



Residential Real Estate Investments and Investor Characteristics

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Abstract

We investigate the returns to individuals who invested in residential real estate over 1999–2015. Using purchase and sales prices, we measure returns on properties that were both bought and sold by an investor using annualized price appreciation. We find that investors outperform market indices. Real estate investors earn larger returns if they live near the investment property, buy without a mortgage, and have experience in real estate investing. These characteristics are associated with investors paying less, as a percentage of the assessed value, for the property. Investors earn smaller returns on houses that they live in than on other property. Since appreciation reflects expenditures on improvements, we study land and mobile home investments where returns are less likely to be affected by improvements and document similar results. Overall, we highlight the risk and returns of residential real estate investments by retail investors. In addition, this paper sheds light on the role of investors in the residential market.

Keywords Real estate investors · Residential market · Characteristics · Investments

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Introduction

Real estate is a popular investment vehicle for many individual investors. One 2012 national survey estimates that one out of eight American adults own real estate investment property.¹ Home Mortgage Disclosure Act (HMDA) data suggests that about 10% of home mortgages taken out in 2010 were used to purchase investment property.² Despite the importance of real estate as an investment vehicle, little is known about the performance of real estate as an investment for individuals. This paper presents a new perspective of real estate investments as viewed through the lens of “retail” investors in the residential market. Specifically, we characterize the risk and returns of individual investors who hold multiple residential properties in their investment portfolios. The size of the residential market was \$31.8 trillion in 2017, making it an important asset class.³ Our paper sheds light on the role of investors in the residential market.

Past work primarily focuses on the role of housing/real estate investments in an individual’s portfolio among other asset classes. For example, Cocco (2005) shows that housing investments crowds out stock market participation. We diverge and track property investments besides an individual’s primary home. This distinction is crucial as consumption related housing decisions may distort optimal investment decisions. While we ignore investors’ other assets such as bonds, stocks, etc., we focus on the entire housing portfolio and relate the returns on such investments to underlying economic factors. Thus, our advantage is to track entire real estate investment portfolios and study factors influencing returns.

In this paper, we examine the performance of real estate investments by individuals. If the market for real estate is efficient, we would expect the price appreciation experienced by real estate investors to be similar to the appreciation of broad-based real estate indices. On the other hand, there are reasons to believe that real estate investors may outperform real estate indices. First, people buy most houses and condominiums to live in them. Likely returns on the property may take a backseat to the amenities it offers and corresponding consumption related decisions. In contrast, investors are less likely to have a sentimental attachment to a property or to value anything other than the return the property generates. Second, many house buyers have little control over the timing of their transactions. The start of a new job or the start of a school year may dictate the timing of purchases and sales. Investors, on the other hand, can time their purchases to provide liquidity and their sales to take advantage of liquidity. Third, real estate investors may have knowledge of local market conditions and negotiating skills that will allow them to outperform indices.

Another view of real estate investors is that they may be prone to behavioral biases that lead to poor investment performance. Bayer et al. (2016) examine the role of contagion in real estate investment. The likelihood that an individual enters the real estate market as an investor increases by about 20% if a nearby house is flipped or if a neighbor starts investing in real estate. Individuals who begin investing in real estate as a result of contagion pay more for property relative to the expected price, earn lower returns, and are more likely to default on a mortgage. Bayer et al. (2011) find that real estate investors in Los Angeles failed to anticipate the market’s peak and “may have contributed to local housing price bubbles.”

¹ See Real Estate Investment Realities (2012) for further details.

² See Gao and Li (2012).

³ See Fortune (2017) for further details.

In this paper, we examine returns (price appreciation) for real estate investments by individuals in 14 states over 1999–2015.⁴ As a whole, real estate investors outperform real estate indices. Regression estimates indicate that they earn positive returns when indices are unchanged, and that investors' returns are more sensitive to positive index returns than to negative index returns. It seems likely that real estate investors earn higher returns than other homebuyers in part because investors are motivated to buy solely by a property's investment potential and not its amenities. That might also explain why investors earn significantly smaller returns on their own homes than on their investment properties.

Different real estate investors should differ in their ability to earn abnormal returns in predictable ways. An experienced investor is likely to be better at selecting properties and negotiating prices. A local investor may have knowledge about the local real estate market that distant investors do not possess. Local investors may be able to see properties more quickly and therefore be better able to take advantage of opportunities when they arise. Hence an investor who lives in an area is likely to do better on investments than an investor who lives farther away. Finally, investors who can pay cash may be in a better negotiating position than those who need to wait for a mortgage to be approved. Cash buyers may be able to move more quickly than other investors.

We show that investors earn larger returns if they live in the same three-digit zip code as the property that they buy. The more properties an investor owned before buying a new property, the greater the return on the new property. Buyers who are able to pay cash earn greater returns than those that take out a mortgage to buy property. These results are very robust. They hold across states and over time.

One reason that these investor characteristics are associated with greater returns is that they are associated with lower purchase prices for property. For each purchase by an investor, we calculate the ratio of the purchase price to the assessed value. This ratio is significantly lower, meaning that the investor pays less relative to the assessed value if the investor pays cash, lives in the same three-digit zip code as the property and already owns investment properties.

We present a series of robustness tests that confirm that our results are robust to alternate explanations. First, we measure price appreciation as a proxy for returns. This implicitly does not account for any property improvements and rents potentially earned. To alleviate concerns relating to this, we consider only land and mobile home transactions and re-do the analyses. Land and mobile homes arguably do not involve improvements and rental streams of income. Our results and interpretations persist for such transactions, thereby alleviating concerns that lack of improvement expenditure and rental data may be skewing our findings. In addition, we find similar results for newer properties where renovations are likely to play a minor role. Secondly, we measure returns using repeat sales. This raises the concern that investors may hold winners and divest losers. We test for differential rates of assessment related appreciation and note that properties that were sold off have similar appreciation rates as those that were held in portfolio.

We contribute to the body of literature on real estate as an asset class by focusing on investment in residential real estate by retail investors. Given the depth in our sample, we are able to characterize entire portfolios of residential real estate investments and

⁴ The annualized price appreciation for each property proxies for the return.

identify the role of non-consumption related objectives, experience, equity positions and information asymmetry in generating excess returns. To the extent that our results are generalizable, our results imply that investors generate superior returns.

The rest of the paper is organized as follows. Section 2 provides a review of the literature. Section 3 discusses our data. Section 4 examines investor returns on real estate investments. Section 5 shows that investors who live near properties, pay cash, and have purchased property before pay less for real estate. Section 6 provides robustness tests. Section 7 shows that leading up to peak real estate prices in 2006–2007, real estate investors were less likely to pay cash and less likely to live near the property they bought. We draw conclusions and summarize our findings in Section 8.

Literature Review

Typically, past work focuses on either real estate as a trade-off between consumption and investment or characterizes the effect of housing investment within an individual's overall portfolio. For example, Flavin and Yamashita (2002) study optimal portfolio allocation across various assets when individuals invest in housing to obtain consumption related benefits. Following a mean-variance efficiency framework, the authors theorize that the level of stock holdings in portfolios is contingent on the ratio of housing to overall net worth. Thus, varying levels of investment in stocks across younger and older households can be explained by the ratio of housing to net worth and the corresponding risk. More recently, Chetty et al. (2017) characterize the varying effects of equity and mortgage debt positions on an individual's overall portfolio. Through a portfolio choice framework, the primary prediction is that increases in property value (expressed as a sum of mortgage debt and home equity) reduce stock holdings, whereas increases in home equity increases stock holdings. While we ignore an investor's other assets such as bonds, stocks, etc., we focus on the entire housing portfolio and relate the returns on such investments to underlying factors. In contrast to the literature on housing as a trade-off between investment and consumption, our primary focus is on acquisition of residential properties for investments. In addition, within investor portfolios, we do differentiate the returns of properties that have a consumption objective.

Closest to our paper is a stream of literature that examines purchases beyond primary homes. Additional homes can be identified among individuals' portfolios either from debt records or by examining property transactions. Using debt related data, Li (2015) depicts an increase in the share of new mortgages by households with more than one first lien from 20% in 2000 to 35% in 2006–07. Furthermore, the author documents that the rise was even more prominent in the sun-belt states, from 20% in 2000 to 45% in 2006–07. Additionally, Gao and Li (2012) study mortgage applications and originations from the Home Mortgage Disclosure Act (HMDA) to examine the prevalence of real estate investors. Prior to 2000, about 5% of mortgage applications were for purchase of investment property. The proportion of mortgage applications for investment property increased steadily until 2005–2006 when it peaked at around 14%. The percentage was higher in the bubble states, particularly Florida, where it reached 25% in 2005.

Next, similar to our paper, a contemporaneous stream of literature uses data on residential property transactions. For example, Giacoletti and Westrupp (2017) examine the returns to real estate flippers in four California cities, Los Angeles, Sacramento, San Diego and San Francisco over the period of 1998 to 2013. In this study, a house is considered to be flipped if it is bought and sold within 12 months, whereas a flipper is considered a professional if he or she bought and sold at least two houses in a two-year period. Besides real estate transactions and recording sale characteristics, the authors use a proprietary dataset of home remodeling permits from Buildzoom to compute excess returns. The results imply that flippers, on average, earn positive abnormal returns and there are large differences in returns across individual houses. In addition, most flippers flip just a few properties per year and one loss can negate any gains. We contribute by looking at the entire portfolios of longer term investors across 14 states and relate returns to underlying characteristics, thereby testing for skill of longer term investors in contrast to flippers in Giacoletti and Westrupp (2017).

Our work is also related to recent literature identifying the role of information asymmetry in housing markets. Kurlat and Stroebel (2015) study the differences in information about neighborhood characteristics among buyers and sellers. The authors contrast transactions of real estate professionals with other “less informed” market participants and show that the presence of informed sellers in a market predicts subsequent house price declines. Additionally, this effect is shown to be larger for areas that have a greater exposure to neighborhood characteristics as informed sellers capitalize and liquidate assets. Chincó and Mayer (2016) examine the impact of out-of-town second home buyers who have relatively less information on housing prices than local buyers. Second home buyers are identified by comparing the address used for tax bills with the property address. Here, distance is a friction. The authors present evidence that out-of-town homebuyers act as misinformed speculators and their presence predicts house price appreciation rates during the financial crisis period. We add to this information based literature and identify the role of distance on investor returns.

Mills et al. (2017) present empirical evidence on buy-to-rent institutional investors in the U.S. residential market. The authors identify buy-to-rent investors from anecdotal sources and present evidence suggesting that presence of such institutional investors is related to an increase in house prices. Additionally, Allen et al. (2018) examine residential purchases in Miami-Dade County and summarize that institutional investors purchase at a discount and their presence is associated with improvement in neighborhood property prices. While examining institutional participants is beyond the scope of this paper, we focus on retail counterparts that have a similar investment objective.

Recent work also identifies the contagion effect of investors. Bayer et al. (2016) study the effect of a set of investors on other nearby individuals. The authors find that novice/inexperienced investors entered housing markets after observing other nearby investors. Furthermore, the study presents evidence that such novice investors underperform relative to others, and thus document a negative externality in housing markets. In contrast, DeFusco et al. (2017) study the spatial spillover of housing market booms and do not find evidence of boom related contagion across markets. However, the authors find evidence of price spillovers in markets neighboring areas that are experiencing a boom. While our work focuses on the returns and characteristics of investors' specific housing portfolios, questions on externalities arise.

Finally, our work complements a recent study by Peng and Zhang (2019) that relates property type and houses' stock market betas. The authors analyze the systematic risk in individual houses and highlight that stock market betas vary for different house types, i.e. for differently priced houses. In contrast, our paper adds to the literature on micro level housing dynamics by relating investor characteristics and returns.

Data

Our primary dataset comprises residential transactions across 14 U.S. states obtained from Zillow who secure such records from county offices. We use transactions from 1999 through 2015. For each real estate transaction, we have the date of the purchase, the name of the buyer and seller, the mailing address the buyer uses to receive tax bills, the price paid for the property, the amount of the mortgage and some mortgage characteristics. We identify investors' portfolios by matching their name, address and track properties' purchase and subsequent divestment. For each property, we have the street address, county, city, zip code, state, latitude and longitude and a brief description that we use to classify the property as a house (single-family dwelling), condominium, apartment, mobile home, recreational property, or land. We also know the year an apartment or house was built and house characteristics like the number of bedrooms and bathrooms and the square footage. For most properties, we have annual total assessed values and separate annual assessed values for land and buildings. Assessed values are most complete for 2002–2014, so tests involving assessed values use those years.⁵

We identify investors as individuals who own two or more properties in the same state. We avoid including individuals who have moved to a new house while waiting to sell the old one and are potentially using the sale proceeds for purchase. We require that the ownership of the property overlap for at least six months and both the name and the home address of the investor have to match exactly for different properties. By matching on both the name and home address we avoid incorrectly assuming two different people with the same name are one investor. As an example, a perusal of the Los Angeles white pages reveals that there are well over 100 Jose Garcias in the metropolitan area. In this case, matching on names alone could result in counting real estate purchases as investments when they were purchases of primary residences by individuals with the same name. Our methodology does miss some investors though. For instance, if names on deeds do not match exactly, we do not include the investor. So, if the same person is listed as Elvis Presley on one deed and Elvis A. Presley on a second, we would assume they are two different people. Likewise, addresses must match exactly. Our requirement that the individual own two or more properties in the

⁵ Zillow generates their data from county records. They appear to have started by compiling data for large counties with active real estate markets. Over time, they have expanded the number of counties. Rather than all 50 states we consider a subset of 14 states. If we included data for all states, we would have very little or no data in the early years for states like North Dakota, Vermont, Kansas, etc. Secondly, many states have non-disclosure laws where the sale price is not revealed and hence a comprehensive transaction dataset is not available for such states. Lastly, the descriptions of properties are idiosyncratic, contain misspellings, and abbreviations. These descriptions also differ significantly from state to state. For example, "double bungalow" is a term we encounter in descriptions of Minnesota property but not elsewhere. We use descriptions of the properties from deed records of the states in our sample to determine whether they are houses, recreational properties, condos, apartments, mobile homes or land.

same state means that we will miss an investor who owns, for example, one property in New York and another in New Jersey. Overall, our methodology undercounts the number of retail investors and investments.

We restrict our attention to fourteen states. We include the “bubble” or “sand” states of Arizona, California, Florida, and Nevada. These states include the metropolitan areas that had the largest run-up of prices in 2003–2006 and suffered the largest decline in prices afterwards. The other states include Georgia, Illinois, Michigan, Minnesota, North Carolina, New Jersey, New York, Ohio, Pennsylvania, and Texas. These states are selected so that the sample includes the ten most populous states and also a number of Midwestern states that avoided the large price run-ups and declines of the bubble states. In total, the 14 states in our sample accounted for over 60% of the U.S. population in 2010. Zillow assembles data on a county-by-county basis, and appears to have begun collecting data for heavily populated counties first. The omitted states include many with small or mainly rural populations. Hence, data for these states is sparse in the early years of our sample period. Most studies that have looked at real estate investors have restricted their attention to one or a handful of large metropolitan areas. By focusing on states, we include smaller cities like Reno, Nevada and Fresno, California.

We obtain monthly Zillow index values for each zip code. Zillow calculates indices for all homes, for single-family houses, for condos and for various house sizes and prices. The Zillow index reflects the median home value in an area. Each month Zillow estimates prices for every home in an area. In a given month, most houses are not sold, of course. Zillow uses hedonic models that incorporate characteristics of the property and land, tax assessment information, and prior sale information to assign a value. The index value is then adjusted for residual systematic error. Seasonal adjustments are also made.

Figure 1 depicts price indices for bubble and non-bubble states from 1999 through 2015. We calculate the average percentage price change for bubble states and other states by taking a simple average of the Zillow zip code price change across all zip codes. The starting value of each index is set to 100 and then changed by the average percentage price change each month. For both the bubble and non-bubble states, prices rise steadily from 1999 to 2007, drop until 2012 and then rise again through 2015. The magnitude of the changes, however, are very different. Prices rise about 160% between 1999 and the peak of the housing bubble for bubble states. For the other states, the total increase is only about 60%. The decline from house price peaks to their trough in 2012 is also much steeper for the bubble states. Because real estate prices behaved so differently in bubble and non-bubble states, we analyze returns to investors in these states separately.

We calculate returns for each three-digit zip code index by taking an equal-weighted average of the Zillow price changes across all zip codes with the same first three digits. The three-digit indices correspond closely with cities, but have the advantage of being available for smaller cities that do not have Zillow real estate indices.

Table 1 provides summary statistics on the properties purchased by investors. For the bubble states, there are 420,914 observations. These purchases include houses, condominiums and apartment buildings. Land and mobile homes are not included, nor are properties with missing or ambiguous descriptions. Most of the properties are not sold during our sample period.

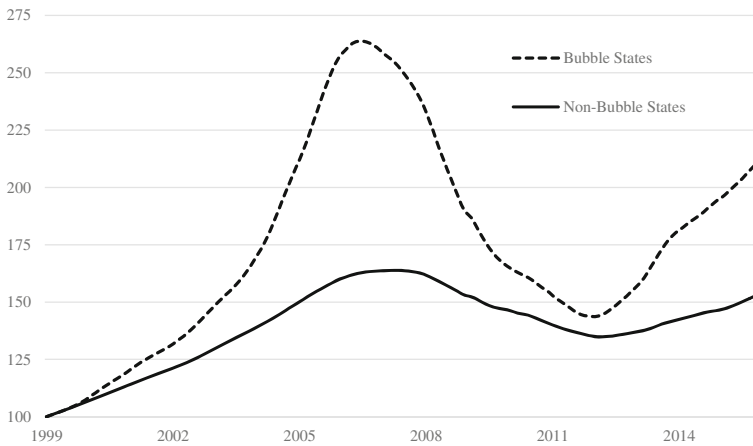


Fig. 1 Price indices for residential property in bubble and non-bubble states

Bubble states are Arizona, California, Florida, and Nevada. Non-bubble states are Georgia, Illinois, Michigan, Minnesota, North Carolina, New Jersey, New York, Ohio, Pennsylvania, and Texas. For each month, percentage changes in real estate prices for bubble (non-bubble) states are a simple average of the changes for each zip code in the bubble (non-bubble) states.

For bubble states as a whole, the mean buy price is \$253,916 while the median price is \$162,000. Purchasers live in the same zip code 41.5% of the time, in the same 3-digit zip code 65.6% of the time, and in the same state 87.6% of the time. An investor is counted as a resident of the property if the mailing address is the same as the property address. Investors live in 27.6% of the properties that they purchase. Foreclosed properties make up 11.5% of their purchases.

The next four rows provide results separately for each of the four bubble states. A few things stand out. First, with an average price of \$358,231, properties are much more expensive in California than elsewhere. Second, most of the purchases, 219,438 out of 420,914 are in Florida. California, despite its larger population, accounts for only 162,478. Third, a smaller proportion of purchasers live near the properties in Nevada than elsewhere. Only 52.2% live in the same 3-digit zip code and only 66.0% live in the same state.

There are 285,551 property purchases in the other ten states. Prices are lower than in the bubble states. The mean purchase price is \$135,749 and the median is just \$75,000. Purchasers are more likely to live near their property in these states than in the bubble states. More than 42.1% live in the same zip code, 71.1% live in the same 3-digit zip code and 93.4% live in the same state. New Jersey and Texas stand out for having few purchases. This is because property descriptions were more often ambiguous or missing there than elsewhere. Property prices are particularly low in Michigan with a median value of only \$23,750. Many of these properties are in the inner city of Detroit or other depressed areas.

We separate properties at the time of purchases into three categories: houses, condominiums, and apartments. Table 2 shows the proportion of properties of each type purchased in each state. Apartments include all multi-family rental properties, from duplexes to buildings with more than 50 units.⁶ Single family houses are 68.7% of bubble state properties and 72.5% of properties in other states. Condominiums are

⁶ In addition, we have information on investor transactions in land and mobile homes. While our focus in the paper is on houses, condominiums, and apartments, we do examine returns on these other properties.

Table 1 Summary statistics on property purchasers by state

State	Observations	Mean Buy Price	Median Buy Price	Live in Same Zip Code	Live in Same 3-Zip Code	Live in Same State	Live in House	Buy After Foreclosed
All Bubble	420,914	\$253,916	\$162,000	41.5%	65.6%	87.6%	27.6%	11.5%
Arizona	15,772	\$152,868	\$119,000	31.5%	60.7%	76.9%	18.2%	10.4%
California	162,478	\$358,231	\$250,000	45.3%	65.9%	98.4%	32.0%	15.5%
Florida	219,438	\$189,253	\$125,000	40.4%	67.2%	82.6%	25.5%	7.4%
Nevada	23,226	\$203,732	\$156,000	31.7%	52.2%	66.0%	22.0%	23.2%
All Others	285,551	\$135,749	\$75,000	42.1%	71.1%	93.4%	20.7%	4.9%
Georgia	9891	\$114,853	\$68,000	45.5%	72.9%	90.8%	16.0%	8.0%
Illinois	40,409	\$177,250	\$122,000	38.9%	73.1%	97.4%	18.7%	4.2%
Michigan	14,075	\$53,623	\$23,750	27.2%	63.8%	89.7%	6.6%	7.9%
Minnesota	11,281	\$185,663	\$147,060	48.9%	73.6%	96.9%	30.7%	1.7%
North Carolina	33,914	\$163,053	\$112,000	43.2%	68.6%	90.3%	23.3%	3.9%
New Jersey	1681	\$263,441	\$169,000	36.8%	52.3%	87.2%	17.8%	1.6%
New York	54,536	\$204,803	\$95,000	45.4%	69.6%	94.8%	21.6%	1.0%
Ohio	53,999	\$85,995	\$55,000	50.3%	77.0%	94.7%	28.4%	9.5%
Pennsylvania	59,403	\$92,750	\$56,650	37.2%	69.0%	90.4%	17.2%	4.0%
Texas	6362	\$50,365	\$31,431	20.0%	70.9%	96.5%	3.7%	14.8%

This table presents summary statistics on property purchasers by state

Table 2 Characteristics of properties purchased by state

State	Observations	Percent House	Percent Condo	Percent Apartment	Median Year Built	Percent Paid Cash
All Bubble	421,944	68.7%	22.4%	8.8%	1982	58.7%
Arizona	15,777	37.3%	51.0%	11.6%	1983	56.6%
California	162,869	72.9%	15.2%	11.9%	1978	67.4%
Florida	220,057	66.2%	26.9%	6.9%	1983	52.6%
Nevada	23,241	84.9%	11.4%	3.7%	1996	56.6%
All Others	294,925	72.5%	9.0%	18.5%	1950	66.1%
Georgia	10,371	91.1%	4.7%	4.3%	1975	97.7%
Illinois	40,474	42.5%	28.4%	29.1%	1958	44.0%
Michigan	15,648	91.3%	6.3%	2.4%	1942	91.8%
Minnesota	12,882	74.8%	9.2%	16.0%	1966	85.0%
North Carolina	34,033	89.0%	6.5%	4.5%	1981	47.5%
New Jersey	1706	4.9%	82.9%	12.2%	1985	64.8%
New York	58,777	62.0%	4.0%	33.9%	1934	83.8%
Ohio	54,371	78.4%	5.1%	16.5%	1947	55.8%
Pennsylvania	60,117	79.2%	5.5%	15.3%	1925	64.4%
Texas	6546	94.1%	2.3%	3.5%	1970	91.0%

This table presents characteristics of properties purchased by state

22.4% of properties in bubble states and 9.0% of properties in other states, while apartments represent 8.8% of bubble state purchases and 18.5% of purchases in non-bubble states. Not surprisingly, we find that there is significant variation across states in property types. Houses make up almost all of the properties in Georgia, Michigan, North Carolina and Texas. Condominiums and apartments are the majority of properties in Arizona, Illinois, and New Jersey. The second to the last column of Table 2 provides the median year built for properties in each state, Bubble states feature more recently built properties. The median year built in bubble states is 1982, while the median year built for properties in the other states is 1950.

The last column of Table 2 provides the proportions of properties that were purchased for cash in each state. The proportions are surprisingly high. For all bubble states combined, the proportion is 58.7%, while the proportion is even larger, 66.1%, for other states. Keep in mind though that these are purchases by investors, and not typical homeowners. In addition, in some states the median price of homes purchased by investors is quite low. In Michigan, it is only \$23,750. According to CoreLogic, nationwide cash sales peaked at 46.6% of house transactions in January, 2011. In October 2015, near the end of our sample period, cash sales still accounted for 46.7% of transactions in Florida and 46.3% of transactions in New York.⁷

Most properties purchased by investors are not sold during the sample period. Table 3 provides some summary statistics for properties that were both bought and

⁷ See Swanson (2016) for further details.

sold during the sample period. For bubble state repeat sale transactions, 61.6% are by investors who live in the same 3-digit zip code and 29.6% are purchased without a mortgage. On average, properties are held for 5.34 years and the mean annualized price appreciation is 4.72%. For other states, 66.8% of investors are in the same 3-digit zip code as the property and 54.4% purchase without a mortgage. On average, in these other states, properties that are both bought and sold during the sample period are held for an average of 5.08 years and produce an annualized price appreciation of 12.54%.

Table 4 shows the percentage of properties that were both bought and sold during the sample period that were purchased or sold in each year. For the bubble states, 53.58% of the properties were bought between 2003 and 2006. For the others, purchases were more evenly distributed across years, but 46.26% were still purchased between 2003 and 2006. Sales are more evenly distributed, but concentrated toward the end of the sample period. We saw in Table 3 that investors earned lower returns in the bubble states than elsewhere. Table 4 shows one reason why – they were more likely to be purchasing before the 2006–2007 peak in real estate prices.

Price Appreciation on Properties that Were Bought and Sold in the Sample Period

Do Real Estate Investors Outperform the Real Estate Market?

There is reason to believe that real estate investors may outperform real estate indices as a whole. Most transactions consist of people buying or selling their principal residence. They do not buy or sell often, and do not develop expertise or skill in real estate transactions. They may be moving from outside the area and with little knowledge of the local real estate market. They may need to buy a home quickly and therefore have limited time to search for a house or negotiate a favorable price. Finally, and perhaps most importantly, personal tastes may lead them to buy property with characteristics that make

Table 3 Characteristics of properties that were bought and sold

	Bubble States	Other States
Percent Investor in Same 3-Digit Zip	61.6%	66.8%
Percent Investor Lives in House	21.6%	17.7%
Percent Bought Without Mortgage	29.6%	54.4%
Percent Bought Foreclosed	5.4%	2.2%
Mean Number of Properties	1.75	1.89
Mean Holding Period	5.34 Years	5.08 Years
Mean Annualized Return	4.72%	12.54%
Observations	125,821	81,325

For inclusion in the properties that were bought and sold, both buy and sell price must exceed \$5000, the property must have been built in a year before the purchase, the property cannot be classified as land, a mobile home or a recreational property, the holding period must exceed six months, the annualized return on the property must exceed –99% and be less than 2000%, and the return on the Zillow 3-digit zip code index must exceed –95% and be less than 1000%

Table 4 Percentage of property purchases and sales that take place each year

	Percent of Purchases		Percent of Sales	
	Bubble States	Other States	Bubble States	Other States
1999	3.96%	6.24%	0.00%	0.00%
2000	5.16%	6.89%	0.00%	0.00%
2001	5.81%	7.83%	0.15%	0.26%
2002	8.08%	8.96%	1.27%	1.81%
2003	10.40%	10.11%	2.28%	2.85%
2004	13.37%	11.63%	4.06%	4.44%
2005	17.43%	13.38%	5.96%	7.03%
2006	12.38%	11.14%	6.11%	8.74%
2007	6.87%	7.75%	5.50%	8.83%
2008	3.39%	4.80%	6.13%	7.91%
2009	3.16%	2.90%	8.68%	7.89%
2010	2.95%	2.60%	10.11%	8.10%
2011	2.87%	2.14%	8.82%	6.62%
2012	2.18%	1.70%	8.81%	7.36%
2013	1.43%	1.30%	9.90%	8.81%
2014	0.54%	0.59%	10.42%	9.62%
2015	0.02%	0.03%	11.79%	9.73%

Only properties that are both bought and sold are included. In addition, for inclusion both buy and sell price must exceed \$5000, the property must have been built in a year before the purchase, the property cannot be classified as land, a mobile home or a recreational property, the holding period must exceed six months, the annualized return on the property must exceed -99% and be less than 2000% , and the return on the Zillow 3-digit zip code index must exceed -95% and be less than 1000%

it unlikely to be a good investment. So, with most transactions coming from homeowners it would not be surprising if real estate investors outperformed real estate markets.

Identifiable characteristics of investors are likely to be associated with higher real estate returns. An investor who lives near a property is likely to know more about the local market. In addition, living in an area makes it likely that he will be able to take advantage of opportunities quickly. If an investor can buy a property with cash rather than taking out a mortgage, he will be in a better negotiating position with sellers and may be able to buy at a lower price. Paying cash may also allow an investor to move quickly when an opportunity arises. Experience in real estate investing may also be associated with higher returns. An investor who has already bought properties may know more about the real estate market and which properties are likely to appreciate in value.

To see whether investors outperform real estate indices, we estimate the following regression:

$$Ret_i = \alpha_0 + \alpha_1 Ret_{3Digit Zip} + \alpha_2 Ret_{3Digit Zip} > 0 + \varepsilon_i \quad (1)$$

Here, Ret_i is the annualized price appreciation earned by the investor who owned property i , $Ret_{3Digit Zip}$ is the annualized return from the average of Zillow zip codes

indices in the 3-digit area over the same period that investor owned property i , $Ret_{3Digit\ zip} > 0$ is the annualized return for the Zillow indices in the 3-digit zip code if positive and zero if negative.

Some caveats are in order. The dependent variable in (1) is referred to as the return, but it is really the annualized price appreciation of the property over the time the investor owns it, calculated from the purchase and sale prices. We do not have any information on rents, and this is an important part of the return of any investment property. In calculating excess returns, we implicitly assume that the rent earned by investors is the same as the rent earned by all real estate in the area. We also ignore leverage. We are measuring the price appreciation of the property, not the return to the investor. Consistent with this, if a property is foreclosed, the return is measured using the next sale price of the property, even if it is sold by the lender.

Another issue is that we only observe returns when investors sell property. If investors sell their real estate winners and hang on to losers, like they do with equities, the return to real estate investment will be overstated. Genesove and Mayer (2001) examine the condo market in Boston over 1990–1997 and find that condo owners are reluctant to realize losses. They also find, though, that investors in condos display far less loss aversion, especially with respect to large losses. We will show that for property bought by investors, growth in assessed values of real estate from purchase to sale is very similar to the growth of assessed value of property that is not sold over the same period.

Panel A of Table 5 reports regression results. To minimize the effect of outliers, we require annualized property returns to be between -99% and 2000% , and holding periods to be greater than six months. To eliminate repeat sales that do not come from arm's length transactions we require buy and sell prices to be at least \$5000.⁸ We require that the property characteristics include the year built, and to ensure that a property is not built during the investor's holding period, we include only properties that were built in years before the purchase year. To make returns from different holding periods comparable, we annualize all returns.

The first two columns provide coefficient estimates and robust t-statistics for regressions that include all properties not identified as land, recreational properties, or mobile homes. We also require the property characteristics to include a year built. The first regression includes returns on properties in the four bubble states. The intercept for this regression is 0.0156, indicating that investors earn an annual return of 1.56% on their real estate investments when the Zillow index return is zero. The coefficient on the Zillow index return is 1.4309. Of more interest is that the coefficient on the Zillow index returns when the return is positive is 0.1701, with a robust t-statistic of 3.86. Real estate investors' returns on their holdings are sensitive to index returns, but are more sensitive on the upside. A potential explanation for this is that real estate investors have timing ability. They buy property that is particularly sensitive to local real estate returns before area real estate appreciates, but buy property that is less sensitive to local real estate returns before property values fall.

⁸ Results are very similar when we use \$1000 as a minimum purchase and sales price.

Table 5 Regressions of annualized holding period returns to real estate investments on Zillow indices

Panel A		Omit Land Mobile Home		Only Houses, Condos, Apts.	
	Bubble	Other	Bubble	Other	Other
Intercept	0.0156*** (8.77)	0.0632*** (18.74)	0.0176*** (9.31)	0.0688*** (15.52)	
R _{3-digit Zip}	1.4309*** (53.25)	0.7135*** (5.86)	1.3799*** (44.35)	0.4697*** (2.62)	
R _{3-digit Zip > 0}	0.1701*** (3.86)	1.5013*** (9.32)	0.2025*** (4.27)	1.7933*** (7.95)	
Observations	125,821	81,325	104,646	53,214	
R ²	0.1266	0.0260	0.1198	0.0233	
Panel B		Omit Land Mobile Home		Only Houses, Condos, Apts	
	Bubble	Other	Bubble	Other	Other
Intercept	0.0261*** (12.42)	0.0849*** (22.74)	0.0297*** (12.98)	0.0933*** (18.83)	0.0288*** (11.87)
R _{3-digit Zip}	1.4805*** (53.75)	0.8421*** (6.91)	1.4373*** (44.99)	0.6423*** (3.57)	1.4756*** (40.92)
R _{3-digit Zip > 0}	0.1004** (2.25)	1.2990*** (8.05)	0.1211** (2.52)	1.5364*** (6.78)	0.1251** (2.29)
R _{3-digit Zip x Live House}			-0.3021*** (-5.00)	0.7608*** (3.96)	0.3298*** (-4.71)
R _{3-digit Zip > 0 x Live House}			0.0811 (0.78)	-1.4896*** (-5.81)	0.1066 (0.96)
Live House	-0.0351*** (-14.51)	-0.0995*** (-28.87)	-0.0379*** (-14.69)	-0.1137*** (-27.06)	-0.0344*** (-9.22)
R ²	0.1274	0.0248	0.1159	0.0272	0.1213

Table 5 (continued)

Panel C		Only Houses, Condos, Apts		Omit Land Mobile Home		Only Houses, Condos, Apts	
	Bubble	Other	Bubble	Other	Bubble	Other	Bubble
Intercept	-0.0304*** (-9.23)	-0.0145** (-2.11)	-0.0317*** (-8.83)	-0.0135 (-1.48)	-0.0334*** (-6.90)	0.0064 (0.72)	-0.0362*** (-6.82)
R _{3-digit Zip}	1.5057*** (54.27)	0.7914*** (6.52)	1.4664*** (45.76)	0.5470*** (3.07)	1.1666*** (19.83)	1.9248*** (6.62)	1.1032*** (17.25)
R _{3-digit Zip} > 0	0.0661 (1.49)	1.3400*** (8.34)	0.0825* (1.72)	1.6215*** (7.20)	0.1981** (2.05)	-0.1085 (-0.30)	0.2607** (2.55)
R _{3-digit Zip} x Num Props					0.1770*** (4.87)	-0.5909*** (-3.44)	0.1893*** (4.63)
R _{3-digit Zip} > 0 x Num Props					-0.0634 (-1.05)	0.7468*** (3.61)	-0.0878 (-1.37)
Num Props	0.0287*** (14.33)	0.0430*** (11.75)	0.0311*** (13.70)	0.0446*** (9.36)	0.0306*** (9.81)	0.0320*** (6.26)	0.0338*** (9.21)
R ²	0.1294	0.0336	0.1240	0.0375	0.1303	0.0342	0.1241
Panel D		Only Houses, Condos, Apts		Omit Land Mobile Home		Only Houses, Condos, Apts	
	Bubble	Other	Bubble	Other	Bubble	Other	Bubble
Intercept	-0.0416*** (-20.39)	-0.0159*** (-4.43)	-0.0414*** (-19.12)	-0.0477*** (-11.37)	-0.0167*** (-13.34)	-0.0174*** (-6.92)	-0.0155*** (-12.14)
R _{3-digit Zip}	1.2525*** (45.79)	1.0877*** (8.99)	1.1966*** (37.96)	0.7701*** (4.35)	1.5163*** (86.15)	1.8808*** (14.77)	1.4930*** (79.45)
R _{3-digit Zip} > 0	0.3640*** (8.06)	1.1485*** (7.22)	0.4012*** (8.27)	1.4534*** (6.53)	-0.1762*** (-5.75)	-0.1292 (-0.84)	-0.1719*** (-5.62)
R _{3-digit Zip} x No Mortgage					-1.0697*** (-10.29)	-1.1795*** (-5.69)	-1.2208*** (-9.98)
							-0.0197*** (-5.97)
							2.0493*** (11.06)
							-0.2715 (-1.24)
							-1.8840*** (-6.17)

Table 5 (continued)

$R_{3_digit_Zip} > 0 \times$ No Mortgage									
				2.0739*** (13.35)	2.0557*** (7.31)	2.2386*** (12.93)	2.6514*** (6.79)		
No Mortgage				0.0787*** (14.56)	0.1586*** (25.86)	0.1793*** (22.15)			
R ²				0.1549	0.0512	0.1503	0.0512		
Panel E									
Omit Land Mobile Home									
Intercept				0.0197*** (6.88)	0.0412*** (6.88)	0.0224*** (7.09)	0.0413*** (5.33)		
R _{3-digit Zip}				1.6542*** (44.00)	0.4541** (2.21)	1.6215*** (36.79)	0.1420 (0.50)		
R _{3-digit Zip} > 0				-0.1673*** (-2.60)	1.8779*** (6.92)	-0.1477** (-2.05)	2.3537*** (6.49)		
R _{3-digit Zip} x Live 3-digit zip				-0.4403*** (-8.13)	0.3938 (1.56)	-0.4547*** (-7.28)	0.5166 (1.42)		
R _{3-digit Zip} > 0 x Live 3-digit zip				0.6329*** (7.14)	-0.5709* (-1.71)	0.6353*** (6.59)	-0.8801* (-1.91)		
Live in Same 3-digit Zip				-0.0081** (-2.20)	0.0326*** (4.50)	-0.0088** (-2.22)	0.0415*** (4.41)		
R ²				0.1274	0.0263	0.1205	0.0237		
Panel F									
Omit Land Mobile Home									
Intercept				0.0084*** (4.78)	0.0529*** (15.96)	0.0101*** (5.39)	0.0566*** (12.90)		
R _{3-digit Zip}				1.4585*** (4.78)	0.7255*** (15.96)	1.4229*** (5.39)	0.4916*** (12.90)		

Table 5 (continued)

$R_{3\text{-digit Zip} > 0}$	(50.49)	(6.55)	(41.94)	(3.37)	(59.11)	(5.89)	(50.83)	(2.67)
	0.2440*** (5.44)	1.4802*** (9.21)	0.2799*** (5.78)	1.7342*** (7.69)	0.1444*** (3.42)	1.5465*** (9.58)	0.1577*** (3.54)	1.8506*** (8.04)
$R_{3\text{-digit Zip} \times \text{Foreclosed}}$					-1.8522*** (-5.85)	1.3751 (1.60)	-1.9318*** (-5.68)	1.6826* (1.90)
$R_{3\text{-digit Zip} > 0 \times \text{Foreclosed}}$					2.3846*** (4.69)	0.5762 (0.21)	2.6005*** (4.75)	0.0831 (0.05)
Purchased in Foreclosure	0.1523*** (16.60)	0.3928*** (14.97)	0.1539*** (15.93)	0.3687*** (13.71)	0.0803*** (5.89)	0.3923*** (8.56)	0.0735*** (5.17)	0.3821*** (9.58)
R ²	0.1315	0.0341	0.1253	0.0308	0.1328	0.0344	0.1268	0.0311

$$Ret_i = \alpha_0 + \alpha_1 Ret_{3Digit Zip} + \alpha_2 Ret_{3Digit Zip} > 0 + \sum_{n=1}^N \beta_n Characteristic_{n,i} + \sum_{n=1}^N \gamma_n Characteristic_{n,i} \cdot Ret_{3Digit Zip} + \sum_{n=1}^N \delta_n Characteristic_{n,i} \cdot Ret_{3Digit Zip} > 0 + \epsilon_i$$

Where Ret_i is the annualized price appreciation of investment property i from its purchase and sale price, $Ret_{3Digit Zip}$ is the average annualized return of all Zillow zip code indices in the three-digit zip code area, $Ret_{3Digit Zip} > 0$ equals $Ret_{3Digit Zip}$ when it is greater than zero and zero if negative, and $Characteristic_{n,i}$ refers to investor characteristic n for property i . Characteristics considered are if the investor lives in the property, number of properties purchased by the investor including the current one, if the property was bought without a mortgage, if the investor lives in the same 3-digit zip code as the property, and if the property had been foreclosed before the investor bought it. Repeat sales are omitted if they are held for less than six months, have annualized returns of less than -99% or more than 2000%. Only properties built before the purchase year are included. Robust standard errors are used. t-statistics are indicated in parentheses. ***, ** and * depict significance at the 1%, 5% and 10% level respectively

The second regression includes properties from the ten other or non-bubble states. The intercept coefficient for this regression is 0.0632. In other states, investors earn an average annual return of 6.32% if the Zillow index is unchanged. The coefficient on the index return is 0.7135, indicating that real estate investors' returns in these states fall by less than the Zillow index when the index declines. The coefficient on positive index returns is 1.5013, so real estate investors earn 6.32% plus $0.7135 + 1.5013 = 2.2148$ times as much as the index when the Zillow index return is positive.

The next two columns provide regression estimates using just properties that are identified as houses, condos, or apartments. Properties that are not described, or that have ambiguous descriptions are omitted. As in the first two regressions, intercepts are positive and highly significant for both the bubble state and other states regressions. When the Zillow indices are flat, investors still earn positive returns. The coefficients on positive Zillow index returns are positive and significant. Real estate investor returns move more with the Zillow indices when the indices are rising than when they are falling. This again could be interpreted as market timing ability. Real estate investors buy properties that move with the local market before real estate prices increase, and buy properties that do not move much with the market before real estate price declines.

As a whole, the results in Panel A indicate that real estate investors purchase properties that outperform real estate indices. This is not a surprising result. Most real estate purchases are made by people who intend to live in the house or condo. They have little experience in real estate and may be new to the area. In addition, these buyers purchase real estate for consumption as well as investment. They may be willing to pay for amenities that the market will not value highly.

Real Estate Investor, Property Characteristics and Investment Returns

Even on properties bought for investment purposes, we would expect real estate investor returns to be a function of their experience, skill, knowledge, and ability to negotiate. To test this, we include variables for investor characteristics in the regressions. We also include interactions between characteristics and the index return and between characteristics and a variable that equals index returns when the index returns are positive and zero when negative. This allows us test whether the characteristic helps investors time the market and take advantage of market-wide price appreciation. Specifically, we estimate

$$\begin{aligned}
 Ret_i &= \alpha_0 + \alpha_1 Ret_{3Digit Zip} + \alpha_2 Ret_{3Digit Zip} \\
 &> 0 + \sum_{n=1}^N \beta_n Characteristic_{n,i} + \sum_{n=1}^N \gamma_n Characteristic_{n,i} \cdot Ret_{3Digit Zip} \\
 &\quad + \sum_{n=1}^N \delta_n Characteristic_{n,i} \cdot Ret_{3Digit Zip} \\
 &> 0 + \varepsilon_i
 \end{aligned} \tag{2}$$

In the remainder of Table 5 we estimate Eq. (2) using one characteristic at a time. In Table 6, we estimate (2) using all investor and property characteristics together.

Table 6 Regressions of real estate investment returns on investor characteristics

	Bubble States			Non-Bubble States		
	Omit Land Mobile Home		Only Houses, Condos, Apts.	Omit Land Mobile Home		Only Houses, Condos, Apts.
Intercept	-0.1040*** (-21.01)	-0.0708*** (-9.45)	-0.1073*** (-19.45)	-0.1272*** (-15.49)	-0.0853*** (-7.78)	-0.1385*** (-12.85)
R _{3-DigitZip}	1.2593*** (43.52)	1.3919*** (16.19)	1.2151*** (36.61)	1.1763*** (9.75)	3.0419*** (8.49)	0.8911*** (5.03)
R _{3-DigitZip} > 0	0.3497*** (7.50)	-0.2851** (-2.03)	0.3744*** (7.46)	1.0218*** (6.45)	1.5761*** (-3.57)	1.3024*** (5.87)
Investor Same 3-digit Zip	0.0343*** (9.65)	0.0138*** (2.85)	0.0374*** (9.12)	0.0344*** (6.03)	0.0400*** (4.59)	0.0387*** (5.12)
Investor Same Zip	-0.0076 (-1.60)	-0.0097 (-1.33)	-0.0164*** (-3.34)	0.0359*** (4.98)	0.0396*** (3.57)	0.0407*** (4.19)
Live in House	0.0050 (1.10)	0.0181** (2.55)	0.0126*** (2.74)	-0.0807*** (-12.10)	-0.0659*** (-6.63)	-0.0913*** (-10.35)
No Mortgage	0.1572*** (41.01)	0.0713*** (13.43)	0.1611*** (38.38)	0.1849*** (46.48)	0.1366*** (23.35)	0.2073*** (39.36)
Foreclosed	0.0875*** (9.68)	0.0540*** (4.01)	0.0874*** (9.17)	0.3223*** (12.43)	0.3271*** (7.18)	0.2887*** (10.87)
Number Props Owned	0.0240*** (11.22)	0.0263*** (6.88)	0.0258*** (10.60)	0.0358*** (10.00)	0.0247*** (5.01)	0.0371*** (8.03)
R _{3-digit Zip} ×						
Live Same 3 Zip	-0.1579** (-2.30)	-0.1636** (-2.01)	-0.1636** (-2.01)		0.3606 (1.20)	0.3644 (0.82)
Live Same Zip	-0.1524 (-1.50)	-0.0469 (-0.45)	-0.0469 (-0.45)		-0.1920 (-0.55)	-0.0492 (-0.09)
Live in House	0.1733* (1.70)	0.0639 (0.61)	0.0639 (0.61)		0.3184 (1.01)	-0.3000 (-0.66)
No Mortgage	-0.9548*** (-10.00)	-1.0899*** (-9.78)	-1.0899*** (-9.78)		-1.4263*** (-7.00)	-2.2522*** (-7.44)
Foreclosed	-1.4371*** (-4.75)	-1.4846*** (-4.61)	-1.4846*** (-4.61)		1.0472 (1.25)	1.4222* (1.67)

Table 6 (continued)

	Bubble States		Non-Bubble States	
	Omit Land Mobile Home	Only Houses, Condos, Apts.	Omit Land Mobile Home	Only Houses, Condos, Apts.
Number Props	0.1432*** (3.69)	0.1515*** (3.46)	-0.6000*** (-3.48)	-0.8872*** (-3.45)
$R_{3-digit Zip} > 0$ x Live Same 3 Zip	0.3677*** (3.46)	0.3980*** (3.27)	-0.3661 (-0.92)	-0.6082 (-1.10)
Live Same Zip	0.1046 (0.61)	-0.1416 (-0.91)	0.0270 (0.06)	-0.0185 (-0.03)
Live in House	-0.3205* (-1.80)	-0.1219 (-0.71)	-0.8715** (-2.04)	-0.3760 (-0.63)
No Mortgage	1.9298*** (13.07)	2.0710*** (12.73)	2.3974*** (8.72)	3.2102*** (8.29)
Foreclosed	1.4865*** (3.01)	1.6634*** (3.14)	0.3773 (0.14)	-0.0300 (-0.02)
Number Props	-0.0661 (-1.01)	-0.0924 (-1.30)	0.7548*** (3.67)	1.0579*** (3.61)
Observations	125,821	104,646	81,325	53,214
R ²	0.1549	0.1505	0.0645	0.0640

$$Ret_i = \alpha_0 + \alpha_1 Ret_{3Digit Zip} + \alpha_2 Ret_{5Digit Zip} > 0 + \sum_{n=1}^N \beta_n Characteristic_{n,i} + \sum_{n=1}^N \gamma_n Characteristic_{n,i} Ret_{3Digit Zip} + \sum_{n=1}^N \delta_n Characteristic_{n,i} Ret_{5Digit Zip} > 0 + \epsilon_i$$

Where Ret_i is the annualized price appreciation of investment property i from its purchase and sale price, $Ret_{3Digit Zip}$ is the average annualized return of all Zillow zip code indices in the three-digit zip code area, $Ret_{5Digit Zip} > 0$ equals $Ret_{3Digit Zip}$ when it is greater than zero and zero if negative, and $Characteristic_{n,i}$ refers to investor characteristic n for property i . Characteristics considered are if the investor lives in the same 3-digit zip code as the property, if the investor lives in the same five-digit zip code as the property, if the investor lives in the property, if the property was bought without a mortgage, if the property had been foreclosed before the investor bought it, and number of properties purchased by the investor including the current one. Repeat sales are omitted if they are held for less than six months, have annualized returns of less than -99% or more than 2000%. Only properties built before the purchase year are included. Robust standard errors are used. t-statistics are indicated in parentheses. ***, ** and * depict significance at the 1%, 5% and 10% level respectively

Returns on Properties that Investors Occupy

If real estate investors' focusing on the investment characteristics of property rather than its consumption value is a significant reason they outperform indices, we would expect their returns to be lower on properties that they occupy. To test this, we estimate Eq. (2) with a dummy that takes a value of one if the investor lives in the property as the characteristic. These regressions are reported in Panel B of Table 5. The first four regressions do not contain interactions between index returns and the dummy variable for the investor living in the house. The four regressions represent bubble and non-bubble states and the two different criteria for including properties, those explicitly defined as houses, condos or apartments, and all properties not defined as land or mobile homes. In each case, the coefficient on the dummy variable for living in the house is negative, significant, and larger in magnitude than the intercept coefficient. Properties owned by real estate investors that they do not occupy earn positive returns when the local Zillow index is flat, while the houses they live in earn negative returns. Real estate investors earn abnormal returns, but not on their own homes.

We include interactions between the Zillow index return and the Zillow index return when positive and the dummy for living in the house in the last four regressions of Panel B. With these additional terms, the coefficients on the dummy variable for living in the house remain negative and significant in each regression. Houses purchased by investors to live in underperform. In the bubble states, the coefficient on the interaction between the return on the index and the dummy for living in the house is negative. Investors choose properties that are less sensitive to local real estate values when they live in a house than when they buy a property as an investment. In the other states, the coefficient on the interaction between living in the house and the index return is positive and significant, while the coefficient on the interaction between a positive index return and the dummy for living in a house is negative and significant. This is the opposite of what we would expect with successful market timing. Houses that investors live in are sensitive to the index during downturns but insensitive to the index when it performs well. This is very different from what we see with properties that investors buy but do not live in.

Investor Experience and Returns

We expect investor experience to affect returns both because we expect experienced investors to do a better job of selecting properties and because we expect them to do a better job of negotiating purchases. We estimate (2) using a variable that equals the total number of properties that the investor has purchased, up to and including the current property. The coefficient on this variable can be interpreted as the extra annual return earned on later purchase. In considering these regressions, bear in mind that we may miss some purchases. Some investors may have bought property before the start of our data. In the instances where this occurs, investors will have more experience than indicated by the experience variables. We will also miss purchases if they occur in a different state or if the investor name or address are recorded slightly differently on different deeds. These problems may add noise to the regressions and possibly weaken results.

We report the regressions in Panel C of Table 5. The first four regressions in Panel C do not include interactions between Zillow Index returns and the number of properties owned by the investor. In each case, the coefficient on the number of properties is positive and highly significant. These regressions suggest that investors learn from their real estate experiences and become better investors. This is not surprising. We would expect them to learn about desirable and undesirable characteristics of properties. We might also expect experience to make them skilled negotiators. The last four regressions include interactions between the number of properties owned by the investor and Zillow index returns and positive Zillow index returns. Even with these interaction terms, the coefficient on the number of properties is positive and significant in each case. For bubble states, the coefficient on the interaction between the index return and the number of properties is positive and significant. Experienced investors pick properties that are more sensitive to index returns than inexperienced investors. For the other states, the coefficient on the interaction between number of properties and the index return is negative and significant, while the coefficient on the interaction between the number of properties and a positive index return is positive and significant. This is consistent with experienced investors being better able to time their real estate investments than other investors.

Mortgage Use and Returns

A large proportion of real estate investors pay cash when buying properties. A big advantage of paying cash is that it puts the investor in a better negotiating position when buying the property. The seller knows that the transaction will be completed. There is no concern that the assessed value of the property will be too low to support the mortgage. There is no uncertainty about whether the buyer will obtain financing. In addition, investors who purchase properties at auction are typically required to pay cash. Finally, an investor who can pay cash can move quickly to take advantage of a favorable price for a property.

We rerun regression (2) with a dummy variable that takes a value one when the purchase is made without a mortgage. Results are shown in Panel D. The first four regressions do not include interactions between the no mortgage dummy and index returns. In each of these regressions, the coefficient on the variable for no mortgage is positive and highly significant. The coefficients are large, ranging from 0.1678 for properties other than land or mobile homes in bubble states, to 0.2257 for the properties designated as houses, condos, or apartments in non-bubble states. All else equal, an investor earns about 20% per year more on properties that are purchased for cash. When the no mortgage dummy is included, the intercept coefficient is negative in each regression. When the local real estate index return is zero, investors who buy with a mortgage lose money while those who buy without a mortgage earn positive returns. The t-statistics on the no mortgage dummies are very large, ranging from 39.99 to 48.23. Adjusted R²s are larger for these regressions than for any others in Table 5. Paying cash seems to be a very important component of investor success.

The regressions in the next four columns include interactions between the dummy for no mortgage and both index returns and positive index returns. Interactions between the no mortgage dummy and positive index returns are particularly interesting because the ability to buy with cash is helpful for investors who are trying to time the market. In

each of the regressions, the coefficient on the interaction between the no mortgage dummy and index returns is negative and highly significant while the coefficient on the interaction between the no mortgage dummy and positive index returns is positive, large, and highly significant. When local house prices fall, houses bought without mortgages experience much smaller price declines. When house prices rise, the prices of houses bought without mortgages rise much more. These results suggest that paying cash for properties helps investors time the market. They can quickly purchase property that is sensitive to local market conditions before an upturn.

Buyer Location and Return

Real estate investors have traditionally lived near their investments, but many in our dataset live in different cities within the same state, or even in different states from their property. A local investor is likely to know more about the area and the local real estate market. In addition, local real estate investors may learn of opportunities more quickly than investors located farther away. They may be able to act more quickly to take advantage of opportunities. To test this, we include a dummy variable that equals one if the investor lives in the same 3-digit zip code as the property in Eq. (2). These regressions are reported in Panel E of Table 5. In the first four regressions, we do not include interactions between the dummy for living in the same three-digit zip code and index returns. In each of these regressions, the coefficient is positive and highly significant. Investors earn returns that are higher by about 2% per year when they live close to properties they own. For the bubble states, the coefficients on the interaction between the dummy for living in the three-digit zip and the index return are negative and significant, while the coefficients on the interaction between the dummy for living in the three-digit zip and the positive index return are positive and significant. This suggests that local investors in the bubble states were able to time the market. Another way to interpret this is that in the bubble states, the investors who were buying into high risk areas before the downturn were not local investors.

Returns on Purchases of Foreclosed Properties

Foreclosed properties account for a significant proportion of the properties that investors purchase in our sample. There were many foreclosures in the bubble states after prices began to decline. Depressed areas like Detroit, Michigan also had numerous foreclosures. Lenders that acquire properties through foreclosure typically have no interest in owning real estate and make for “motivated” sellers. Investors who purchase foreclosed properties may therefore be able to negotiate favorable prices and may be able to earn large returns.

Estimates of Eq. (2) with a dummy variable that is one if the house had been foreclosed when purchased are shown in Panel F. The coefficients on the foreclosure dummy are 0.1523 and 0.1539 in the bubble states, and are highly significant. Investors who buy foreclosed properties in the bubble states earn annual returns that are about 15% greater than returns on indices. The coefficients on the foreclosure dummy for the non-bubble states are very large: 0.3928 and 0.3687. These coefficients are also highly statistically significant. The last four regressions include interactions between foreclosed properties and index returns and positive index returns. For the bubble

states, the interactions between foreclosure and index returns are negative while the interactions between foreclosure and positive index returns are positive. For the other states, these interactions are insignificant.

Some caution is needed in drawing conclusions from the returns to foreclosed properties. If investors spend more money to renovate properties than is spent on the typical house or condo in the Zillow index, excess returns may be overstated. Foreclosed properties may require more repairs and renovations than typical properties. Homeowners who expect to default on mortgages are likely to skimp on maintenance and owners of property that needs major repairs may be more likely to default on loans, all else equal. This could help explain the very large abnormal returns earned on foreclosed property in the non-bubble states.

Real Estate Returns when all Investor Characteristics Are Considered

Now, rather examining the impact of investor characteristics separately, we combine them into one regression. We include dummy variables for the investor living in the same 3-digit zip code as the property, for living in the same zip code, for living in the property, for buying the property without a mortgage and for foreclosed property. We also include the number of properties owned by the investor. In additional regressions, we also include interactions between each characteristic and the index return and positive index return variables. Table 6 presents regression estimates.

As in Table 5, we estimate separate regressions for bubble and non-bubble states. For both locations, we estimate one regression using all properties that are not designated as land, mobile homes, or recreational properties, and one that includes only properties explicitly categorized as houses, apartments or condos. In these regressions, the coefficients on investor characteristics generally have the same sign and significance level that they do in the regressions that include only one characteristic at a time.

In each regression, after including all the other variables, the coefficients on the dummy variables for living in the same three-digit zip code as the property, for purchasing the property without a mortgage, and for purchasing foreclosed property are positive and highly significant. Investors earn higher returns on property if they live in the same city, can pay cash, and buy when the house has been foreclosed. The coefficient on the number of properties owned is also positive and significant. Even after adjusting for all of the other variables, experienced investors earn higher returns than inexperienced ones. The coefficient on the dummy variable for living in a house is negative and highly significant for the non-bubble states, but not for the bubble states.

It is particularly interesting that in each of these regressions, even after including all other variables, the interaction between buying without a mortgage and the index return is negative and significant, while the interaction between buying without a mortgage and a positive index return is positive and significant. More than any other variable, paying cash for a property is associated with ability to time the local real estate market.

Investor Characteristics and the Purchase Prices of Properties

Investors can earn abnormal returns on real estate in several ways. First, they can use their knowledge of local real estate, or their negotiating ability or their ability to provide

liquidity to purchase properties at favorable prices. Or, they can use knowledge of local economies to forecast areas and property types that will provide better returns. Finally, it is possible that they earn superior returns by providing property improvements. We examine that issue in the next section of the paper.

In this section, we test whether the characteristics that are associated with large real estate returns are also associated with purchasing real estate at low prices. If specific real estate investor characteristics allow them to earn abnormal returns on their investments, it is likely that these characteristics are associated with the investors paying less for properties. The ability to buy without a mortgage may allow investors to negotiate better prices, and to move more quickly when good buying opportunities arise. Foreclosed properties may have “motivated sellers” and be available at better prices. People living near properties may be more aware of when they can be purchased at a favorable price. Finally, investors who have purchased numerous properties may be better at negotiating purchase prices and assessing property values.

To test whether investor characteristics affect purchase prices, we run the following regression,

$$\left(\frac{\text{Purchase Price}}{\text{Assessed Value}}\right)_i = \alpha_0 + \alpha_1 D_{\text{No Mortgage},i} + \alpha_2 D_{\text{Foreclosed},i} + \alpha_3 D_{\text{Same 3-digit zip},i} + \alpha_4 \text{Number Prop}_i + \alpha_5 D_{\text{Live in House}} + \varepsilon_i \quad (3)$$

The correspondence between purchase prices and assessed values is likely to differ significantly across locations, so we include fixed effects for the five-digit zip code of each property and cluster standard errors on the purchase year. We present results in Table 7.

Panel A shows results for bubble states. We do not need sale prices for properties, just purchase prices. Hence, these regressions have more observations than the return regressions. We first run separate regressions for each investor characteristic that is associated with real estate returns. The first regression contains only the dummy variable for no mortgage as an explanatory variable. With fixed effects, the intercept is determined arbitrarily. Stata chooses it so that the predicted value calculated at the mean of the independent variables equals the mean of the dependent variable. In the first regression, it is 1.5855, indicating that investors pay about 59% over the assessed value. The coefficient of -0.3178 means that investors without a mortgage paid almost 32% of the assessed value less than other investors. The ability to purchase without a mortgage appears to allow investors to negotiate better prices or to move quickly to buy promising properties. In the second regression, the coefficient on the dummy variable for a foreclosed property is -0.4795 . Investors bought foreclosed property for about 48% of the assessed value less than other properties. In the third regression, we estimate the impact of the investor living in the same three-digit zip code as the property on purchase prices. Living nearby is associated with a purchase price that is only 1.7% lower, as a percentage of the assessed value, than is paid by an investor living in another city. Unlike the coefficients on all the other characteristics, this one is statistically insignificant with a t-statistic of -1.31 . The fourth regression has just the number of properties held by the investor as an independent variable. The coefficient is -0.0208 , indicating that more properties are associated with lower purchase prices relative to assessed values. The coefficient on the dummy variable for living in the house, shown in regression (5) is 0.0870. Investors who intend to live in a house pay more, relative to the assessed value,

than investors who buy property solely for an investment. When all the variables are included together, in the sixth regression, all retain the same signs. The coefficient on the dummy variable for living in the same 3-digit zip code shift from being insignificant to having a t-statistic of -8.50 . The number of properties and the dummy variable for living in the house are now statistically insignificant.

Panel B shows results for other states. Results are similar to the bubble state results but stronger. All coefficients have the expected sign, are larger in absolute value than the bubble state coefficients, and are more statistically significant. For example, in the regression for non-bubble states with all variables, the coefficient on the dummy for the investor living in the same 3-digit zip code is -0.0849 with a t-statistic of -9.33 , while the same variable has a coefficient of -0.0335 with a t-statistic of -8.50 in the bubble state regression.

The results in Table 7 are consistent with real estate investors earning abnormal returns by buying at low prices relative to assessed values. The same characteristics of investors that allow them to earn large returns on real estate investments also allow them to buy at low prices.

Robustness Checks

Robustness Tests: Are the Results Dependent on the Zillow Indices?

Our results thus far indicate that individual investors outperform Zillow indices on their investments, particularly if they live in the same city as the investment property, buy it without a mortgage, and if the property has been foreclosed. The Zillow indices are popular and widely followed, but the details of their construction is relatively opaque. Before concluding that individual real estate investors earn abnormal returns, we examine the sensitivity of our results to the real estate index.

We construct monthly repeat sales indices for four three-digit zip codes areas in Florida, and three three-digit zip codes areas in California. The Florida areas are 331 (Miami), 334 (Boca Raton, West Palm Beach), 339 (Fort Myers) and 342 (Sarasota). The three California areas are 922 (Palm Springs, Riverside County), 923 (San Bernardino County), and 945 (Napa, Fremont, Valejo). Estimation of repeat sales indices requires a lot of observations, and these were the three-digit zip codes in California and Florida with the largest number of repeat sales over 2000–2015. For each three-digit zip code, we generate a repeat sales index.⁹

We regress annualized investor returns on annualized index returns, investor and property characteristics, and interactions between positive index returns and property characteristics using our repeat sales indices and the Zillow indices used throughout the paper. Results are presented in Table 8. The first column provides coefficients and t-statistics for the regression that uses our repeat sales indices and does not have interactions between index returns and characteristics. The second column reports results of a similar regression that uses the Zillow index.

For the most part, results are insensitive to index choice. In both regressions, the coefficients on the dummy variables for buying the house without a mortgage and

⁹ This is the methodology in Bailey et al. (1963) and is similar to Case and Shiller (1987).

Table 7 Regressions of the ratio of purchase price on assessed value

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Bubble States						
Intercept	1.5855*** (21.34)	1.5142*** (20.48)	1.4423*** (17.43)	1.4693*** (18.31)	1.4153*** (17.15)	1.6602*** (21.89)
D _{No Mortgage}	-0.3178*** (-8.28)					-0.2604*** (-8.38)
D _{Foreclosure}		-0.4795*** (-5.47)				-0.4102*** (-5.55)
D _{Same 3-digit Zip Code}			-0.0168 (-1.31)			-0.0335*** (-8.50)
Number Prop.				-0.0208*** (-2.68)		-0.0052 (-1.49)
Live in House					0.0870*** (3.06)	-0.0126 (-0.51)
Fixed Effects	2687	2687	2687	2687	2687	2687
Observations	263,231	263,231	263,231	263,231	263,231	263,231
Adj. R ²	0.2850	0.2956	0.2385	0.2394	0.2405	0.3256
Panel B. Non-bubble states						
Intercept	1.8911*** (38.38)	1.5860*** (27.65)	1.5771*** (25.71)	1.6188*** (28.35)	1.5080*** (25.44)	1.9480*** (39.20)
D _{No Mortgage}	-0.4842*** (-30.21)					-0.4251*** (-24.31)
D _{Foreclosure}		-0.5202*** (-7.05)				-0.4162*** (-6.69)
D _{Same 3-digit Zip Code}			-0.0409*** (-3.85)			-0.0849*** (-9.33)
Number Prop.				-0.0351***		-0.0186***

Table 7 (continued)

Live in House				(-9.11)			(-13.25)
Fixed Effects	7097	7097	7097	7097	7097	0.2903*** (17.64)	0.1916*** (14.08)
Observations	167,233	167,233	167,233	167,233	167,233	167,233	167,233
Adj. R ²	0.4481	0.4240	0.4063	0.4090	0.4161	0.4161	0.4663

For properties purchased by investors that have an assessed value in the purchase year, we run the following regression

$$\left(\frac{\text{Purchase Price}}{\text{Assessed Value}}\right)_i = \alpha_0 + \alpha_1 D_{\text{No Mortgage}, i} + \alpha_2 D_{\text{Foreclosed}, i} + \alpha_3 D_{\text{Same 3-digit zip}, i} + \alpha_4 \text{Number Prop}_i + \alpha_5 D_{\text{Live in House}} + \epsilon_i$$

where $D_{\text{No Mortgage}, i}$ is one if the property was purchased without a mortgage, $D_{\text{Foreclosed}, i}$ is one if the property was purchased after a foreclosure, $D_{\text{Same 3-digit zip}}$ is one if the investor lived in the same 3-digit zip code as the property, Number Prop_i is the number of properties owned by the investor, including the purchased property, at the time of purchase and $D_{\text{Live in House}}$ is one if the property is the investor's home. Only ratios between 0.25 and 4.0 are used. Fixed effects for zip codes are included. Standard errors are clustered on the purchase year. t -statistics are indicated in parentheses. ***, ** and * depict significance at the 1%, 5% and 10% level respectively

Table 8 Robustness Tests: Comparing Results Using Zillow Indices and Repeat Sale Indices

	Repeat Sale Index	Zillow Index	Repeat Sale Index	Zillow Index
Intercept	-0.0286*** (-2.63)	-0.0948*** (-8.88)	-0.0084 (-0.54)	-0.0553*** (-4.17)
R _{3-digit Zip}	1.0197*** (40.67)	1.3977*** (34.27)	1.0025*** (12.71)	1.5078*** (10.86)
R _{3-digit Zip} > 0	-0.0888 (-1.53)	0.1453** (2.01)	-0.4403** (-2.25)	-0.5842*** (-2.62)
Investor Same 3-digit Zip	0.0103 (1.57)	0.0137** (2.06)	-0.0155 (-1.28)	0.0014 (0.16)
Investor Same Zip	0.0063 (0.74)	0.0061 (0.72)	0.0006 (0.04)	-0.0160 (-1.06)
Live in House	0.0008 (0.01)	-0.0012 (-0.16)	0.0137 (0.98)	0.0266* (1.83)
No Mortgage	0.1304*** (19.23)	0.1441*** (21.17)	0.0720*** (6.39)	0.0639*** (7.21)
Foreclosed	0.0679*** (3.35)	0.0922*** (4.55)	0.0030 (1.05)	0.0700*** (4.52)
Number Props Owned	0.0279*** (5.49)	0.0266*** (5.27)	0.0367*** (4.11)	0.0232*** (3.44)
R _{3-digit Zip} x Live Same 3 Zip			-0.0568 (-0.90)	-0.0541 (-0.60)
Live Same Zip			-0.1982** (-2.27)	-0.3850** (-2.25)
Live in House			0.1521* (1.71)	0.3958** (2.18)
No Mortgage			-0.3362*** (-3.80)	-0.8946*** (-6.27)
Foreclosed			-0.7497*** (-2.99)	-1.0976*** (-2.70)
Number Props			0.1016** (2.31)	0.1087 (1.52)
R _{3-digit Zip} > 0 x Live Same 3 Zip			0.3674** (2.54)	0.2025 (1.30)
Live Same Zip			0.0188 (0.09)	0.4841 (1.45)
Live in House			-0.1835 (-0.90)	-0.6668** (-1.97)
No Mortgage			0.8384*** (5.03)	1.7265*** (7.63)
Foreclosed			1.1029* (1.92)	1.2633** (1.98)
Number Props			-0.0695 (-0.70)	0.0593 (0.52)
Observations	28,337	28,337	28,337	28,337
R ²	0.1968	0.2002	0.2025	0.2065

$$Ret_{it} = \alpha_0 + \alpha_1 Ret_{3Digit Zip} + \alpha_2 Ret_{3Digit Zip} > 0 + \sum_{n=1}^N \beta_n Characteristic_{n,i} + \sum_{n=1}^N \gamma_n Characteristic_{n,i} \cdot Ret_{3Digit Zip} + \sum_{n=1}^N \delta_n Characteristic_{n,i} \cdot Ret_{3Digit Zip} > 0 + \epsilon_i$$

We construct monthly repeat sale indices of house values in four three-digit zip code areas of Florida (331, 334, 339, and 342) and three three-digit areas of California (922, 923, 945). Zillow indices for the same three-digit zip code areas are constructed by averaging all five-digit indices in the three-digit area. Returns on repeat sales of properties in these areas by real estate investors are regressed on the index returns, investor and property characteristics, and interactions between index returns and property characteristics. Characteristics considered are if the investor lives in the same 3-digit zip code as the property, if the investor lives in the same five-digit zip code as the property, if the investor lives in the property, if the property was bought without a mortgage, if the property had been foreclosed before the investor bought it, and number of properties purchased by the investor including the current one. t-statistics are indicated in parentheses. ***, ** and * depict significance at the 1%, 5% and 10% level respectively

buying foreclosed property are positive and statistically significant. The coefficient on the number of properties owned is also positive and significant in both regressions. The one important difference is that the coefficient on a positive index return for the three-digit zip code is positive and significant when the Zillow indices are used, but negative when the repeat sale indices are included in the regression.

The last two columns of Table 8 show regression results when index returns and positive index returns are interacted with investor characteristics. Now, in both regressions the coefficient on positive index returns is negative and significant. This is not what we find in the full sample, but appears in this subsample regardless of which index is used. In both cases, the coefficient on the interaction between index returns and the no mortgage dummy is negative and significant, while the interaction between positive index returns and buying with no mortgage is positive and highly significant. Investors are better able to time the real estate market if they buy with cash. The interaction between index returns and the foreclosure dummy is negative and significant for both regressions while the interaction between positive index returns and the foreclosure dummy is positive and of marginal significance in both cases.

The main lesson of Table 8 is that our results are not sensitive to the real estate index that we use to measure abnormal returns. Regressions that use our repeat sales indices produce similar results to regressions that use the Zillow indices. All-in-all, the Zillow indices appear to be somewhat better than the simple repeat sale indices. R^2 's are higher for regressions that use the Zillow indices than similar regressions that use the repeat sales indices. In addition, the repeat sales indices used in Table 8 were estimated using areas with large numbers of repeat sales. It is likely that repeat sales indices estimated for areas with fewer transactions would not work as well.

Do Real Estate Investors Sell Winners and Keep Losers?

Based on properties that they both buy and sell, it appears that real estate investors outperform local real estate indices. This is particularly true for certain types of investors. Those who live in the same three-digit zip code as the property and hence are likely to have better information about the local area than outsiders, earn positive abnormal returns. Investors who do not need to take a mortgage to buy property are in a better position to negotiate a purchase and can move quickly when a desirable property is available at a good price. These investors also outperform local indices on properties that they buy and sell. Investors with more experience as property owners are also likely to make fewer mistakes in buying, selling and managing property. We would expect them to earn higher returns, and our evidence suggests that they do.

These estimates are based on properties that are both bought and sold in our sample period – a minority of all investor held properties. Investors in equities have been shown to sell winners while hanging on to losers. If the same is true for real estate investors, their returns could be overstated.

To see if real estate investors are selling winners, we compare the change in assessed value between a property's purchase and sale years with the change in assessed values over the same time period for properties that were held through that year. We do that by estimating the following regression,

$$Ret_{t,t+k}^{Assessed,i} = \alpha_0 + \alpha_1 D_{Sold\ t+k}^{Bought\ t} + \varepsilon_i \quad (4)$$

Where the return is based on assessed values for years t and $t+k$ and the dummy variable takes a value of one if the property was bought in year t and sold in year $t+k$. Other observations are properties that were bought in year t and sold at a later date, or not at all during our sample period. Fixed effects for the three-digit zip code of the property capture the average annualized assessed value return for properties in that zip code bought in year t and held at least until year $t+k$. To ensure that we do not include properties that were built while the property was held, we only include observations if the building was built at least a year before the purchase date. A positive value for α_1 indicates that properties that were sold outperformed, at least in assessed value, properties that the investor continued to hold. Or, put another way, a positive α_1 estimate suggests that investors are selling winners.

Table 9 presents the α_1 coefficients, or the difference between annualized returns for properties that were sold and returns for properties that were held. Panel A provides results for the bubble states. Each coefficient is the coefficient from the regression with a specific purchase and sale year. Recall that each regression contains all assessed value returns for properties that were bought in year t and sold in year $t+k$ or later. Therefore, the coefficient estimates are not independent. Many of the properties that were bought in, say, 2002 and not sold in 2008 were also not sold in 2009, and the assessed returns for these properties from 2002 to 2009 may be strongly correlated with the assessed returns from 2002 to 2008.

If investors were more likely to sell winners, the coefficients would be positive. That is not what we see. In Panel A, coefficients are more likely to be negative, particularly if investors purchased the property in 2006 or 2007. T-statistics, in parentheses under the coefficients, indicate that several of these coefficients are significantly less than zero. If anything, investors in the bubble states were selling losers and hence returns could be understated. Panel B provides results for non-bubble states. Coefficients are about half positive and half negative. These is little to suggest that investors are selling winners. This evidence suggests that it is unlikely that calculating returns using completed repeat sales imparts a bias to the return estimates.

Do Real Estate Investors Outperform Indices or Do they Spend More to Improve Properties?

It appears that real estate investors, particularly those who live near their properties and buy without a mortgage, earn returns that exceed local real estate indices. One reason for this is that they appear to buy these properties at attractive prices. It is also possible though that investors are spending more to renovate and improve properties than others. Note that individuals who purchase properties to live in also spend money on improvements and renovation, and the value of the local real estate indices reflect these improvements. The issue then is whether real estate investors spend more on renovations than others, and whether the extra returns earned by them are eliminated when the extra amount that they spend on improvements is included.

There are investors who purchase houses, with the aim of renovating them and “flipping” them quickly. Note, however, that we omit flippers who buy and sell in six

Table 9 The difference between assessment value returns for properties that were sold and properties that were held

Panel A. Bubble states		Year Sold										
Buy Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
2002	0.0046 (0.39)	0.0071 (1.08)	0.0080 (1.36)	0.0102* (1.79)	0.0069 (1.48)	-0.0014 (-0.39)	-0.0031 (-1.08)	0.0007 (0.26)	-0.0033 (-1.45)	0.0018 (0.87)	-0.0015 (-0.80)	
2003	0.0097 (1.02)	0.0092 (1.37)	0.0092 (1.37)	0.0085 (1.59)	-0.0038 (-0.82)	-0.0001 (-0.02)	-0.0047* (-1.67)	-0.0029 (-1.22)	-0.0045** (-2.06)	-0.0028 (-1.58)	0.0010 (0.63)	
2004	0.0008 (0.08)	0.0008 (0.87)	0.0008 (0.87)	0.0056 (0.87)	-0.0032 (-0.64)	-0.0122*** (-3.74)	-0.0116*** (-4.54)	-0.0091*** (-4.06)	-0.0018 (-0.91)	-0.0024 (-1.39)	-0.0005 (-0.33)	
2005	0.0144 (1.31)	0.0144 (1.31)	0.0052 (0.47)	0.0144 (1.31)	0.0052 (0.47)	-0.0015 (-0.28)	-0.0054 (-1.63)	-0.0101*** (-4.16)	-0.0091*** (-4.16)	-0.0081*** (-4.17)	-0.0010 (-0.56)	
2006					-0.0440*** (-3.31)	-0.0154*** (-2.85)	-0.0174*** (-4.39)	-0.0196*** (-5.61)	-0.0136*** (-4.22)	-0.0085*** (-3.02)	-0.0110*** (-4.27)	
2007						-0.0554*** (-4.48)	-0.0467*** (-7.21)	-0.0376*** (-7.28)	-0.0242*** (-5.52)	-0.0092** (-2.52)	-0.0137*** (-4.16)	
2008							-0.0358** (-2.07)	-0.0144 (-1.39)	-0.0094 (-1.37)	0.0054 (1.20)	-0.0032 (-0.86)	
2009								0.0115 (0.94)	-0.0068 (-1.10)	-0.0003 (-0.09)	0.0026 (0.85)	
2010									-0.0127 (-1.27)	-0.0017 (-0.37)	0.0045 (1.27)	
2011										0.0102 (1.31)	0.0079* (1.79)	
2012											-0.0047 (-0.58)	

Panel B. Non-bubble states		Year Sold										
Buy Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												
2011												
2012												

Table 9 (continued)

2002	-0.0179 (-1.51)	-0.0012 (-0.15)	0.0003 (0.05)	0.0018 (0.33)	-0.0045 (-0.86)	-0.0021 (-0.47)	0.0011 (0.31)	-0.0031 (-0.82)	0.0083** (2.27)	0.0017 (0.50)	0.0030 (0.86)
2003	0.0053 (0.39)	-0.0059 (-0.73)	-0.0049 (-0.67)	-0.0070 (-0.87)	0.0010 (0.17)	0.0010 (0.17)	0.0012 (0.26)	-0.0058 (-1.19)	0.0022 (0.60)	0.0086** (2.30)	0.0036 (1.03)
2004	-0.0053 (-0.43)	-0.0071 (-0.93)	-0.0114** (-2.19)	0.0032 (0.74)	0.0034 (0.85)	0.0032 (0.74)	-0.0045 (-1.34)	-0.0029 (-0.72)	-0.0091*** (-2.98)	-0.0006 (-0.18)	0.0028 (0.77)
2005	0.0337*** (3.81)	-0.0015 (-0.28)	-0.0015 (-0.28)	0.0019 (0.37)	0.0019 (0.37)	0.0019 (0.37)	0.0051* (1.73)	-0.0040 (-1.38)	-0.0012 (-0.50)	0.0025 (1.09)	-0.0021 (-0.81)
2006	-0.0029 (-0.33)	-0.0029 (-0.33)	-0.0029 (-0.33)	-0.0019 (-0.17)	-0.0019 (-0.17)	-0.0019 (-0.17)	-0.0030 (-0.83)	-0.0015 (-0.41)	-0.0057* (-1.90)	-0.0051* (-1.85)	-0.0023 (-0.72)
2007	-0.0019 (-0.17)	-0.0019 (-0.17)	-0.0019 (-0.17)	-0.0019 (-0.17)	-0.0019 (-0.17)	-0.0019 (-0.17)	-0.0011 (-0.18)	-0.0004 (-0.07)	-0.0034 (-0.83)	0.0094*** (3.02)	0.0033 (0.82)
2008	0.0006 (0.05)	0.0006 (0.05)	0.0006 (0.05)	0.0006 (0.05)	0.0006 (0.05)	0.0006 (0.05)	0.0006 (0.05)	-0.0200* (-1.79)	0.0011 (0.14)	0.0126** (2.17)	0.0108** (2.14)
2009	-0.0307*** (-2.07)	-0.0307*** (-2.07)	-0.0307*** (-2.07)	-0.0307*** (-2.07)	-0.0307*** (-2.07)	-0.0307*** (-2.07)	-0.0307*** (-2.07)	-0.0307*** (-2.07)	0.0122 (1.34)	0.0044 (0.79)	0.0023 (0.37)
2010	0.0196 (1.49)	0.0196 (1.49)	0.0196 (1.49)	0.0196 (1.49)	0.0196 (1.49)	0.0196 (1.49)	0.0196 (1.49)	0.0196 (1.49)	0.0196 (1.49)	0.0030 (0.36)	0.0060 (0.076)
2011	0.0187* (1.95)	0.0187* (1.95)	0.0187* (1.95)	0.0187* (1.95)	0.0187* (1.95)	0.0187* (1.95)	0.0187* (1.95)	0.0187* (1.95)	0.0187* (1.95)	0.0110 (1.20)	0.0110 (1.20)
2012	0.0143 (0.78)	0.0143 (0.78)	0.0143 (0.78)	0.0143 (0.78)	0.0143 (0.78)	0.0143 (0.78)	0.0143 (0.78)	0.0143 (0.78)	0.0143 (0.78)	0.0143 (0.78)	0.0143 (0.78)

For each purchase year t and subsequent year $t + k$, we regress the percentage change in assessed value on a dummy variable that takes a value of one if the property was sold in $t + k$ and zero if the property was still held and not sold. That is

$$Ref_{t,t+k}^{Assessed,i} = \alpha_0 + \alpha_1 D_{Sold,t+k}^{Bought,t} + \epsilon_i$$

Coefficients on the dummy variable for a sale in $t + k$ (α_1) are reported. Only properties built in years before the purchase year are included. Regressions include 3-digit zip code fixed effects. t-statistics are indicated in parentheses. ***, ** and * depict significance at the 1%, 5% and 10% level respectively

months or less from our return calculations. Instead, the average holding period of properties used to calculate returns is over five years. Nevertheless, to get at this issue, we estimate the return regression using returns on land and mobile homes. It is unlikely that returns from buying and selling either of these forms of property can be attributed to improvements made by the investor. Abnormal returns must instead come from superior knowledge of property values, better negotiating of prices, or fewer behavioral biases than the typical property buyer.

Table 10 presents the regression results separately for land and mobile homes along with the comparable regressions for houses, apartments, and condos. There are far fewer observations of returns on land and mobile homes than there are for houses, condos and apartments. This is particularly true for the other states. Hence we omit interactions between index returns and investor characteristics in these regressions. The first two regressions are for bubble state properties. For land and mobile homes the coefficient on $Ret_{3\text{-digit Zip}} > 0$ is large, 6.2296 with a t-statistic of 30.80. This is not surprising. Building material and construction labor prices do not fluctuate much, so most changes in real estate prices should come from changes in the value of a location. Land values will be particularly sensitive to those changes.

Of more interest is how investor characteristics affect returns on land and mobile homes. For land and mobile homes, like houses, condos, and apartments, investors earn larger returns if they live in the same state and same 3-digit zip code as the property. This suggests that value of living close to the property isn't that it makes it easier to improve the property. That would not apply to land. Likewise, investors earn larger returns on land or a mobile home if the property is bought without a mortgage. This suggests that the extra return from paying cash doesn't arise because the investor has more resources to put into renovation. It is likely that there is no renovation for land or mobile homes. Also like houses, condos and apartments, land investors who have already invested in properties earn larger returns than those who are new to real estate investing. This can be explained by experienced investors knowing more about the local real estate market, but not by them being better at renovating property.

The next two columns show results by property type for non-bubble states. The land and mobile home regressions again show that returns are affected in the same way by the same investor characteristics that affect returns on houses, condos, and apartments. Returns are larger for land investors if they live close to the property, pay cash, and already own property. Returns are larger on foreclosed properties than others.

Recently built houses are also unlikely to be improved or renovated by real estate investors. Abnormal returns from investing in these houses (or condos or apartments) are likely to come from better negotiating skills, better knowledge of local economies and real estate markets, or an ability to supply liquidity to property sellers. To compare investor returns on new properties that are unlikely to need renovation with returns on older properties, we divide repeat sale transactions into those in which the property was bought five or fewer years after it was built, and those in which the property was bought between six and one hundred years after its construction. We then estimate the price appreciation regression separately for new and old buildings. Regression estimates are presented in Table 11.

The first two columns show bubble state regressions for properties that are one to five years old, and properties that are six to one hundred years old. For the new properties, the coefficient on the no mortgage variable is 0.1141. An investor who buys a recently built house and pays cash earns an extra 11.41% annually on her investment. This again suggests

Table 10 Investor returns on land and mobile homes versus houses, condominiums, and apartments

	Bubble States		Non-Bubble States	
	Land and Mobile Homes	Only Houses, Condos, Apts.	Land and Mobile Homes	Only Houses, Condos, Apts.
Intercept	-0.4325*** (-19.54)	-0.1283*** (-21.62)	-0.3070*** (-4.48)	-0.1741*** (-12.69)
R _{3-digit Zip}	-0.1623 (-1.19)	1.2171*** (36.71)	0.5225 (1.04)	0.9084*** (5.11)
R _{3-digit Zip} > 0	6.2296*** (30.80)	0.3691*** (7.37)	4.2731*** (4.82)	1.2809*** (5.76)
Investor Same State	0.0599*** (3.99)	0.0354*** (8.33)	0.0836* (1.67)	0.0474*** (3.96)
Investor Same 3-digit Zip	0.1052*** (5.78)	0.0248*** (5.24)	0.0703 (1.61)	0.0275*** (3.38)
Investor Same Zip	-0.1002*** (-5.60)	-0.0164*** (-3.35)	0.0044 (0.11)	0.0407*** (4.19)
Live in House	NA	0.0120*** (2.61)	NA	-0.0914*** (-10.37)
No Mortgage	0.2638*** (26.43)	0.1624*** (38.34)	0.2829*** (9.72)	0.2069*** (39.29)
Foreclosed	-0.0158 (-0.60)	0.0856*** (8.98)	0.3019** (2.43)	0.2882*** (10.85)
Number Properties Owned	0.0660*** (6.78)	0.0248*** (10.21)	0.1006*** (4.53)	0.0371*** (8.04)
Observations	39,361	104,646	6713	53,214
R ²	0.2353	0.1509	0.0436	0.0643

$$Ret_i = \alpha_0 + \alpha_1 Ret_{3Digit Zip} + \alpha_2 Ret_{3Digit Zip} > 0 + \sum_{n=1}^N \beta_n Characteristic_{n,i} + \varepsilon_i$$

Where Ret_i is the annualized price appreciation of investment property i from its purchase and sale price, $Ret_{3Digit Zip}$ is the average annualized return of all Zillow zip code indices in the three-digit zip code area, $Ret_{3Digit Zip} > 0$ equals $Ret_{3Digit Zip}$ when it is greater than zero and zero if negative, and $Characteristic_{n,i}$ refers to investor characteristic n for property i . Characteristics considered are if the investor lives in the same state, if the investor lives in the same 3-digit zip code as the property, if the investor lives in the same five-digit zip code as the property, if the investor lives in the property, if the property was bought without a mortgage, if the property had been foreclosed before the investor bought it, and number of properties purchased by the investor including the current one. Repeat sales are omitted if they are held for less than six months, have annualized returns of less than -99% or more than 2000%. Only properties built before the purchase year are included. Robust standard errors are used. t-statistics are indicated in parentheses. ***, ** and * depict significance at the 1%, 5% and 10% level respectively

that the value of paying cash is that investors can negotiate a better deal, not that they have money to pay for renovations. Finally, each extra property owned before purchasing the recently built house means an extra 1.01% annual return. The number of properties owned is statistically significant with a t-statistic of 3.44.

The intercept coefficient for the regression is -0.0753. So, an investor who lived in the same 3-digit zip code but not the same 5-digit zip code as the property, had no mortgage, and owned one property before this purchase could be expected to earn returns of $-0.0753 + 0.0167 + 0.0108 + 0.1141 + 2 \times 0.0101 = 8.65\%$ per year when

Table 11 Investor Returns on New and Old Properties

	Bubble States		Non-Bubble States	
	1–5 Years	6–100 Years	1–5 Years	6–100 Years
Intercept	−0.0753*** (−7.94)	−0.1338*** (−21.34)	−0.0628*** (−3.55)	−0.1588*** (−13.59)
R _{3-digit Zip}	1.1785*** (22.10)	1.2836*** (37.72)	1.8503*** (5.79)	1.1049*** (8.60)
R _{3-digit Zip} > 0	0.0392 (0.36)	0.3677*** (6.98)	−0.7158* (−1.77)	1.0273*** (6.03)
Investor Same State	0.0167** (1.99)	0.0364*** (8.39)	0.0315* (1.76)	0.0413*** (3.99)
Investor Same 3-digit Zip	0.0108 (1.08)	0.0240*** (5.40)	0.0149 (0.97)	0.0223*** (3.37)
Investor Same Zip	−0.0087 (−1.07)	−0.0072 (−1.37)	0.0452** (2.53)	0.0360*** (44.47)
Live in House	0.0138** (2.18)	0.0054 (1.05)	−0.0461*** (−2.79)	−0.0782*** (−10.58)
No Mortgage	0.1141*** (13.98)	0.1651*** (38.31)	0.0565*** (6.16)	0.1870*** (42.27)
Foreclosed	0.0874*** (3.47)	0.0857*** (8.83)	0.0938** (2.25)	0.3229*** (11.34)
Number Properties Owned	0.0101*** (3.44)	0.0254*** (10.16)	0.0087** (2.05)	0.0365*** (9.61)
Observations	20,566	104,866	6591	64,622
R ²	0.1566	0.1534	0.0425	0.0655

$$Ret_i = \alpha_0 + \alpha_1 Ret_{3Digit Zip} + \alpha_2 Ret_{3Digit Zip} > 0 + \sum_{n=1}^N \beta_n Characteristic_{n,i} + \varepsilon_i$$

Where Ret_i is the annualized price appreciation of investment property i from its purchase and sale price, $Ret_{3Digit Zip}$ is the average annualized return of all Zillow zip code indices in the three-digit zip code area, $Ret_{3Digit Zip} > 0$ equals $Ret_{3Digit Zip}$ when it is greater than zero and zero if negative, and $Characteristic_{n,i}$ refers to investor characteristic n for property i . Characteristics considered are if the investor lives in the same state, if the investor lives in the same 3-digit zip code as the property, if the investor lives in the same five-digit zip code as the property, if the investor lives in the property, if the property was bought without a mortgage, if the property had been foreclosed before the investor bought it, and number of properties purchased by the investor including the current one. Repeat sales are omitted if they are held for less than six months, have annualized returns of less than −99% or more than 2000%. Only properties built before the purchase year are included. The regressions for properties that are one to five years old, and properties that are six to one hundred years old are estimated separately. Robust standard errors are used. t-statistics are indicated in parentheses. ***, ** and * depict significance at the 1%, 5% and 10% level respectively

local real estate prices were unchanged. Given that these are recently built properties, it is highly unlikely that these large returns relative to local real estate indices come from investors spending more on improvements than the typical homeowner spends on improvements for properties in the index.

The next column contains the regression results for older properties in bubble states. Returns are somewhat more sensitive to the investor living near the property and not having a mortgage, but total excess returns are similar. An investor who lived in the same 3-digit zip code but not the same 5-digit zip code as the property, had no

mortgage, and owned one property before this purchase could be expected to earn returns of 14.25% per year.

Regressions for the non-bubble states are reported in the next two columns. Returns are more sensitive to the investor's location in these states, and returns are much lower if the investor lives in the house. For recently constructed properties in the non-bubble states, investors who lived in the same 3-digit zip code but not the same 5-digit zip code as the property, had no mortgage, owned one real estate investment before the purchase and did not live in the property, earned returns of $-0.0628 + 0.0315 + 0.0149 + 0.0565 + 2 \times 0.0087 = 5.75\%$ if the local Zillow index was flat. Again, given how recently these properties were constructed, it seems highly unlikely that property renovations could account for the appreciation that investors earn.

The price appreciation regression for older properties in non-bubble states is shown in the last column. Like returns on newer properties, returns to investors in older properties are greater for nearby properties, if the investor pays cash, and if the investor already owns real estate. A difference here is that the return on older properties is more sensitive to positive index returns than to negative index returns.

The findings in Tables 10 and 11 do not, of course, indicate that remodeling and renovations play no part in the returns earned by real estate investors. But, the fact that similar returns are earned on investments in land and in new properties suggests that renovations play a minor role in investors' real estate returns.

Real Estate Investors and the Housing Bubble

Our results suggest that real estate investors are, as a whole, rational investors who outperform real estate indices with their investments. This raises the question of whether real estate investors were different in the bubble states and during the housing bubble. We have seen consistently that investors who paid cash and investors who lived near properties earned larger returns than investors who bought with mortgages or lived farther from properties. We next examine investors who bought in bubble states and during the bubble period differed from other investors in those characteristics.

Fig. 2 plots the proportion of all investor property purchases each year from 1999 to 2014 that were made by investors that lived in the same 3-digit zip code as the property. The solid

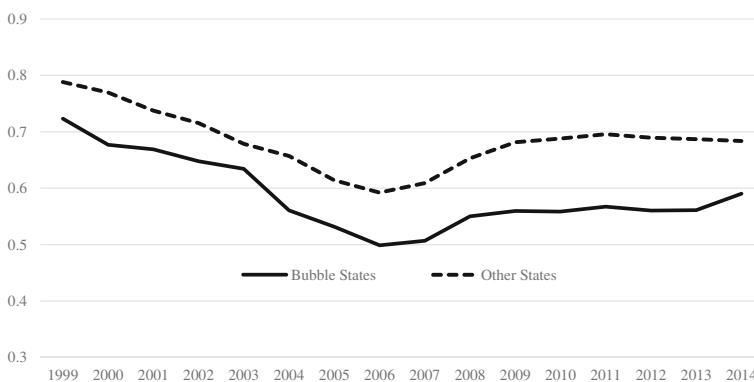


Fig. 2 The proportion of real estate purchases by investors living in the same 3-digit zip code by year

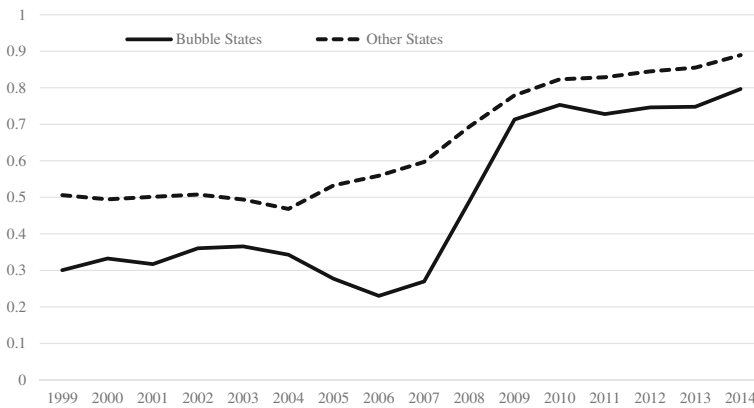


Fig. 3 The proportion of real estate purchases by investors that do not use a mortgage by year

line is the proportion of bubble state purchases by local investors while the dashed line is the proportion of purchases in other states from local investors. The proportion of local investor purchases in bubble states declines steadily from over 70% in 1999 to 50% in 2006 and 2007, the peak of housing prices. It then increases to about 60% by 2014. The proportion of purchases by local investors is higher in non-bubble states than bubble states every year. Nevertheless, it also decreases from almost 80% in 1999 to about 60% in 2006 and 2007. It then increases back to 60% by the end of our sample period.

Paying cash is also a robust predictor of investment success. Figure 3 shows the proportion of investor purchases each year that were made without a mortgage. For bubble states, the proportion is around 35% during 2002–2004 before dropping to under 30% in 2005–2007. For non-bubble states, the proportion is around 50% in the early part of the period and does not change noticeably during the bubble period. After 2007, the proportion of cash purchases increases sharply, especially in the bubble states.

So, the investors who perform poorly make up a larger proportion of purchases in bubble states and a larger proportion during the bubble period. It appears that the run-up in real estate prices attracted less qualified investors into the market in bubble states.

Conclusions

We examine the returns earned by individuals who invest in real estate. As a whole, investors outperform real estate indices. This is not surprising. The marginal buyer of a house is someone who is buying a place to live. The investment prospects for a house or condo are likely to take a backseat to its amenities.

We identify several specific characteristics of individual investors that are associated with significantly higher returns on investments. One is living close to the investment property. Investors who live near a property are likely to be more knowledgeable about local economic conditions and the local real estate market. They may learn about investment opportunities before outsiders and may be able to take advantage of them quickly. Another is paying cash for the property. An investor who is able to pay cash may be able to move more quickly when opportunities arise. She may be better able to

negotiate a favorable price. Finally, we show that experienced real estate investors who had previously purchased property earned higher returns than inexperienced ones. Investors with these characteristics outperform real estate property indices.

One reason that investors with these characteristics outperform indices is that they buy at low prices relative to assessed values. This can occur if investors are good negotiators, or if they are better able to provide liquidity to the real estate market, or if they are better equipped to take advantage of opportunities when they arise. It is possible that real estate investors appear to outperform indices, but only because they spend more to renovate properties. We find, however, that real estate investors (with the right characteristics) also outperform indices when they invest in land, mobile homes, or recently constructed property. It is unlikely that they spend more money to improve these properties than the average homeowner represented in the Zillow indices.

Most of the properties that investors buy are not sold before the end of our sample period. It is well known that individual stock market investors are reluctant to realize losses by selling stocks and much more likely to sell stocks with capital gains. If real estate investors have the same biases to the same degree, our estimates of real estate returns may be too high. We find though, that properties that were bought but not sold had just as much appreciation in assessed values as properties that were bought and sold.

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Compliance with ethical standards

Conflict of Interest The authors declare that they have no conflict of interest.

References

- Allen, M. T., Rutherford, J., Rutherford, R., & Yavas, A. (2018). Impact of Investors in Distressed Housing Markets. *The Journal of Real Estate Finance and Economics*, 4, 622–652.
- Bailey, M., Muth, R., & Nourse, H. (1963). A regression method for real estate price index construction. *Journal of the American Statistical Association*, 58, 933–942.
- Bayer, P., Geissler, C., Mangum, K., & Roberts, J. (2011). *Speculators and middleman: The strategy and performance of investors in the housing market* (p. 16784). NBER Working Paper.
- Bayer, Patrick, Kyle Mangum, and James Roberts (2016). Speculative fever: Investor contagion in the housing bubble, working paper, Duke University.
- Case, Karl E., and Robert J. Shiller (1987). Prices of single family homes since 1970: New indexes for four cities. No. w2393. National Bureau of Economic Research.
- Chetty, R., Sándor, L., & Szeidl, A. (2017). The effect of housing on portfolio choice. *The Journal of Finance*, 72(3), 1171–1212.
- Chinco, A., & Mayer, C. (2016). Misinformed speculators and mispricing in the housing market. *Review of Financial Studies*, 29(2), 486–522.
- Cocco, J. F. (2005). Portfolio choice in the presence of housing. *The Review of Financial Studies*, 18(2), 535–567.
- DeFusco, A., Ding, W., Ferreira, F., & Gyourko, J. (2017). *The role of price spillovers in the American housing boom, working paper*. Northwestern University.
- Flavin, M., & Yamashita, T. (2002). Owner-occupied housing and the composition of the household portfolio. *American Economic Review*, 92(1), 345–362.

- Fortune (2017). Article available at <http://fortune.com/2017/12/28/house-value-gain-zillow/>
- Gao, Z., & Li, W. (2012). *Real estate investors and the boom and bust of the US housing market*, working paper. Federal Reserve Bank of Philadelphia.
- Genesove, D., & Mayer, C. (2001). Loss aversion and seller behavior: Evidence from the housing market. *The Quarterly Journal of Economics*, 116(4), 1233–1260.
- Giacoletti, M., & Westrupp, V. (2017). *Residential real estate traders: Returns, risk and strategies*, working paper. Stanford Graduate School of Business.
- Kurlat, P., & Stroebel, J. (2015). Testing for information asymmetries in real estate markets. *The Review of Financial Studies*, 28(8), 2429–2461.
- Li, Wenli (2015). Smart money or dumb money: Investors' role in the housing bubble. Federal Reserve Bank of Philadelphia Business Review.
- Mills, J., Molloy, R., & Zarutskie, R. (2017). Large-scale buy-to-rent Investors in the Single-Family Housing Market: The emergence of a new asset class. *Real Estate Economics*, 47(2), 399–430.
- Peng, L., & Zhang, L. (2019). House prices and systematic risk: Evidence from microdata. *Real Estate Economics*.
- Real Estate Investment Realities (2012). Joint Biggerpockets.com/Memphis Invest National Survey of Residential Real Estate Investors.
- Swanson, Jann (2016). 1 in 3 homes still bought with cash, Mortgage News Daily, February 4, 2016.

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