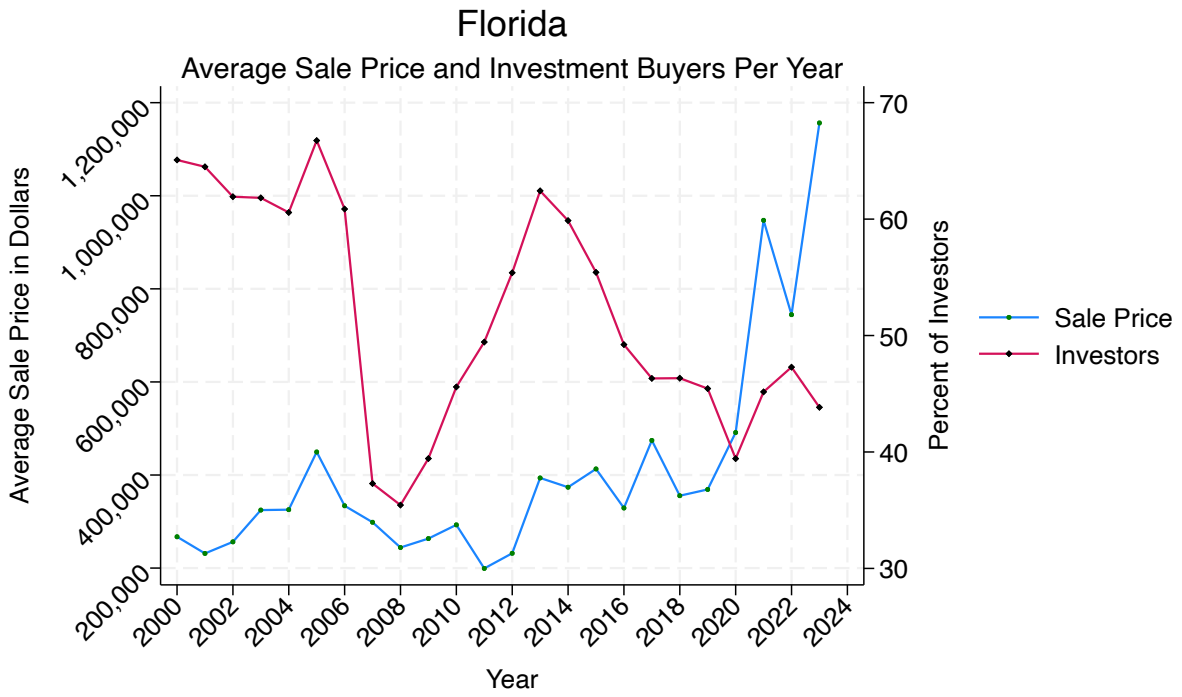
A crucial piece of information is to figure out what is driving the recent price growth. If investors and speculators drive the price, a crash could be looming. Conversely, the price may be driven by the low interest rates in 2020 through 2021 and reduced housing starts.

Role of Speculation

My inquiry was initially sparked by DeFusco et al. (2020). The authors looked at the relationship that investment buyers had with the sale price of homes. They noted that investment led price. I investigate if investment buyers have a causal effect on price. I identify investment buyers at home purchasers who list their mailing address as a different address than the purchased property.

Additionally, I use corporate buyers, identified by their name, as another proxy for investment buyers, but I want to look at them separately from non-corporate investment buyers. I look at the average amount of investment transactions' effect on price and the change in investment buyers' impact on price each year. I conduct the same regressions and graphs for corporate buyers and repeat corporate buyers. I look at the state of Florida for an in-depth analysis and then compare my findings to Ohio and Arizona for perspective.

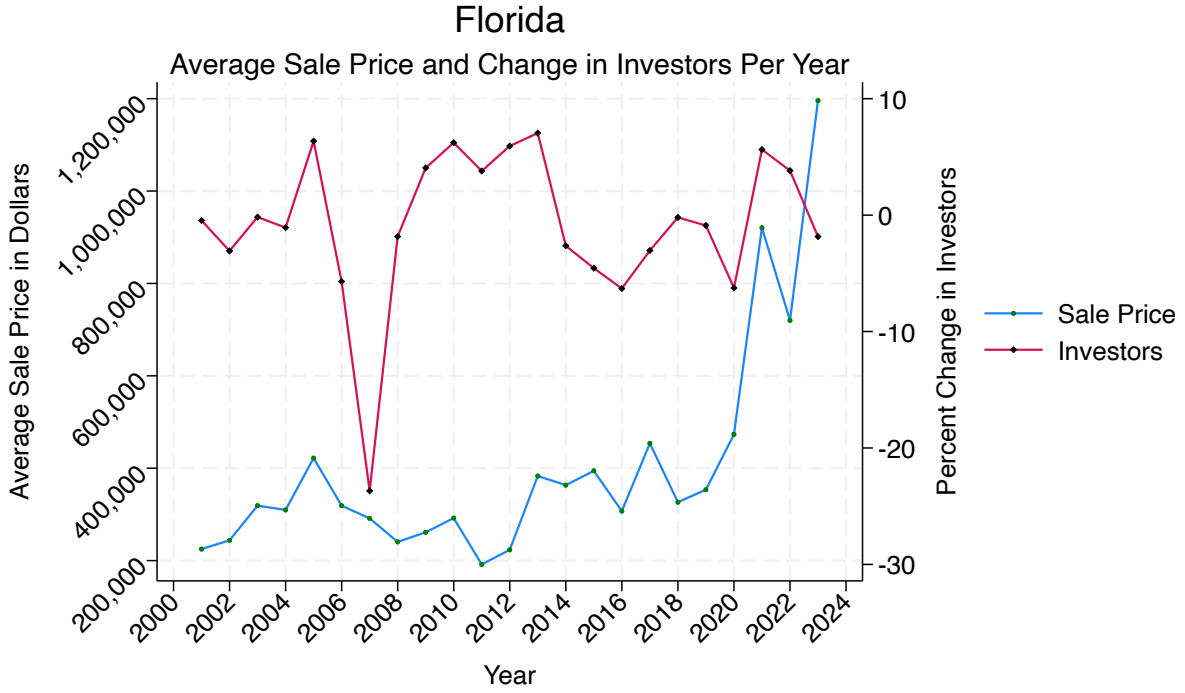
Figure 1



Note: This figure displays the average sale price and investment buyers for the state of Florida from 2000 to 2024. The transaction information comes from CoreLogic and is aggregated yearly from daily observations.

Figure 1 shows the mean sale price of residential homes per year and the average amount of investment transactions per year in Florida. We see a considerable decline in 2005 only to see many investors return by 2013. This would make sense, considering the aftermath of the 2008 financial crisis. However, since 2013, investment transactions have been falling. A potential answer to this is the purchasing of vacation homes in Florida. Since I classify investment buyers as those with differing mailing and purchasing addresses, vacation home buyers are grouped into this category. Florida is known as a destination for vacationers. Conversely, Florida has become a more permanent location for people to live in recent years. Florida residency is desired due to looser COVID-19 restrictions and lower state income tax.

Figure 2



Note: This figure displays the average sale price and the percent change in real estate investment buyers for the state of Florida from 2000 to 2024. The transaction information comes from CoreLogic and is aggregated yearly from daily observations.

In Figure 2, I display the average sale price in Florida per year and the change in investment transactions from year to year. A massive decline is seen after 2005, most likely due to the start of the 2008 financial crisis. Sale price and the change in investment buyers move together. Besides the 2008 financial crisis, the change in investment buyers has remained mostly flat, lying between a 10% and -10% range.

I next regress investment buyers onto mean sales to decipher a relationship between the two variables.

Table I: Regression Table Predicting Average Sale Price

	(1) Model A	(2) Model B	(3) Model C
meaninvest~t	-6888.0***	-7002.1***	-1049.9***
	(11.48)	(11.65)	(5.137)
mortgagepu~r		-9673.0***	-9937.8***
		(168.0)	(72.63)
y20invest			11733.1***
			(1.986)
_cons	809075.0***	819695.0***	422183.1***
	(564.2)	(593.5)	(265.3)
N	8023390	8023390	8023390
adj. R-sq	0.043	0.043	0.821

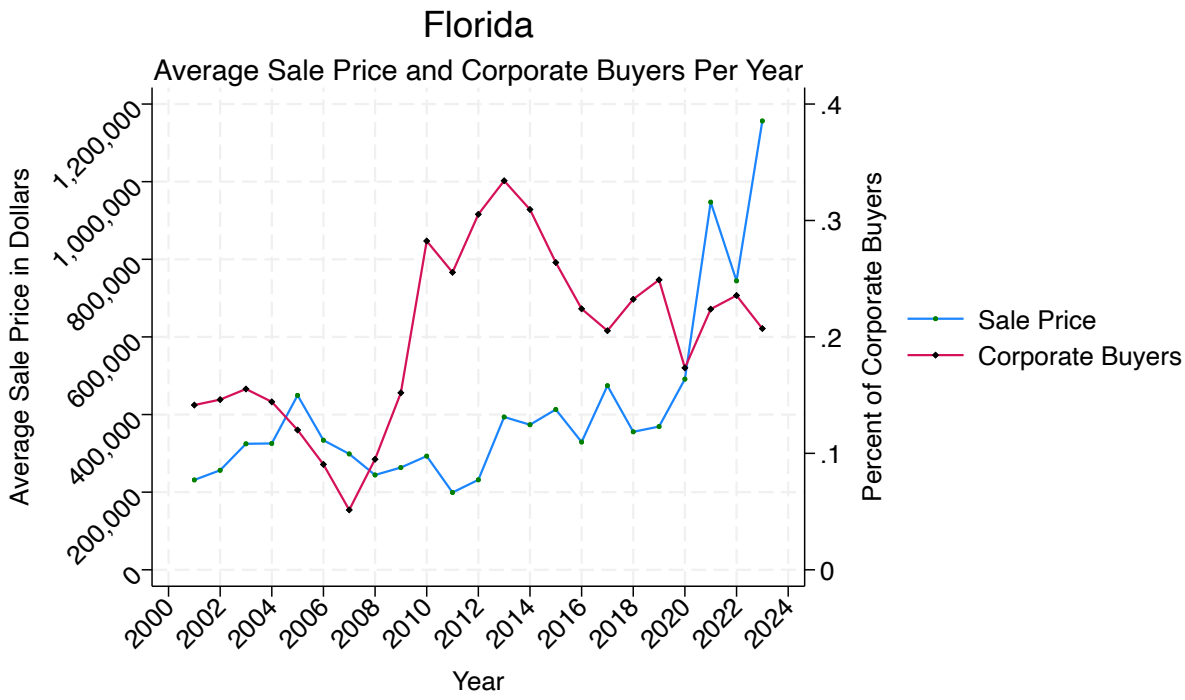
Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

In Table I, Model A shows that the average number of investors (meaninvestment) is statically significant. However, the overall fit could be better. The average number of investors negatively affects the average sale price, meaning the more investors, the lower the sale price. Alternatively, I created a variable that combines a dummy variable for any year above 2019 and the average investment viable, to capture any change in investment behavior since COVID-19. The y20invest viable reflects a positive relationship between investor purchases and sales price from 2020 onward.

To extend my research, I look at the investment buyers with three or more transactions in a single year or large corporation transactions. Considering that Florida could include many vacation home buyers, looking at corporate buyers will give a better idea of how investment dollars in

residential real estate are moving. I look at these buyers and see if they have any relationship with price.

Figure 3

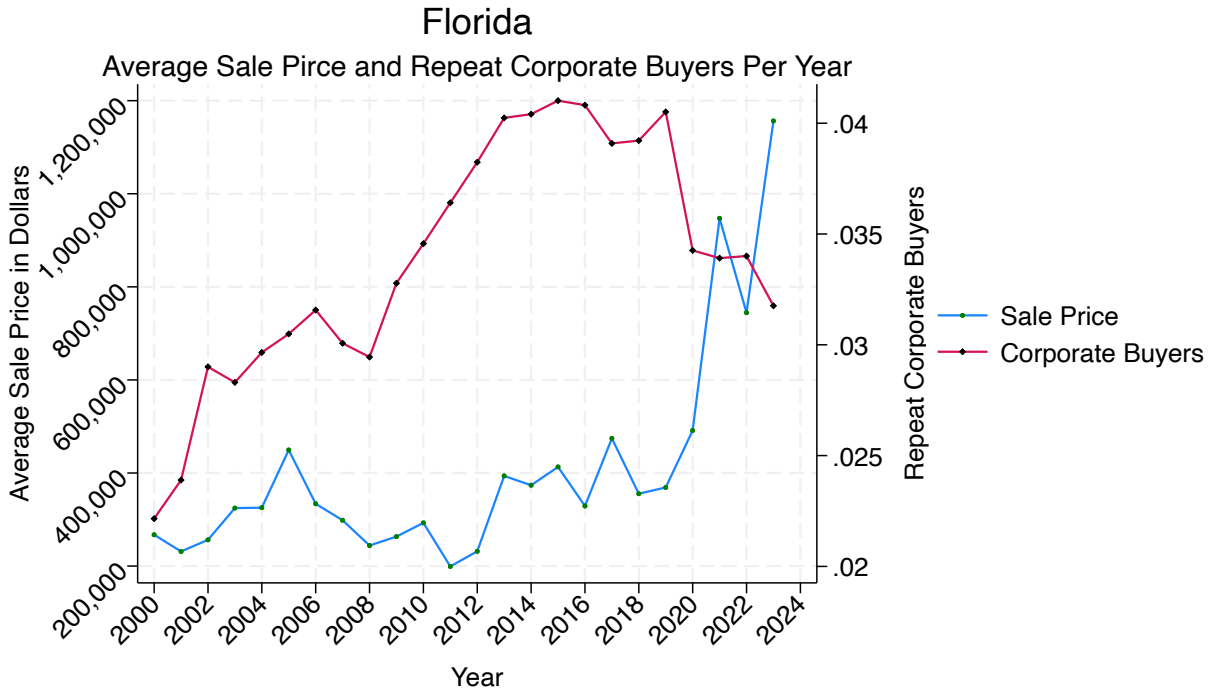


Note: This figure displays the average sale price and the percentage of corporate buyers compared to all real estate investment buyers for the state of Florida from 2000 to 2024. The transaction information comes from CoreLogic and is aggregated yearly from daily observations.

According to Figure 3, corporate investors bought the dip after the 2008 crisis, but the volume peaked around 2013-2014, similar to Figure 1, which shows all investors. The graph indicates that corporate buyers are driving price growth.

I next looked at corporate buyers who made three or more transactions to weed out many one-off corporate buyers. They represented a minimal number of transactions, about 2-3% per year.

Figure 4



Note: This figure displays the average sale price and the percent of total corporate buyers that made three or more transactions in the same year for the state of Florida from 2000 to 2024. The transaction information comes from CoreLogic and is aggregated yearly from daily observations.

In Figure 4, the muti-purchase corporate investors had a more extended growth period, but it peaked before 2019, indicating that it is not a price driver of the recent upsurge. However, this does show increasing interest from larger corporate buyers in the Florida housing market. Like all corporate buyers, they have had limited activity during the recent upturn in price.

Next, I wanted to add corporate and repeat corporate buyers to my regression to see if they influenced the mean sales price.

Table II: Regression Table Predicting Average Sale Price

	(1) Model A	(2) Model B	(3) Model C	(4) Model D
meaninvest~t	-6888.0***	-932.7***	-1050.6***	-391.0***
	(11.48)	(5.071)	(7.629)	(7.569)
y20invest		11732.9***	11727.3***	12597.2***
		(1.989)	(2.007)	(2.492)
meancorp			18289.9***	-416259.1***
			(884.5)	(1155.5)
meanmultic~p				9395238.3***
				(16512.1)
_cons	809075.0***	411278.0***	412803.9***	125462.0***
	(564.2)	(253.3)	(263.9)	(567.4)
N	8023390	8023390	8023390	8023390
adj. R-sq	0.043	0.821	0.821	0.828

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Model D of Table II shows that corporate and repeat corporate buyers are statistically significant. However, corporate buyers do not add to the model's overall fit. Investment buyers have a statistically significant yet small effect on the average sale price. Despite making up only 2-3% of overall transactions, repeat corporate buyers significantly affect the average sale price.

Other States

After looking at Flordia, I wanted to look at Ohio and Arizona, two states somewhat different from Florida, to see how the regressions compared. Looking at Appendix Tables I through IV, I found that the results differed. Overall, the models were not as good of a fit as they were for Florida. Additionally, average investment buyers positively impacted the average sale price, and

corporate and repeat corporate buyers hurt the average sale price. These results indicate that all the states are not behaving similarly. Arizona and Ohio have similar results, showing that Florida may be a more unique case in the United States. However, there needs to be more information on the other states to make a claim.

Conclusion and Continuation

The presented data does not allow for definitive conclusions but suggests distinctions between the current housing cycle and the 2000-2007 period. Unlike the prior boom, non-occupancy buyers seem less influential in the recent price surge. The lack of non-occupancy buyers involved in the current housing transaction volume leads me to believe that restricted housing supply is a probable explanation for the high home prices. However, further investigation is needed to prove such a claim.

Comparing Florida to Arizona and Ohio shows that all states are not behaving similarly and that investment buyers do not behave the same everywhere. Additionally, corporate buyers do not behave the same across the United States. The definite conclusion is that investment buyers and corporate buyers have a statistically significant impact on average sale prices.

Further analyzing the volume of 30-year fixed-rate mortgages and the extent of refinancing could provide valuable insights into the ongoing dynamics of home prices in the U.S. The 30-year fixed-rate mortgage is a unique loan only offered in the U.S. and may give more insight into the behavior of housing cycles.

References

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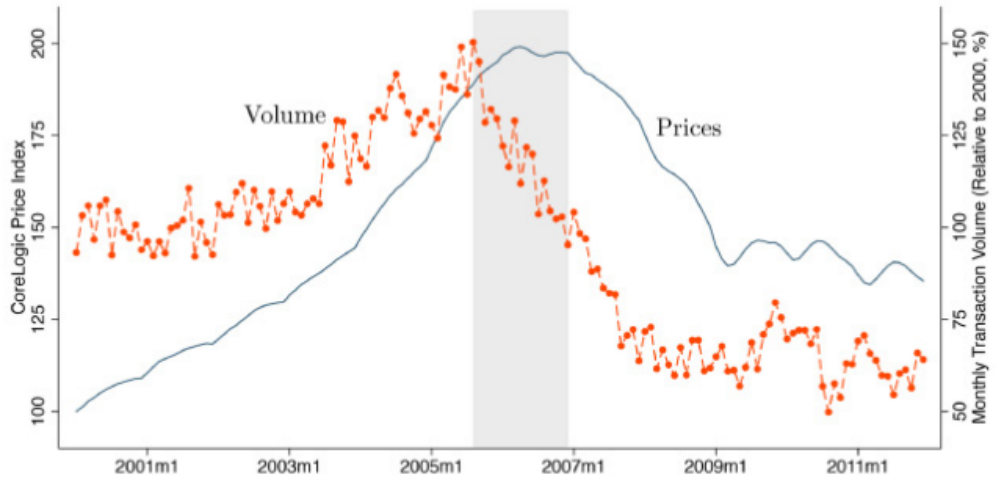
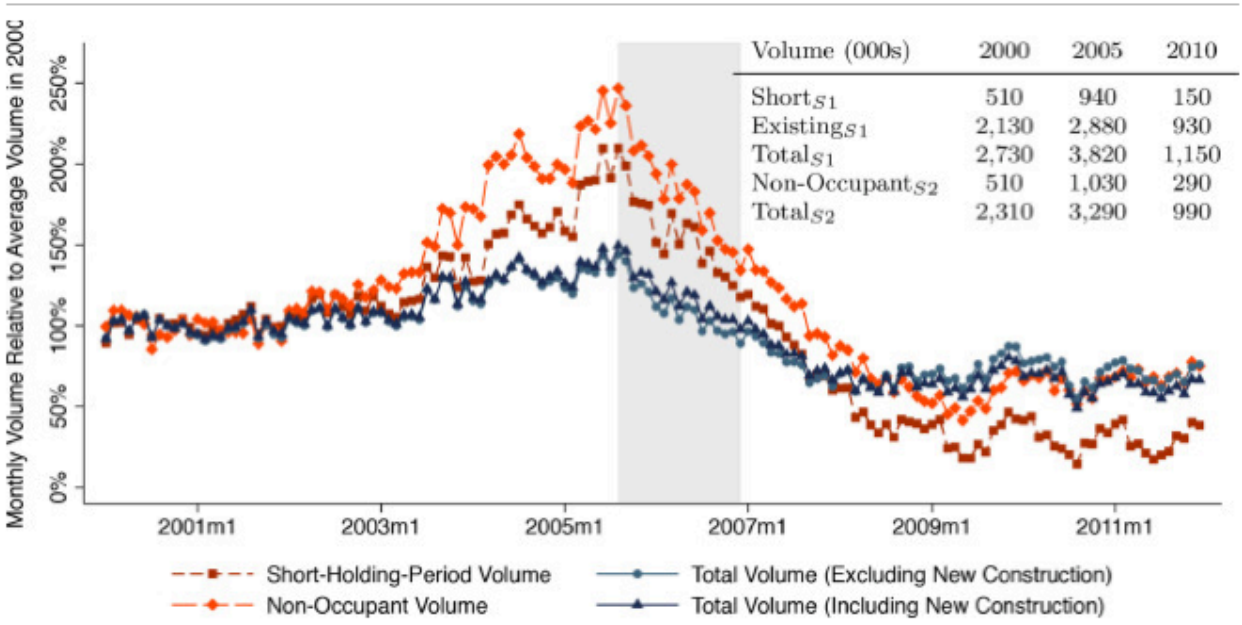
Appendix

Figure 1



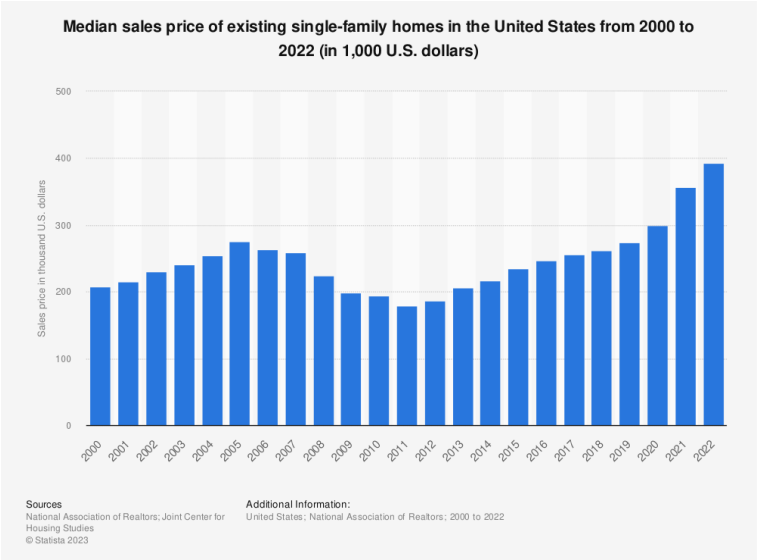
Notes: This figure is taken from DeFusco et al. (2022). It displays the dynamic relationship between prices and inventory in the U.S. housing market between 2000 and 2011. It shows monthly prices and the inventory of listings at the aggregate level. Monthly price index information comes from CoreLogic, and monthly inventory by MSA is based on aggregated data from CoreLogic for 57 of the 115 MSAs in the primary sample for which listing data are available. Shaded regions denote the quiet, defined as the period between the peak of volume and the last peak of prices before their pronounced decline.

Figure 2



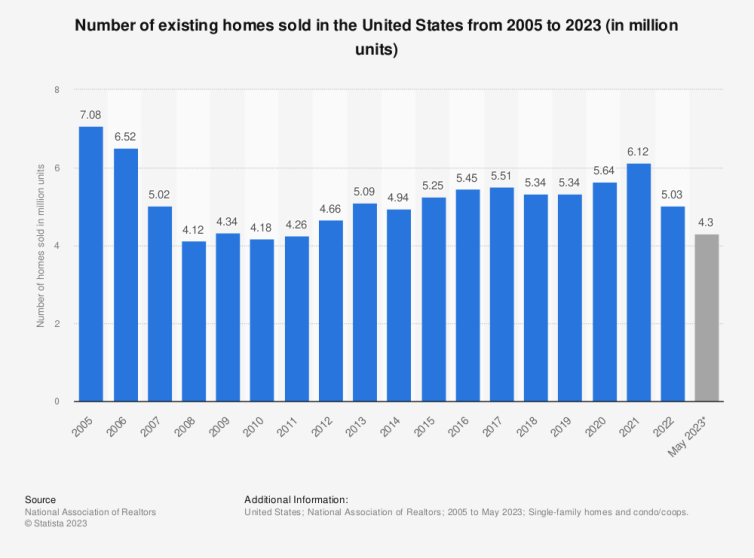
Notes: This figure is taken from DeFusco et al. (2022). It shows monthly aggregate time series for total transaction volume (navy triangles), total volume excluding new construction (blue circles), short-holding-period volume (red squares), and non-occupant volume (orange diamonds) between 2000 and 2011. The raw counts of each type of transaction in the years 2000, 2005, and 2010 are reported in the upper right corner of the figure. In the table, S1 refers to the short-holding-period sample of 115 MSAs, and S2 refers to the non-occupant sample of 102 MSAs.

Figure 3



Notes: This figure is taken from Statista. It shows the median sale price of single-family homes per year in the United States from 2000 to 2022.

Figure 4



Notes: This figure is taken from Statista. It shows the number of existing homes sold per year in the U.S. from 2005 to 2023.

Ohio

Appendix Table I

Table I: Regression Table Predicting Average Sale Price

	(1) Model A	(2) Model B	(3) Model C
meaninvest~t	**-4927.1*** **	**-4872.3*** **	**-15642.9*** **
	(31.45)	**(31.61)**	**(21.68)**
mortgagepu~r		**8152.1*** **	**-7258.5*** **
		(468.3)	**(309.5)**
y20invest			**14173.2*** **
			(7.648)
_cons	**1020602.5*** **	**1012721.9*** **	**1407808.2*** **
	(1528.8)	**(1594.3)**	**(1074.7)**
N	**2660464**	**2660464**	**2660464**
adj. R-sq	**0.009**	**0.009**	**0.568**

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Appendix Table II

Table II: Regression Table Predicting Average Sale Price

	(1) Model A	(2) Model B	(3) Model C	(4) Model D
meaninvest~t	**-4927.1*** **	**-15590.4*** **	**-23163.2*** **	**-22348.0*** **
	(31.45)	**(21.56)**	**(17.44)**	**(17.87)**
y20invest		**14168.4*** **	**8669.1*** **	**7293.2*** **
		(7.646)	**(7.115)**	**(10.20)**
meancorp			**4806227.7*** **	**5864045.2*** **
			(3521.2)	**(6646.7)**
meanmultic~p				**-1152376.2*** **
				(6156.9)
_cons	**1020602.5*** **	**1400662.2*** **	**853235.5*** **	**1051868.6*** **
	(1528.8)	**(1030.7)**	**(886.4)**	**(1379.0)**
N	**2660464**	**2660464**	**2660464**	**2660464**
adj. R-sq	**0.009**	**0.567**	**0.746**	**0.749**

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Arizona

Appendix Table III

Table I: Regression Table Predicting Average Sale Price

	(1) Model A	(2) Model B	(3) Model C
meaninvest~t	**2575.8*** **	**2633.6*** **	**2770.9*** **
	(6.506)	**(6.495)**	**(4.590)**
mortgagepu~r		**7985.5*** **	**4710.0*** **
		(53.03)	**(37.51)**
y20invest			**2473.6*** **
			(1.340)
_cons	**91734.7*** **	**85053.3*** **	**66542.0*** **
	(245.7)	**(248.9)**	**(176.1)**
N	**3396857**	**3396857**	**3396857**
adj. R-sq	**0.044**	**0.050**	**0.526**

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Appendix Table IV

Table II: Regression Table Predicting Average Sale Price

	(1) Model A	(2) Model B	(3) Model C	(4) Model D
meaninvest~t	**2575.8*** **	**2737.3*** **	**4317.3*** **	**4676.1*** **
	(6.506)	**(4.593)**	**(3.791)**	**(4.074)**
y20invest		**2481.6*** **	**2027.6*** **	**1716.0*** **
		(1.342)	**(1.106)**	**(1.745)**
meancorp			**-481602.1*** **	**-159820.7*** **
			(336.4)	**(1440.7)**
meanmultic~p				**-401133.5*** **
				(1747.1)
_cons	**91734.7*** **	**70414.4*** **	**123777.5*** **	**209903.9*** **
	(245.7)	**(173.8)**	**(142.2)**	**(400.8)**
N	**3396857**	**3396857**	**3396857**	**3396857**
adj. R-sq	**0.044**	**0.524**	**0.703**	**0.707**

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001