Wall Street, Main Street, Your Street: How Investors Impact the Single-Family Housing Market

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Abstract

We examine the entrance of institutional investors in the single-family housing market before and after the 2007-2009 recession. We empirically test whether the entrance of institutional investors contributed to the subsequent increase in home prices after the recession. Using just under 337,000 home sale transactions for the Charlotte region between the years 2005-2017, we find that institutional investors paid a discount of about 8.13%-11.19% per transaction. Additionally, we find that an increase in institutional investor home purchases in the single-family housing market had a positive statistical impact on individual home prices but only a moderate economic impact.

JEL Classifications: R31, R38

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Introduction

Since the early 2000s, the U.S. housing market has seen a significant rise, a dramatic fall, and a subsequent rebound in home prices. The current consensus is that the loosening of credit access in the U.S., especially in the mortgage market, was a contributing factor to the large increase in home prices in the early 2000s as well as a contributing factor to the subsequent fall of home prices during the 2007-2009 recession. In this paper, we examine the driving forces in the subsequent rebound in home prices after the 2007-2009 period. Specifically, we look at the emergence of institutional investors in the single-family housing market and empirically test if they contributed to the increase in home prices and if they contributed to the housing affordability issue in the U.S.

Following the Great Recession, credit became harder to obtain even for well-qualified individuals. This was the result of many factors, including: depository institutions exiting the mortgage lending business, depository institutions being capital constrained, and regulatory uncertainty before and after the passage of Dodd-Frank and the Qualified Mortgage standard. In addition, the introduction of HARP and other government programs (which operated through financial institutions) resulted in increased demand for re-financing, which affected the mortgage origination pipelines of lenders. Meanwhile, home prices continued to fall.

However, since 2012, national home prices have risen and have surpassed peak pre-recession prices. At the same time, the average national homeownership rate between 2010 and 2017 was 64.87%, which is below the average national home ownership rate of 68.29% between 2000 and 2006. A contributing factor to this low homeownership rate is the fact that many single-family housing units have been converted into rental units. Although these are national level numbers, many of these trends can be seen at a lower level. For example, each of these trends for the Charlotte region can be found in Figure 1. The combination of these three trends has put housing affordability concerns back near the top for policy issues in the U.S.[1]

One of the key differences between the pre-recession and post-recession periods is the increased presence of institutional investors in the single-family housing market, which has been well documented.[2] Institutional investors, such as Real Estate Investment Trusts (REITs), saw

[1] See American Housing and Economic Mobility Act of 2019 and the Executive Order Establishing a White House Council on Eliminating Regulatory Barriers to Affordable Housing.

[2] See `https://www.wsj.com/articles/investors-are-buying-more-of-the-u-s-housing-market`

that home prices relative to rents were low. They realized they could purchase single-family homes for the purpose of renting them out to the general population. Furthermore, while many individuals were unable to raise funds to purchase homes, institutional investors already had funds to do so, which meant they did not need to obtain a traditional mortgage for each home purchase. This gave institutional investors a significant timing advantage in the housing market.

The perception in the popular press has been that these institutional investors entered the housing market and "out-bid" the traditional single-family home buyer. In essence they are arguing two things: institutional investors were "crowding out" traditional owner-occupied buyers, and institutional investors were willing and able to pay more for a house than non-institutional investors. However, what is not immediate clear is from whom were institutional investors purchasing? The single-family housing market has always had some mix of owner-occupiers and investors participating at any given time. Historically, these investors were the "mom and pop" investors who purchased and rented out these homes. It is entirely possible that institutional investors came into the single-family housing market and purchased directly from these "mom and pop" investors and not from owner-occupiers themselves. If this is the case, then one could argue that institutional investors were in a completely different market.

If institutional investors were purchasing a majority of their homes directly from owner-occupiers, then concerns of potential outbidding may be warranted. However, Mills, Molloy, and Zarutskie (2019) show that buy-to-rent investors only made up to 0-15% of total home purchases each year between 2012-2014, which is small relative to the overall market. What they do not show is where on the price distribution these institutional investors were purchasing. For example, institutional investors could have segmented the market by identifying homes that are better suited for renting than for owning. These homes might have been of lower quality on average, so the demand for these homes may not have been as high before the entrance of institutional investors. When institutional investors started buying these homes, they boosted demand and left only the homes that were more appropriate for owner-occupiers. If traditional owner-occupiers wanted to buy these lower quality homes, then they would need to pay a premium in order to out-bid these institutional investors. This would lead to an increase in the

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lower part of the price distribution and leave only higher priced homes in the market, which would naturally boost the average price in an area.

On the other hand, institutional investor managers are professionals who are buying relatively large numbers of homes in the market, so we would expect that they are, on average, more informed about the market than individuals that are buying for owner-occupied use. Thus, institutional investors would be less likely to overpay than owner-occupied purchasers. Furthermore, institutional investors were purchasing at a fragile time in the housing market, which may imply that they had higher bargaining power. Both of these mechanisms would lead to homes being purchased at a discount. Thus, the net effect that institutional investors have on home prices is unclear. If institutional investors purchased at a discount, they are clearly not raising prices on an individual basis. However, by purchasing homes, they are effectively decreasing the supply of the remaining homes, which would push home prices up on average as long as the remaining homes are being purchased and being purchased at a premium.

In this paper, we empirically examine the effect institutional investors had on home prices at the transaction level. Using transaction level data for Charlotte, North Carolina, between the years 2005-2017, we find that institutional investors paid a discount of about 8.13%-11.19% per transaction. This discount is independent of the discount obtained from purchasing a real-estate owned (REO) home. Additionally, we find that an increase in institutional investor home purchases in the single-family housing market had a statistically positive impact on home prices but a moderate economic impact. That is, a 1 percentage point increase in the percentage of homes purchased by institutional investors in the previous 6-months increased individual home sale prices by about 0.32%-0.59%. The economic significance is about $4,611.63-$5,099.53 for a one standard deviation increase in institutional investor activity in the Charlotte region. Both of these results are consistent across the entire price distribution as well as across various census tract and racial/ethnic groups.

Our results suggest that although investors pay a discount on an individual basis, their aggregate activity increased home prices across the entire price distribution. As more homes continue to be purchased, traditional home buyers (owner-occupiers and non-institutional investors) have to bid higher prices for the lower quality homes, have to buy higher quality homes, or have to leave the single-family housing market. This creates a competition effect and

in combination with the tight access to credit, hinders low income/wealth buyers from buying homes. In line with this thought, our results show that individuals are more likely to pay a premium relative to the asking price of the home.

However, we shed some concern that this positive price impact may not all be coming directly from institutional investor activity. In fact, we find that a majority of the price increase is coming from a general increase in demand. Using a difference-in-difference based test, we find that there is no direct price impact on owner-occupier bought homes within 0.1 miles of an institutional investor bought home. Nonetheless, we find that owner-occupier homes further away from institutional investor purchased homes were positively impacted. In other words, homes purchased by owner-occupiers saw an increase in price of about 0.28%-0.34% for each home purchased by an institutional investor within 0.1-0.25 miles. This effect, combined with the increased likelihood owner-occupiers have been paying a premium, suggests that competition for housing among owner-occupiers has increased.

Given the recent surge of institutional investor activity in the single-family housing market, the literature on their effect is small but growing. At the transaction level, our results are most similar to Allen et al. (2018) and Smith and Liu (2018). Both of these papers find that investors paid a discount at the transaction level. We extend their work by examining the competition effect among the remaining single-family home buyers as well as examining the effect across different quantiles of the price distribution. The aforementioned papers only examine the effect on average prices, and in the case of Smith and Liu (2018), only focus on individual effects rather than effects from aggregate investor activity.

In terms of aggregate investor activity, our results are in line with the results of Garriga, Gete, and Tsouderou (2019), Lambie-Hanson, Li, and Slonkosky (2019), and Mills, Molloy, and Zarutskie (2019), in which each find that an increase in investor activity increases home prices at the aggregate level. However, each of these studies only look at the aggregate level and do not look at the transaction level. For this reason, their focus is not on the competition effect among the different types of buyers within the single-family housing market. Thus, they cannot speak on the impact institutional investors have on traditional single-family home purchasers. Given the growing concern of housing affordability in the U.S., the impact institutional investors have on the market, especially on individuals, is a top priority both economically and politically.

The rest of the paper is as follows: Section 2 discusses the data, Section 3 discusses the main methodology used, Section 4 discusses the results, and Section 5 includes the closing remarks.

2 Data

The main data to study the effects of institutional investors on the housing market comes from Metrostudy, which maintains one of the most comprehensive U.S. housing databases. Metrostudy is a leading provider in residential construction activity across the nation, but they complement this data with transaction level history for a wide range of property types. This transaction level housing data comes from CoreLogic, a major provider of housing data for the U.S, as well as from deed and tax assessor data from individual counties. Since housing is highly localized, we focus our attention to a single area: the Charlotte region between the years 2005-2017.[3] In addition, given that townhomes and condominiums have had a larger history with investors, we restrict our study to the detached single-family housing market.

Each observation contains the sale price, sale date, address, sale type, loan amount (if applicable), and other housing characteristics. Most importantly, each observation also contains the name of the seller, purchaser, and lender. Any observation missing a variable was dropped from the analysis. Furthermore, any home sale considered to be part of a "bulk" sale was also dropped. We define a bulk sale as three or more home sales with the same sale price, sale date, and purchaser name. Using the names of the seller and purchaser, we can identify investors and non-investors in the Charlotte housing market. We define investors as non-individuals that are not banks, mortgage/credit lenders, relocation companies, building companies, nor government entities. This leaves us with companies we believe have purchased homes for investment purposes. Many of the company names include words such as "investment" or "asset management." However, to ensure the accuracy of the data, we inspect each name to make sure they are not an individual or entity listed above.

Using this definition of an investor, we are able to identify 14,850 homes purchased by an investor in the Charlotte region. These observations include homes bought by institutional investors as well as homes bought by non-institutional investors. Given that the main focus

[3]The Charlotte region covers Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, and Union counties.

of this study is to examine the effect institutional investors had on the single-family housing market, we create a strict definition for what we consider an institutional investor. We define an institutional investor as an investor that has filed as a publicly traded company, that has filed as a REIT with the SEC, or that has filed a Form D with the SEC.[4] Using this definition of an institutional investor, we can identify 7,365 homes purchased by an institutional investor.[5]

Table 1 provides the summary statistics for the entire dataset. There are 336,878 home sales with no missing attributes across the 6 counties.[6] A majority of these sales comes from regular resales of existing homes, about a quarter of the sales comes from new construction, and the remaining home sales come from REO sales. 82.55% finance the home purchase with a mortgage, which means that 17.45% paid with only cash-on-hand. The average price in the Charlotte region is $256,231.98.

Table 2 breaks the summary statistics down by investors and non-investors. Investors typically do not finance the home purchase with a mortgage and instead pay with cash-on-hand because only 12.42% of investors obtained a mortgage. In addition, the average loan amount among investors is also relatively small at $19,381.16, whereas non-investors have an average loan of about $190,208.84. However, investors are also buying smaller homes and are more likely to purchase an REO home relative to non-investors. Both of these are typically associated with lower home prices, which is clear given that investors pay an average price of $167,710.56, while non-investors pay an average price of $260,314.06.

The summary statistics in Table 2 clearly show that there is a difference in activity and eventual outcome between investors and non-investors. What it does not show is how much of the investor activity is attributed to institutional investors and to non-institutional investors. Table 3 shows the difference between these two types of investors. One can see that more than half of the investor observations comes from institutional investors, and 0.00% of these home purchases were financed with a mortgage. Furthermore, institutional investors were more likely to buy non-REO homes. Thus, we would expect that on average, institutional investors will pay

[4]Form D is used to file a notice of an exempt offering of securities with the SEC. For more information see: `https://www.sec.gov/smallbusiness/exemptofferings/formd`

[5]These institutional investors include: American Homes 4 Rent, American Housing REIT, Amherst Holdings, Cerberus, Colony Starwood Homes, Conrex, Equity One, Front Yard Residential, Harrison Street, Home Partners of America, Invitation Homes, Main Street Renewal, Progress Residential, Silver Bay Realty Trust, Tamina Homes, Tricon, and West Granite Homes. Many of these institutions are similar to those used in Mills, Molloy, and Zarutskie (2019) and Smith and Liu (2018).

[6]Although Metrostudy has foreclosure observations, all of these observations were missing the sales price. For this reason, all foreclosure observations were dropped from the analysis.

a slightly higher price than non-institutional investors, which is the case.

One of the most important aspects of the data is the time period in which institutional investors entered the housing market. Prior to the 2007-2009 recession, home prices were at an all-time high. Once the recession occurred, many individuals began to default on their mortgage. This led to mortgage lenders reducing the number of new mortgage originations and led to policy makers enacting legislation to tighten financial regulation. The outcome of these events was a reduction in home purchases, especially among traditional single-family home buyers. The number of transactions in the Charlotte region can be found in Figure 2. We can see that following the beginning of the recession in 2007, home purchases decreased steadily and hit the lowest point in 2011 at about 13,230 transactions. However, since 2011, home transactions have steadily increased.

As competition in the housing market was low, institutional investors realized an opportunity. Figure 3 shows the number of homes purchased, the percentage of homes purchased relative to the total market, and the total dollar value of homes purchased by year by investor type. From the figure, we can see that between 2005-2011, there were no homes purchased by institutional investors. The market was entirely made up of traditional single-family home purchasers. Starting in 2012, institutional investors entered the Charlotte housing market, and between 2013-2015, institutional investors purchased nearly double the amount of homes purchased by non-institutional investors. The amount spent by these institutional investors is also significant as they spent between \$49.43-\$332.12 million per year since 2012.

Given that aggregate changes in housing trends in the Charlotte region began to change in 2012 (Figure 1), informal conclusions may suggest that these aggregate changes occurred due to the entrance of institutional investors. However, as mentioned earlier, it is entirely possible that institutional investors were purchasing directly from "mom and pop" investors and not from owner-occupiers themselves. Figure 4 plots the percentage of single-family homes bought by investors directly from owner-occupiers by year. This figure shows that institutional investors purchased about 61.67%-83.17% of their homes directly from owner-occupiers. This suggest that institutional investors were actively involved in the single-family market and may be directly competing with owner-occupiers.

However, similar to Mills, Molloy, and Zarutskie (2019), our data shows that institutional

investors only made up about 2.11%-7.40% of total home purchases per year since 2012. This suggests that although they contributed to demand, they did not contribute by an extreme amount. Nonetheless, it is not necessarily the total number of homes purchased that matters but the number of homes purchased in a given price range that matters. For example, if institutional investors were buying extremely low priced homes that no other buyers wanted, then institutional investors will not "crowd out" traditional home buyers. If institutional investors were buying the so called "starter home," then there is a higher likelihood that institutional investors will "crowd out" traditional home buyers, especially owner-occupiers.

Figure 5 plots the percentage of homes bought by each purchaser by sale price since 2012. Figure 5a compares institutional investors with non-institutional investors, and Figure 5b compares institutional investors with owner-occupiers. One can see that both types of investors purchased the majority of their homes below $250,000. Most interestingly, non-institutional investors purchased the majority of their homes at the lowest price level. Non-institutional investors purchased about 54.85% of their homes below $100,000, while institutional and owner-occupiers only purchased 13.62% and 10.48% of their homes under $100,000 respectively. As one moves along the sale price range, non-institutional investors purchased less homes relative to their total purchases, while institutional investors and owner-occupiers purchased slightly more homes. Specifically, institutional investors purchased about 81.94% of their homes between $100,000 and $250,000, while non-institutional and owner-occupiers purchased 38.29% and 50.36% of their homes in the same range respectively. The key takeaway is that as sales price increases and enters into the "starter home" price range, institutional investors conduct a majority of their activity. This further suggests that institutional investors may be directly competing with owner-occupiers.

On top of that, institutional investors are less likely to sell homes relative to traditional single-family buyers. Figure 6 shows the number of homes sold and the percentage of homes sold relative to the total market by year by investor type. One can see that institutional investors rarely sold homes in their possession as opposed to non-institutional investors. By holding these homes, institutional investors reduced the supply of single-family housing. In addition, institutional investors were more likely to sell homes to other investors (Figure 7a), while non-institutional investors were more likely to sell homes to owner-occupiers (Figure 7b).

3 Methodology

The summary statistics laid out in Section 2 suggest that the entrance of institutional investors in the Charlotte housing market had a pronounced effect on home prices. The main issue with summary statistics is that it does not take into account all the factors that can drive home prices. For example, many papers, such as Anenberg and Kung (2014), Campbell, Giglio, and Pathak (2011), and Clauretie and Daneshvary (2009), have shown that homes that were REO sales or that sold near a foreclosed home, sold for a significant discount. Given that investors were more likely to purchase REO homes than non-investors, it is hard to conclude from summary statistics that investors increased prices.

In order to tease out the various factors and extract the marginal effect investors had on home prices, we utilize a hedonic regression approach. Given that both types of investors conduct most of the their home buying activity at the lower end of the price distribution and were less likely to obtain traditional mortgage financing, we would expect investors to have a different effect at the lower end than the higher end. Specifically, we expect that investors will have a larger discount at the lower end of the price distribution relative to the higher end.

Since there was high uncertainty surrounding mortgage financing after the Great Recession, it was not immediately clear to sellers whether potential buyers would be able to satisfy the requirements to obtain a mortgage. This increase in uncertainty increased the risk that sellers would not be able to sell their home. Given that investors, on average, had enough funds to pay for the house without a mortgage (and could provide proof of the funds), investors were able to reduce the credit uncertainty issue for the seller. Thus, sellers would be more willing to accept a discount from investors

However, as one moves up the price distribution, the likelihood for single-family purchasers obtaining a mortgage increases, particularly for individuals and non-institutional investors. From Table 3, we know that institutional investors never used a traditional mortgage. In addition, Figure 5a shows that more non-institutional investors participated in the higher end of the market relative to institutional investors. Therefore, the higher end of the market is made up mostly of non-institutional investors and owner-occupiers, all of whom are more likely to purchase with a mortgage. We would still expect a discount from investors as a whole at the top

of the price distribution, but this discount will be less than their discount from the lower end of the market. Thus, as prices increase, the discount obtained from an investor will decrease.

These dynamics also suggest that a purchase with just cash-on-hand will have a negative effect on price. Again, since purchasers are more likely to use just cash-on-hand at the low end of the market relative to the high end, we would expect that as prices increase, the discount from cash should decrease in magnitude. The remaining issue is that it is unclear which of the discounts will have a larger relative magnitude.

In order to examine the effects at various price points, we depart from the standard approach to the hedonic regression by using a quantile approach rather than OLS. Unlike OLS, which examines the marginal effect an explanatory variable can have on the *average* value of the response variable, quantile regressions examine the marginal effect on different points of the response variable distribution. We find this to be a more appropriate approach because we are more interested in how investors, especially institutional investors, affect different parts of the price distribution and not just how they affect the average price. This is important because there are concerns that investors are affecting first-time homebuyers, who mostly concentrate their search efforts at the lower end of the price distribution.

Furthermore, quantile regressions are appealing for a few reasons. Analogous to OLS, quantile regressions minimize a set of residuals. Instead of minimizing the sum of squared residuals like OLS, quantile regressions minimize the sum of absolute deviations. Additionally, quantile regressions make no assumptions about the distribution of the response variable. Finally, quantile regressions use the entire data set and not just certain sub-samples, thus avoiding the sample selection issue laid out in Heckman (1979).

Our main specification for house i, at time t, is as follows:

$$\begin{aligned} p_{i,t} = \beta_0 + \beta \mathbf{X}_{i,t} + \delta_1 PurchasedBy_{i,t} + \delta_2 REO_{i,t} + \\ \delta_3 NoMortgage_{i,t} + \delta_4 RIA_{C,[t-1,t-6]} + ZC_i + QY_t + \epsilon_{i,t} \end{aligned} \tag{1}$$

where $p_{i,t}$ is the log sale price, $\mathbf{X}_{i,t}$ are housing characteristics such as number of bedrooms, number of bathrooms, size of lot (acres), finished square footage, and age of the home, $REO_{i,t}$ indicates whether the home was an REO sale, $NoMortgage_{i,t}$ indicates whether the home was purchased without a mortgage or with a mortgage, $RIA_{C,[t-1,t-6]}$ is recent institutional investor

activity expressed as a percentage of homes bought by institutional investors in the past six months within county C relative to the total number of homes purchased in the past six months within county C, and ZC_i and QY_t are zip code and quarter-year fixed effects respectively.

For the $PurchasedBy_{i,t}$ variable, we use two separate definitions. The first definition is binary such that $PurchasedBy_{i,t}$ equals 1 if the home was purchased by any type of investor and 0 otherwise. The second definition is categorical such that $PurchasedBy_{i,t}$ represents purchases made by institutional investors, non-institutional investors, or owner-occupiers. One can view the categorical version of this variable as two dummy variables: an institutional investor dummy and a non-institutional investor dummy. These dummies equal 1 if the home was purchased by an institutional investor or non-institutional investor respectively. Note that when both of these dummies equal 0, then the home was purchased by an owner-occupier.

With this specification, we can capture the effect investors have on home prices through δ_1. As mentioned above, at the transaction level, investors are large entities that can quickly and easily purchase homes. In addition, given the slow recovery following the recession, investors may have had significant borrowing power relative to non-investors. Thus, we should expect the sign on δ_1 to be negative, such that investors will pay less than non-investors on average.

In order to assess the effect institutional investors have on home prices as a whole, we include the recent institutional investor activity from the past 6-months.[7] That is, we include the percentage of homes bought by institutional investors relative to the total number of homes purchased from time $t-6$ to $t-1$. If the popular press is correct, then we should see a statistically positive and economically large δ_4 coefficient. However, given that institutional investors only make up a small amount of purchases and are expected to pay a discount, we believe we should not expect a large coefficient. Although, it is entirely possible that the coefficient remains positive as it still represents a demand factor in the Charlotte region.

[7] We also use 3, 9, and 12 months, all of which give similar results.

4 Results

4.1 Investor's Effect on Home Sale Prices

Table 4 shows the results from our main specification. We present the results from the standard hedonic regression using OLS in the first few columns and the results from the quantile in the remaining columns. We report the 25th, 50th, and 75th percentile of the sales price for the quantile regression. We consider the OLS results as our baseline. Panel A shows the results without the recent investor activity variable, and Panel B shows the results with the recent investor activity variable.

From Table 4 Panel A, we can see that the baseline model suggests that investors pay a 19.5% discount on an average home in the Charlotte market. This discount decreases to 9.5% when the control for $NoMortgage_{i,t}$ is included. As we look at the quantile results, we can see that the investor effect is about 14.24%-19.97%. That is, an investor will pay roughly 14.24%-19.97% less than an owner-occupier purchaser. Moreover, when we control for whether the purchase was made with a mortgage or not, the investor discount effect decreases in magnitude to 10.29%-12.99%, but still remains statistically and economically significant.

These results are line with what we would expect from an investor. On average and at various points on the sale price distribution, all types of investors pay a discount relative to owner-occupiers. This discount is both statistically and economically significant. Furthermore, as we move up the price distribution, the investor discount effect has a smaller magnitude when we do not control for a mortgage. When we do control for a mortgage, the investor discount effect increases as we move up the price distribution. This occurs because single-family purchasers at the high end of the market are more likely to use a mortgage. As mentioned before, this creates uncertainty for the seller. Although non-institutional investors still obtain mortgages, they obtain much smaller ones than owner-occupiers because non-institutional investors have a larger amount of available funds to purchase a home. The combination of these two will make investors seem more attractive to the seller. This gives investors an upper hand relative to owner-occupiers with a mortgage. Thus at the high end of the market, investors have a stronger discount effect, which is evident in Table 4 Panel A.

When we use our categorical definition for investors (i.e. individual indicator variables

for whether the home was purchased by an institutional investor, non-institutional investor, or owner-occupier), we see that non-institutional investors purchase an average home about 29.28% less than owner-occupiers. Institutional investors purchase homes on average about 11.44% less than owner-occupiers. Looking at the quantile regressions, we see that non-institutional investors purchase the 25th, 50th, and 75th percentile home about 35.24%, 30.9%, and 23.22% less than owner-occupiers respectively. Similarly, we see that institutional investors purchase the 25th, 50th, and 75th percentile home about 8.12%, 9.7%, and 11.25% less than owner-occupiers respectively.

These results are consistent with our argument from Section 3. That is, non-institutional investors will have a higher discount at the low end of the market relative to their discount at the high end of the market. This is the case because they are more likely to use a mortgage, which will increase uncertainty for the seller. Therefore, non-institutional investors lose some bargaining power when they take on a traditional mortgage. On the other hand, institutional investors never use a traditional mortgage and always use just cash-on-hand. For this reason, their discount remains fairly stable throughout the price distribution.

Institutional investors also produce a significantly lower discount compared to non-institutional investors. The reason being is that non-institutional investors are mostly local, "mom and pop" investors, while institutional investors are non-local, large investors. When it comes to house price dynamics, location is important. Since these non-institutional investors are mostly local, they have a comparative advantage as they know the area better than institutional investors. This may give non-institutional investors the ability to close home sales more quickly relative to institutional investors.

When we control for the recent institutional investor activity in the Charlotte region from the previous 6-months, all the above mentioned effects still hold. This can be seen in Table 4 Panel B. Results suggest that investors pay a discount both on average and at various locations on the price distribution. These discounts are both statistically and economically significant. The most important point to note though, is the effect from recent investor activity. We can see that across all specifications, the coefficient on this variable is statistically positive. This means that a 1 percentage point increase in the percentage of homes purchased by institutional investors in the previous 6-months increased individual home sale prices by about 0.32%-0.59%. Although

this is statistically significant, it only has a moderate economic impact on average. That is, for a one standard deviation increase in institutional investor activity in the Charlotte region in the previous 6-months, the average home price sale increased by about $4,611.63-$5,099.53. The impact is even smaller at the lower end of the price distribution. For home prices at the bottom 25th percentile, a one standard deviation increase in institutional investor activity in the previous 6-months increased individual home sale prices by about $1,385.56-$2,673.98.

Note that this is the price increase that owner-occupiers pay. This positive impact does not offset the large discounts that investors gain. Furthermore, this recent investor activity does not explain the large increase in home prices in the Charlotte region since 2012. The home price indices in Figure 1 show that since 2012, home prices in the Charlotte region have increased about 5.61%-5.75% per year. However, the results in Table 4 Panel B suggest that an increase in investor activity only increased home prices by about 0.32%-0.59%.

4.1.1 Investor's Effect Across Groups

One area of concern in terms of housing affordability is that some groups may be more effected by institutional investor purchases than other groups. Specifically, those with low income or those belonging to a racial minority may be more effected. Historically, minorities have been less likely to own homes, and there has been some evidence that discrimination may occur in the housing market.[8] Thus, with the increased presence of institutional investors in the housing market, it is important to investigate whether these minority groups or those with low income have been pushed out of the market.

In order to do this, we group our data by census tract median income and by census tract minority population percentage. We use the Census 5-Year ACS estimates between 2007-2011 to identify median income for each of the census tracts in our data and to identify the census tracts that have a minority population greater than 50%. We create six different census tract groups: census tracts with a minority population greater than 50%, census tracts with a minority population less than or equal to 50%, census tracts with median income less than $35,100, census tracts with median income between $35,100-$44,600, census tracts with median income between $44,600-$58,000, and census tracts with median income greater than $58,000.

We then rerun our main specification (Equation (1)) on these six groups. To get a

[8]See Ondrich, Ross, and Yinger (2003) and Ahmed and Hammarstedt (2008) to name a couple.

meaningful interpretation of our RIA variable, we change it so that it now represents the group of interest rather than the county. That is, RIA for this test is the percentage of homes bought by institutional investors in the past six months within group G relative to the total number of homes purchased in the past six months within group G, where group is the census tract group of interest.

The results for this test can be found in Table 5. We can see that similar to our main results institutional investors purchase at a discount of about 6.34%-18.35% and that institutional investor activity had a similar impact across all six groups. Although, the discount effect in high minority areas was slightly lower, these results suggest that regardless of race or income of the individuals in a given area, institutional investors did not outbid owner-occupiers. These results also suggest that no group was more adversely effected than another group.[9]

4.2 Investor's Effect on Home Listing Prices

On the surface, our results suggest that investors did not *directly* contribute to rising home prices but that they contributed *indirectly*, although only slightly. The next question we address is through which avenue did institutional investors affect other single-family purchasers. The most natural approach to answer this question is did institutional investors increase competition within the single-family market? In order to answer this question, we first need to know whether owner-occupiers paid a premium relative to the list price of the home and if they were more likely to pay a premium once institutional investors entered the market.

The results from the previous section do not tell us if owner-occupiers were paying a premium relative to the list price of the home. The results only tell us that owner-occupiers paid more than investors, yet home prices, in general, have been increasing substantially. It could be the case that the entrance of investors led homeowners to pay a larger amount over the list price in order to "outbid" investors. This process would still affect home prices *indirectly*. That is, as more investors entered into the market, homeowners were more likely to pay a higher amount over the list price. This would lead to an increase in the final sales price. If investors do indeed have a significant impact on the *likelihood* of owner-occupiers paying a premium relative

[9]Note that running this specification by area group may still cover up the micro-level heterogeneity at the individual level. In the appendix, we rerun the main specification using the race of the individual. We find results consistent with Table 5.

to the list price of the home, then concerns of investors creating a housing affordability issue may be warranted.

To test this conjecture, we utilize data from the MLS for the Charlotte region over the 2005-2017 time period since Metrostudy does not have list price data. Each observation in the MLS contains the sale price, sale date, address, and other housing characteristics. Most importantly, each observation also contains the list price as well as the listing contract date. The latter is used to construct the number of days on the market. Unfortunately, the MLS does not contain the name of the seller nor the name of the purchaser. In order to obtain this information, we match the MLS data with the Metrostudy data by sale date and address. Only observations found in both data sets were kept. Summary statistics for this merged data can be found in Table 6.

The largest issue with this merge is that any home not sold by a real estate agent gets dropped from the data set. Thus, the final merged data set consists of 244,453 observations, which is about 72.56% of the full Metrostudy data set used in the previous section. Nonetheless, we are able to preserve 10,694 purchases by investors, which is 72.01% of the number of investor purchases in the full Metrostudy data. Given that there are less investors in this merged data, we should expect a slightly higher sales price. The sales price in the merged data is $260,723.86, which is slightly higher than the $256,231.98 sales price in the Metrostudy data. Finally, we note that the housing characteristics are on average very similar between the two sets of data.

The key piece of this merged data is the days on the market (DOM) and list price variable. Table 6 shows that the average DOM and average list price in the Charlotte region between 2005-2017 was 118 and $268,707.65 respectively. That is, it takes roughly 118 days to sell a home and on average, homes list for a higher price than the final sales price. Since 2011, the number of days it takes a home to sell has drastically decreased and has dipped below the long run average. At the same time, both the list price and the sale price have increased, and the list price has consistently been larger than the sale price. These trends can be seen in Figure 8. It is also worth mentioning that since 2011, the gap between the sales price and the list price has shrunk. These statistics suggest that, on average, single-family home purchasers are paying higher prices, are paying closer to the list price, although only marginally, and are closing transactions quicker. Furthermore, these trends hold for owner-occupiers as well as for

institutional investors, which makes it difficult to interpret whether the entrance of institutional investors led to owner-occupiers paying closer to the list price.

To formalize this finding, we estimate a logit model to determine the likelihood that a purchaser pays more than the list price of the home.

$$Pr(SalePrice > ListPrice)_{i,t} = \Lambda(\beta \mathbf{X}_{i,t} + \delta_1 PurchasedBy_{i,t} + \delta_2 REO_{i,t} + \delta_3 NoMortgage_{i,t} + \delta_4 RIA_{C,[t-1,t-6]} + ZC_i + QY_t) \quad (2)$$

where $Pr(SalePrice > ListPrice)_{i,t}$ is the probability that the sale price is larger than the list price for transaction i at time time t, and Λ is the logistic function. The remaining variables are similar to Equation (1).

Table 7 shows the results for this logistic test. We can see that across each specification, the coefficient on the *PurchasedBy* variable is negative and statistically significant, while the coefficient on the *RIA* variable is positive and statistically significant. The marginal effects associated with the *RIA* variable suggests that a one standard deviation increase in the number of homes purchased by institutional investors relative to owner-occupiers within the past 6-months, increases the probability that an owner-occupier will pay more than the list price of an average home by about 1.49%-1.58%. Consistent with previous results, this suggests that institutional investors had an indirect effect on prices through the list price channel. As more institutional investors entered the single-family market, owner-occupiers were more likely to pay a higher value for a home, possibly to "outbid" investors.

4.3 The Bias with Home Listing Prices

One major issue with the previous result is that listing prices of homes may be strategically chosen by the seller. There is a long literature that shows that both theoretically and empirically, a higher listing price will lead to a longer time-on-the-market. However, at the same time, home sellers do not want to set too low of a listing price because they will lose out on potential capital gains.[10] Therefore, current home sellers may be choosing a listing price to fit their own needs rather than choosing a listing price that is comparable to a fair market value. This may bias

[10]See Arnold (1999), Knight (2002), Cheng, Lin, and Liu (2008), Haurin et al. (2010), and Carrillo (2013) to name a few.

our results, but it is difficult to determine in which direction the bias occurs.

In order to limit the bias issues, we must remove the strategical component of the home seller. However, this is difficult because we do not know the reason why the homeowner is selling. All we know is that home sellers are balancing time-on-the-market and capital gains, which may imply that the listing price home sellers ultimately set may be above or below the fair market value of the home. Thus, we need to estimate a listing price that is consistent with a fair market value of the home because in the end, we are concerned whether the increase in institutional investor home purchases increased the likelihood that owner-occupiers paid more than the market value of the home.

To accomplish this task, we need to estimate each home price, $p_{i,t}$, in our sample. We use a hedonic regression to carry out this estimation. However, using prices at and beyond time t as well as using home prices significantly further back historically may confound this estimated price. Thus, we use a 6-month rolling hedonic regression from time $t-6$ to time $t-1$ to estimate home price i at time t. Our hedonic regression includes only housing characteristics and zip code fixed effects. We then replace the list price of home i at time t with the imputed value from our rolling regression and re-estimate Equation (2).

The result from this re-estimation can be found in Table 8. We can see that similar to the previous results, the coefficient on the *PurchasedBy* variable is negative and statistically significant, while the coefficient on the *RIA* variable is positive and statistically significant. The marginal effects are slightly larger in magnitude for both variables but tell a consistent story: institutional investors may have had an indirect effect on prices through the list price channel. That is, owner-occupiers were more likely to pay higher than the market value of the home relative to institutional investors and were more likely to pay higher than the market value of the home as more homes were purchased by institutional investors.

4.4 Robustness

4.4.1 Propensity Score Analysis

The major caveat with our results thus far is the fact that there is an ample self selection issue surrounding investors. Institutional investors came into the single-family market because they realized that home prices relative to rents were low. Additionally, these investors are large

corporations that want to maximize their return. We would expect investors to buy certain *types* of homes that are relatively cheap but can be rented at or above the market rent. For example, American Homes 4 Rent, one of the largest institutional investors in our data, stated in their 2016 annual report exactly what type of home in which they want to buy:

> "We are focused on acquiring homes with a number of key property characteristics, including: (i) construction after 1990; (ii) three or more bedrooms; (iii) two or more bathrooms; (iv) a range of $100,000 estimated minimum valuation to $350,000 maximum bid price; and (v) estimated renovation costs not in excess of 25% of estimated value. We target areas with above average median household incomes, well-regarded school districts and access to desirable lifestyle amenities."

Given that institutional investors choose homes based off some type of observables, we know that this sample is not random leading to our prior results being biased. Specifically, it could be that institutional investors choose some *type* of home that they believe can be obtained at a low value. If this is the case, then institutional investors are not necessarily paying a discount but instead, are finding low values homes relative to owner-occupiers. This will inflate the discounts that we uncovered in the previous sections. Thus, one could view our discount results as an upper limit.

In order to mitigate this endogeneity issue, we employ a Propensity Score Matching (PSM) algorithm to match all of the treated units with all of the untreated units based on a set of observables. By matching units based on a set of observables, we effectively remove any observable difference between treated and untreated units such that any difference in the outcome will be due to the treatment effect. In our case, a treated unit is a home bought by an institutional investor, and an untreated unit is a home bought by an owner-occupier.

In order to implement the PSM algorithm, we again use the full Metrostudy similar to Section 4.1. For each zip code, year pair, we run a logistic regression in which the dependent variable is equal to 1 if the home was bought by an institutional investor and 0 if the home was bought by an owner-occupier. The independent variables include only observable housing characteristics such as number of bedrooms, number of bathrooms, size of lot (acres), finished square footage, and age of the home. From this logistic regression, we obtain the predicted probability (propensity score) of the home being a treated or untreated home. We then use a

nearest neighbor matching algorithm to match each of the treated homes with an untreated home based on the propensity score. This results in a balanced sample of treated and untreated homes based on observable characteristics. We do three separate matches: institutional investor home matched with any owner-occupier home, institutional investor home matched with an owner-occupier home with a mortgage, and institutional investor home matched with an owner-occupier home without a mortgage.

Summary statistics for the three matched samples can be found in Table 9. As expected, for each of the three samples, the average observable home characteristics are similar between institutional investor bought homes and owner-occupier bought homes. Most importantly, owner-occupiers pay about \$21,199.74-\$23,857.21 more than institutional investors for a similar home. This supports prior results that institutional investors pay a discount relative to owner-occupiers.

However, note that the difference in the average sale price does not take into account the different physical locations of the home nor the different time periods in which each home sold. In order to control for this, we re-estimate a modified Equation (1). The modified specification includes all the same independent variables except for the housing characteristics because by definition all the homes in each sample have similar housing characteristics. We can see that as expected, when we control for the selection bias, our estimates decrease in magnitude. The most striking result though is the estimate for the *RIA*. The estimate for this variable is again positive, but it is no longer statistically significant. This suggests that although there may be some induced competition among owner-occupiers after the entrance of institutional investors into the single-family housing market, this effect is fairly weak.

4.4.2 Difference-in-Difference Analysis

The results up to now strongly suggest that institutional investors did pay lower than owner-occupiers both across the price distribution as well as across census tract areas. The results also show that as more institutional investors entered the single-family housing market, owner-occupiers paid more for housing. However, the propensity score analysis suggests this may not be the case, at least not for starter homes. In this section, we attempt to investigate whether this price increase from institutional investors was directly from institutional investors or just from a general increase in demand. The issue with our previous measure for institutional

investor activity (RIA) is that it could just be picking up on a general increase in demand in the housing market rather than a direct price effect from institutional investors. That is, prices could have already been increasing before institutional investors entered the market.

In order to test the potential spillover effect from institutional investors, we utilize the difference-in-difference framework of Linden and Rockoff (2008), which was subsequently used in the foreclosure literature by Campbell, Giglio, and Pathak (2011) and Anenberg and Kung (2014). This methodology compares the price of a home by an owner-occupier before and after the purchase of a home by an institutional investor. This comparison is done with institutional investor purchased homes close to (within 0.1 miles) and further away from (within 0.25 miles) the owner-occupier purchased home. The main assumption is that at the hyper-local level, price trends in housing are similar, but there should be varying effects depending on the distance from the institutional investor purchased home.

Formally, this can be written as:

$$p_{i,t} = \beta_0 + \beta \mathbf{X}_{i,t} + \delta_{Close,Before} N_{i,t}^{Close,Before} + \delta_{Close,After} N_{i,t}^{Close,After} + \delta_{Far,Before} N_{i,t}^{Far,Before} + \delta_{Far,After} N_{i,t}^{Far,After} + \delta_2 REO_{i,t} + \delta_3 NoMortgage_{i,t} + CTY_i + \epsilon_{i,t} \quad (3)$$

where $N_{i,t}^{Close,Before}$ and $N_{i,t}^{Close,After}$ are the number of homes purchased by an institutional investor within 0.1 miles of home i both before and after the purchase of home i respectively, and $N_{i,t}^{Far,Before}$ and $N_{i,t}^{Far,After}$ are the number of homes purchased by an institutional investor within 0.25 miles of home i both before and after the purchase of home i respectively. *Before* are all home sales that occurred one or two years before home sale i, and *After* are all home sales that occurred one or two years after home sale i. CTY_i is the census tract-year fixed effect. The estimated spillover effect comes from the difference between $\delta_{Close,Before}$ and $\delta_{Close,After}$. Any difference between $\delta_{Far,Before}$ and $\delta_{Far,After}$ estimates general price changes in the area.

The results for the difference-in-difference test can be found in Table 11. The first two columns represent institutional investor home purchases within one year before and after the purchase of home i. The last two columns represent institutional investor home purchases within two years before and after the purchase of home i. Both sets of columns report the difference between $\delta_{Close,Before}$ and $\delta_{Close,After}$ and the difference between $\delta_{Far,Before}$ and $\delta_{Far,After}$.

When only institutional investor homes purchased within 0.1 miles are being controlled, we

can see that the difference between $\delta_{Close,Before}$ and $\delta_{Close,After}$ is positive. This suggest that an additional home purchased by an institutional investor within 0.1 miles increases owner-occupier prices by about 0.18%-0.49%, however only the estimate from the two year window is statistically significant. This is expected because the two year window will have more institutional investor home purchases, therefore representing a larger demand increase. Nonetheless, the difference in "close" coefficients suggest that there may be a spillover effect from institutional investor home purchases.

However, there still could be a general demand shock in this hyper-local area. To control for any price increases in the area, we include institutional investor home purchases within 0.25 miles of home i. We can see that once this variable is controlled for, all effects from "close" homes goes to 0, while institutional investor homes purchased between 0.1 and 0.25 miles away absorb all the positive price effects. This suggest that all positive price impacts may be coming from a general increase in home prices within the area and that there is no real spillover effect from institutional investor home purchases.

5 Conclusion

Using various tests, we empirically find that institutional investors paid a discount of about 8.13%-11.19% per transaction. Our results also suggest that as more institutional investors bought single-family homes relative to owner-occupiers, owner-occupiers paid about 0.32%-0.59% higher for single-family homes than institutional investors. However, this effect is fairly weak both statistically and economically. We find that this positive price impact may be coming entirely from a general increase in demand and not necessarily from institutional investors themselves. That is, we find no real spillover effect of institutional investor home purchases.

Given the growing concern of increased home prices, we find little evidence that the entrance of institutional investors had a significant effect on rising home prices. Nonetheless, institutional investors target specific types of homes, especially the "starter" home, which reduces the supply of these homes in the area. Therefore, owner-occupiers must search for other types of homes in the area or stay out of the market. Given that the number of total home sale transactions is below the pre-recession peak, it may be the case that there is not an adequate *supply* of "starter" homes in the area, which will push lower income individuals out

of the market. In addition, the remaining homes are aggressively being purchased at or above the listing price as more institutional investors enter into the market. These dynamics would magnify any housing affordability issue.

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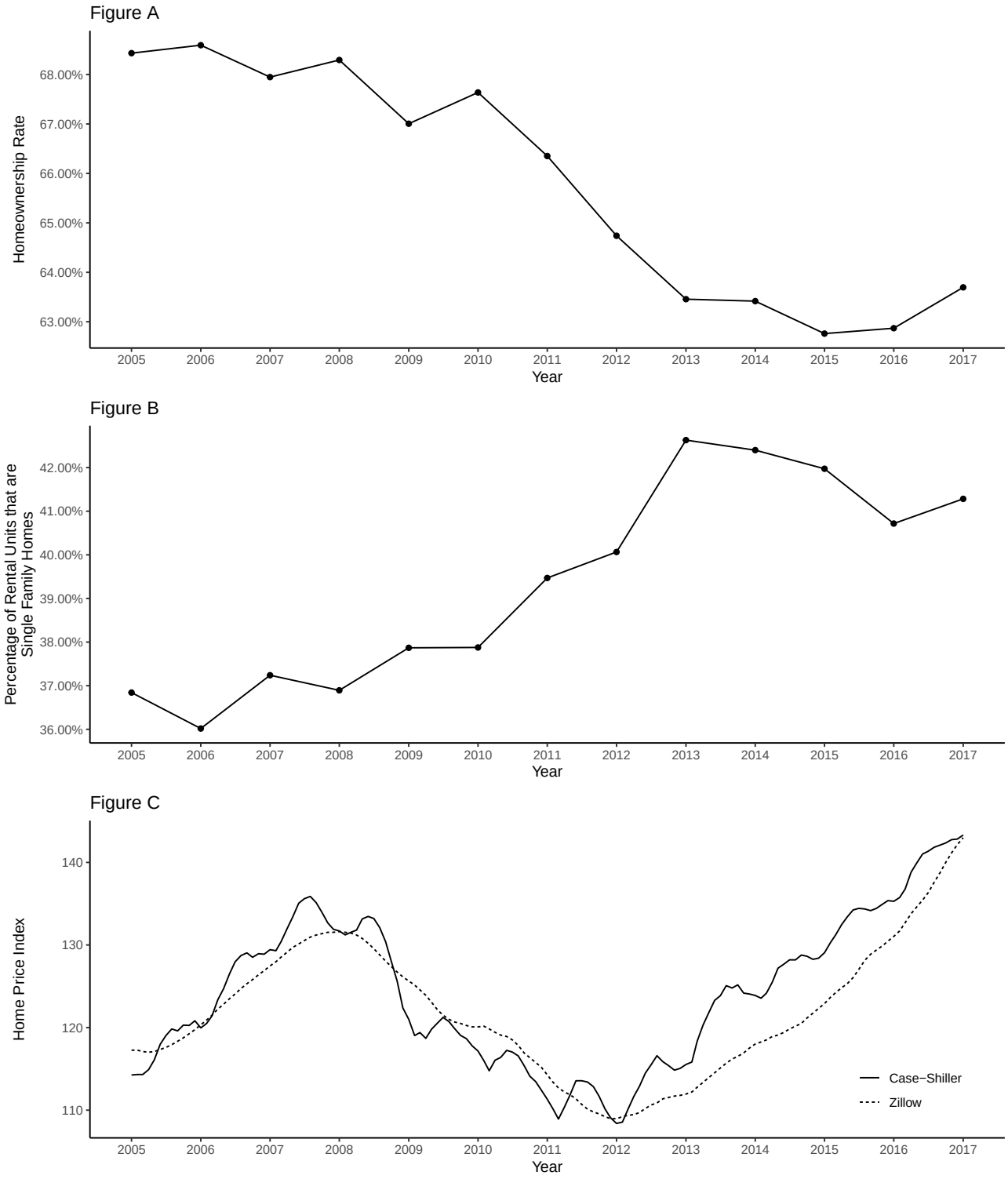
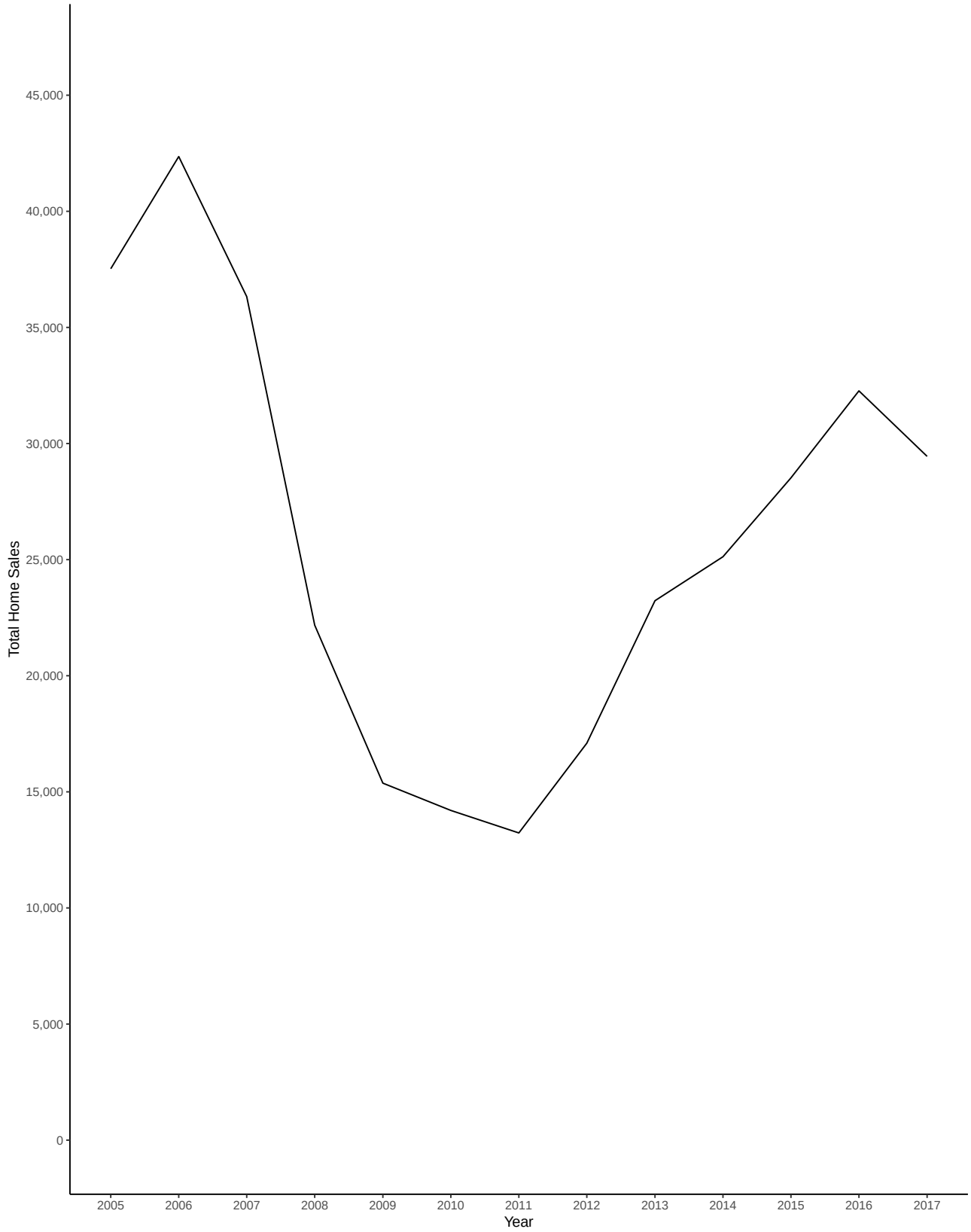
Figure 1: Homeownership Rate, Single-Family Rentals, and Home Prices



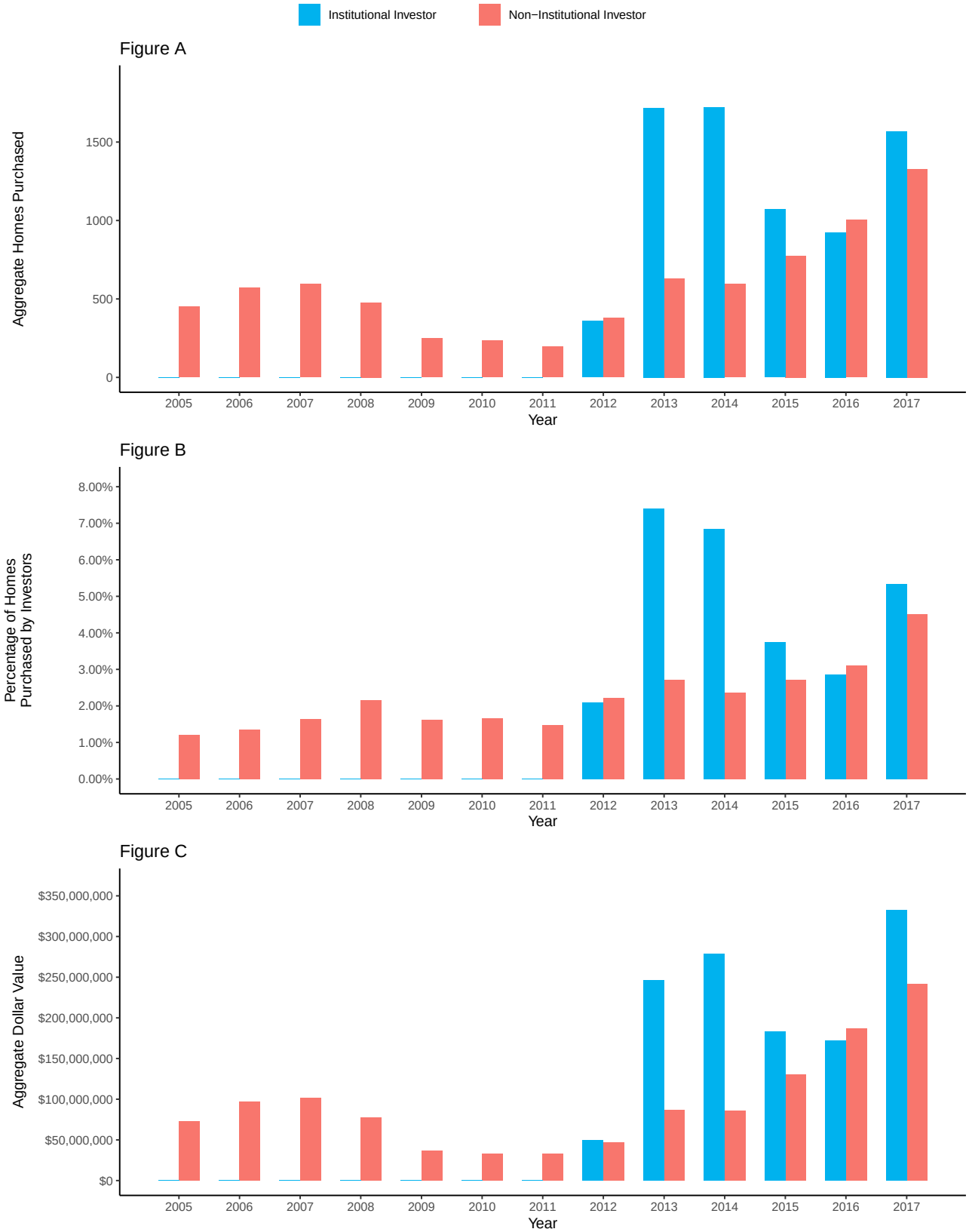
This figure shows the homeownership rate from the 1−year ACS estimates, the percentage of rental units that are single−family units from the 1−year ACS estimates, and the home price index from Case−Shiller and Zillow. The homeownership rate and the percentage of single−family units covers Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, and Union counties. Single−family rental units include detached and attached units, mobile homes, and units such as RVs and boats. The stock of rental units includes all occupied rental units plus vacant units for rent and units rented but not occupied. Figure 1b is calculated by dividing single−family rental units by the stock of rental units. The Case−Shiller home price index covers Anson Cabarrus, Gaston, Mecklenburg, Union, and York (SC) counties, while the Zillow home price index covers the Charlotte−Gastonia−Concord MSA. The base year for the indices is 2000.

Figure 2: Total Transactions in the Charlotte Region



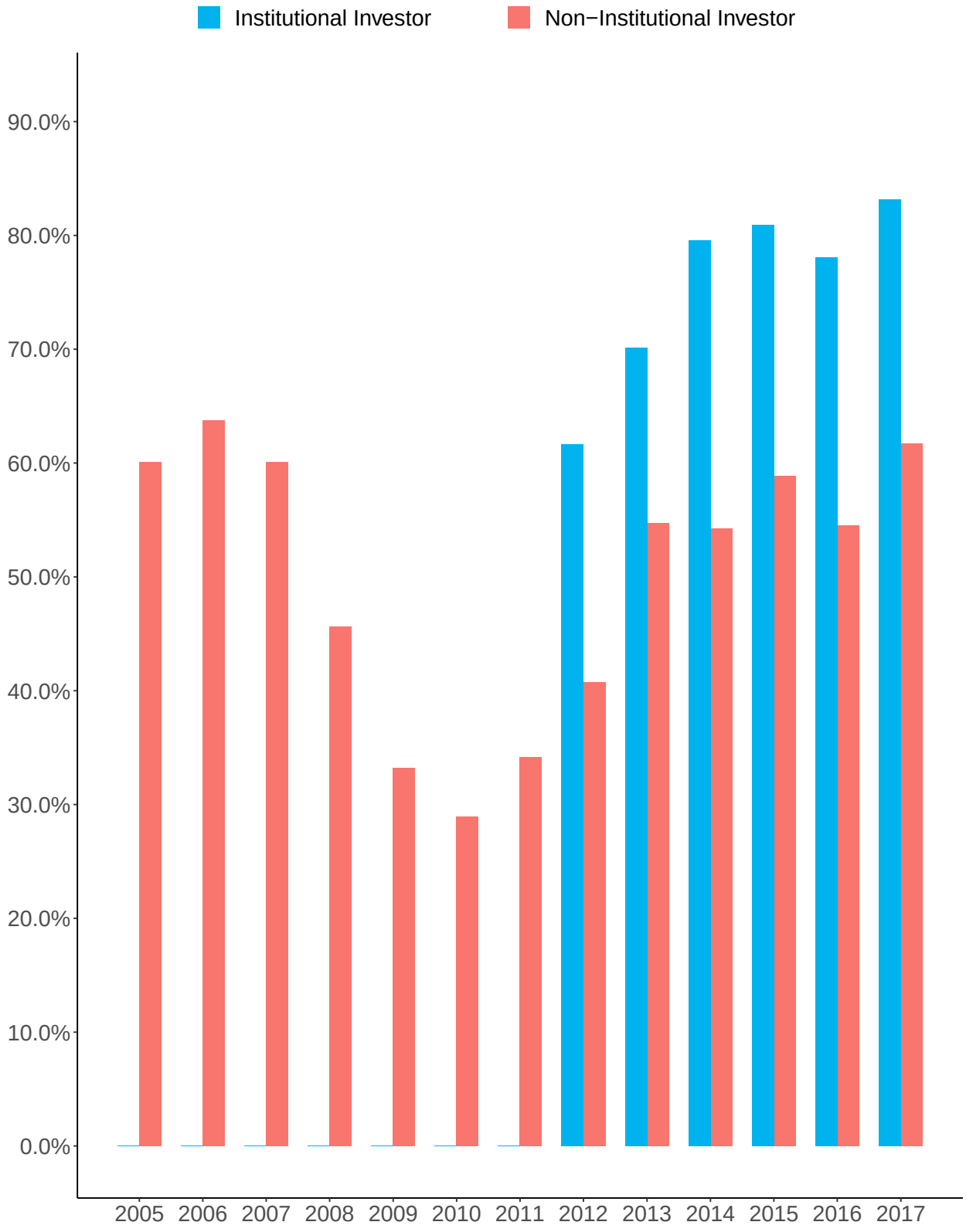
This figure shows the total number of single−family home sales in the Charlotte region. The Charlotte region covers Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, and Union counties from 2005−2017. Data is from Metrostudy.

Figure 3: Homes Purchased by Investors



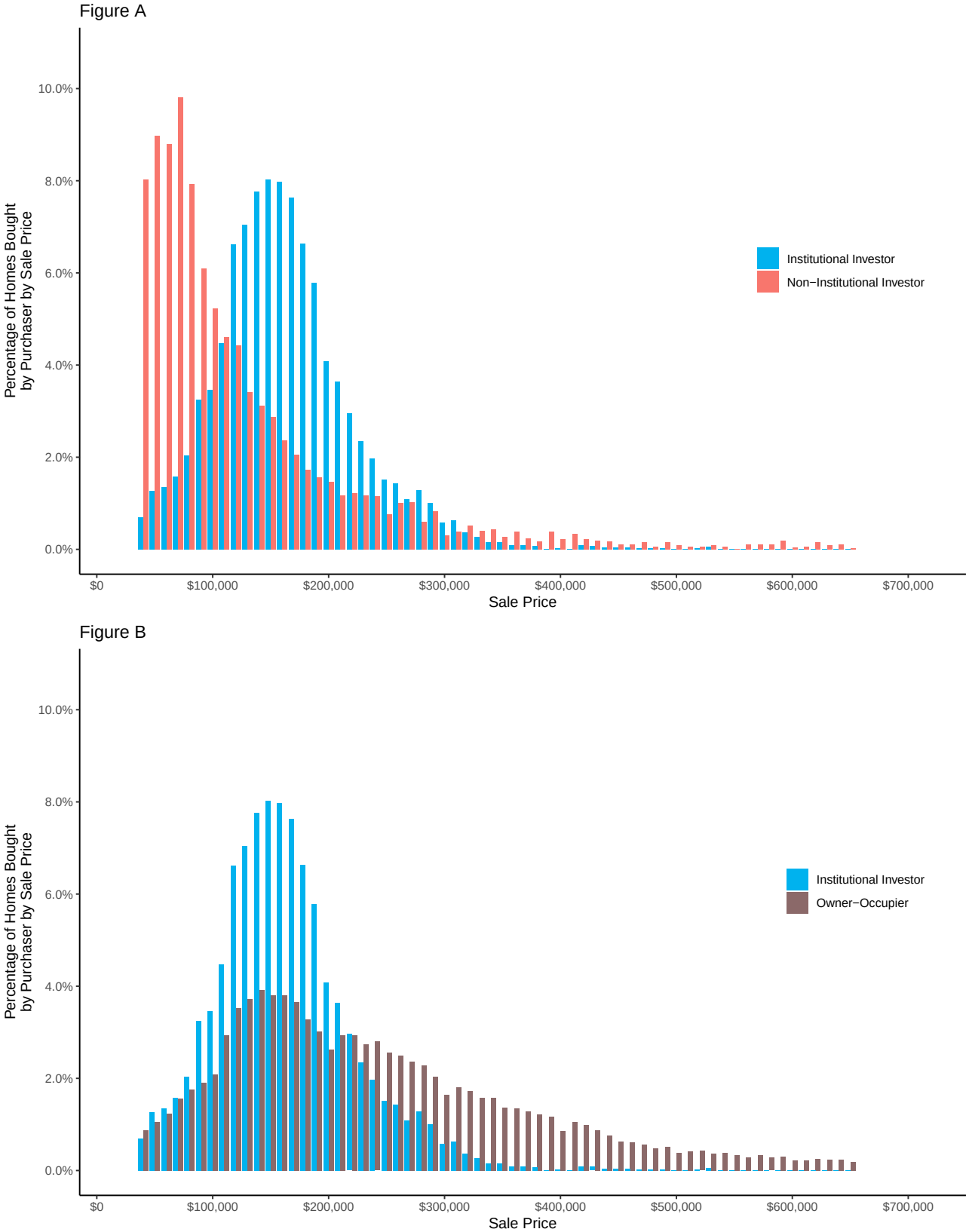
This figure shows the total number of single−family home purchases made by investors, the percentage of homes purchased by investors, and the total dollar value of homes purchased by investors. Investors are defined as non−individuals that are not banks, mortgage/credit lenders, relocation companies, building companies, nor government entities. Institutional investors are investors that have filed as a publicly traded company, that have filed as a REIT with the SEC, or that have filed a Form D with the SEC.

Figure 4: Homes Purchased by Investors from Owner-Occupiers



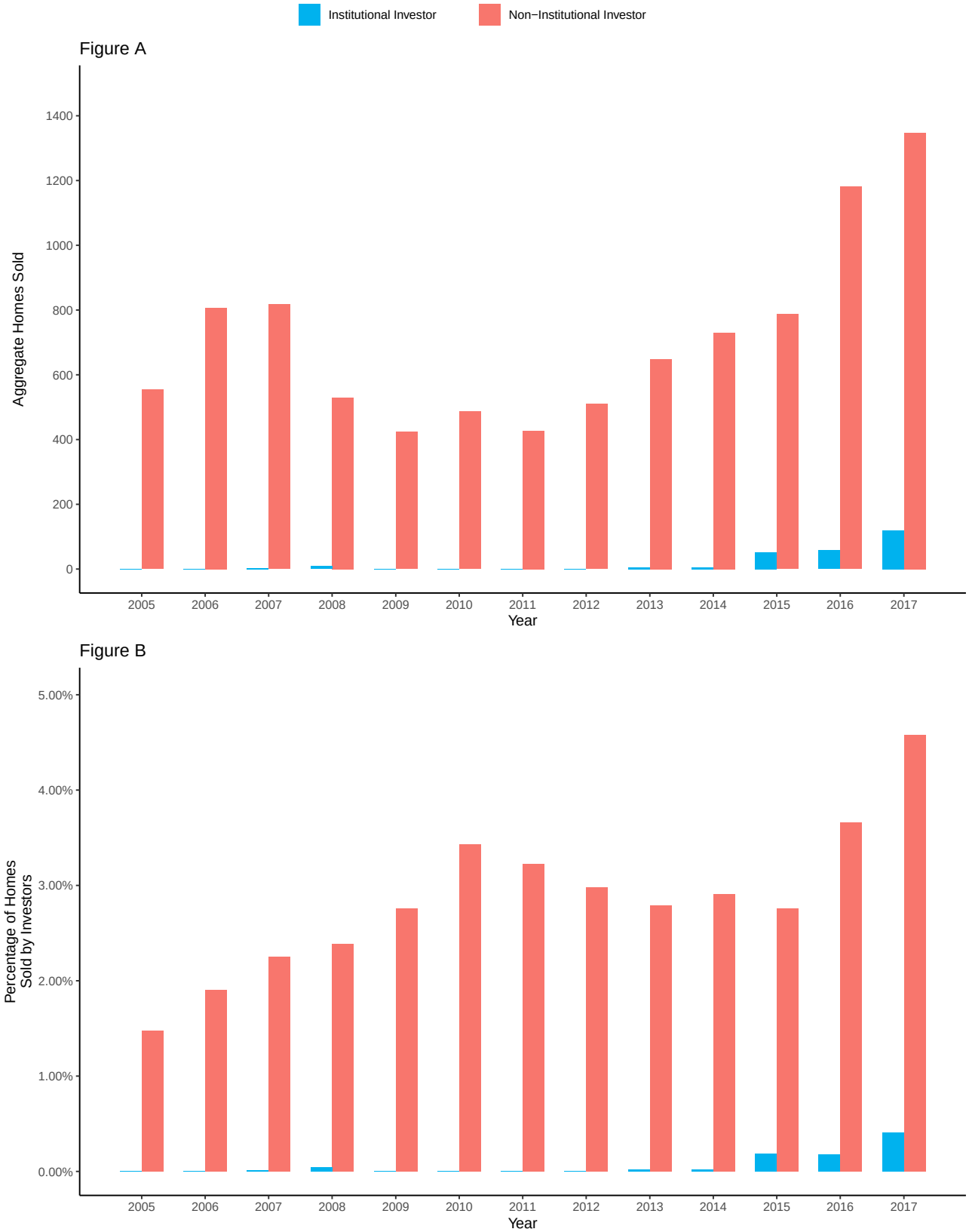
This figure shows the percentage of single−family homes bought by investors directly from owner−occupiers by year. Investors are defined as non−individuals that are not banks, mortgage/credit lenders, relocation companies, building companies, nor government entities. Institutional investors are investors that have filed as a publicly traded company, that have filed as a REIT with the SEC, or that have filed a Form D with the SEC.

Figure 5: Homes Purchased by Investors By Sale Price



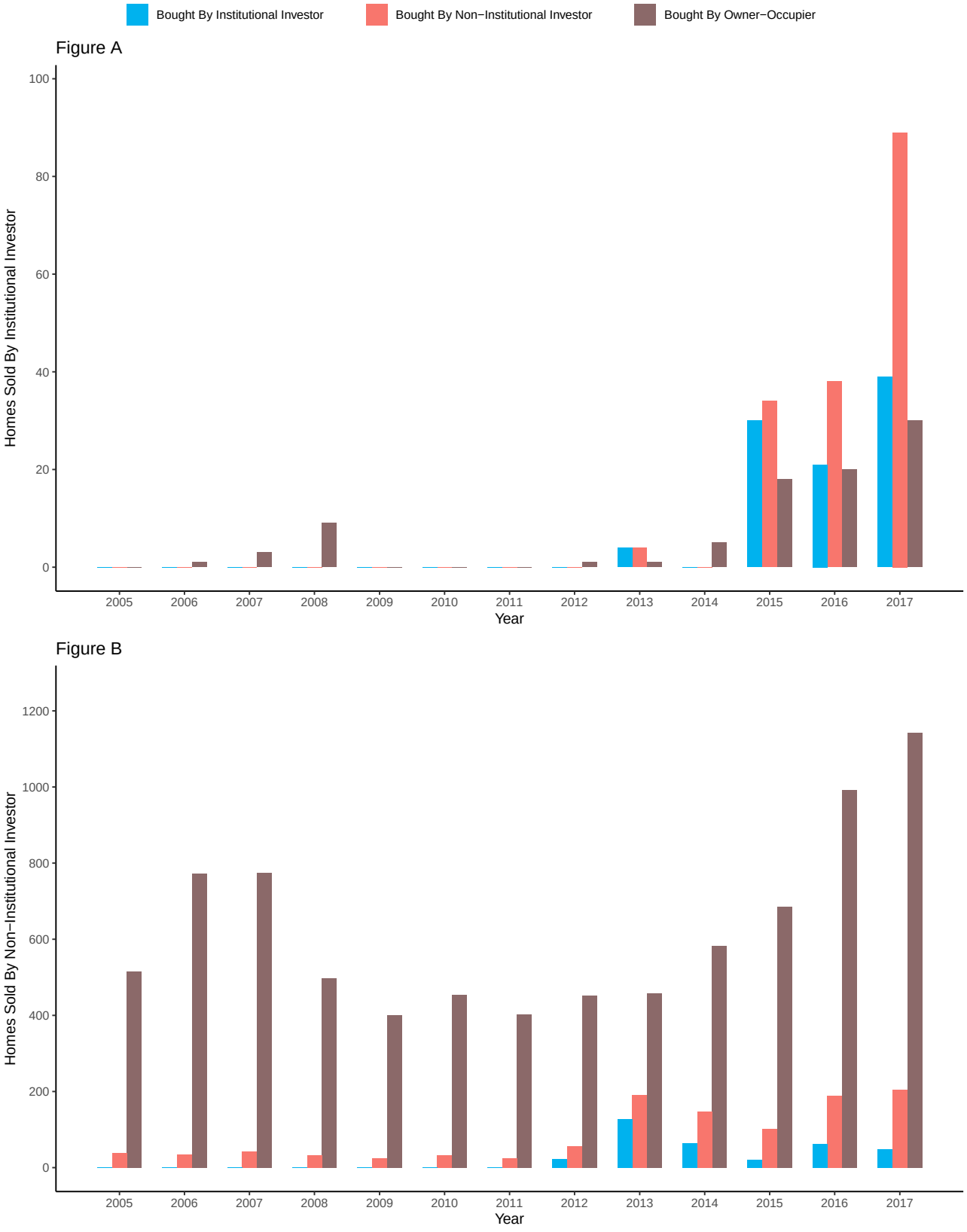
This figure shows the percentage of homes bought by each purchaser by sales price since 2012. Each bar represents a sale price range of $10,000. Investors are defined as non−individuals that are not banks, mortgage/credit lenders, relocation companies, building companies, nor government entities. Institutional investors are investors that have filed as a publicly traded company, that have filed as a REIT with the SEC, or that have filed a Form D with the SEC.

Figure 6: Homes Sold by Investors



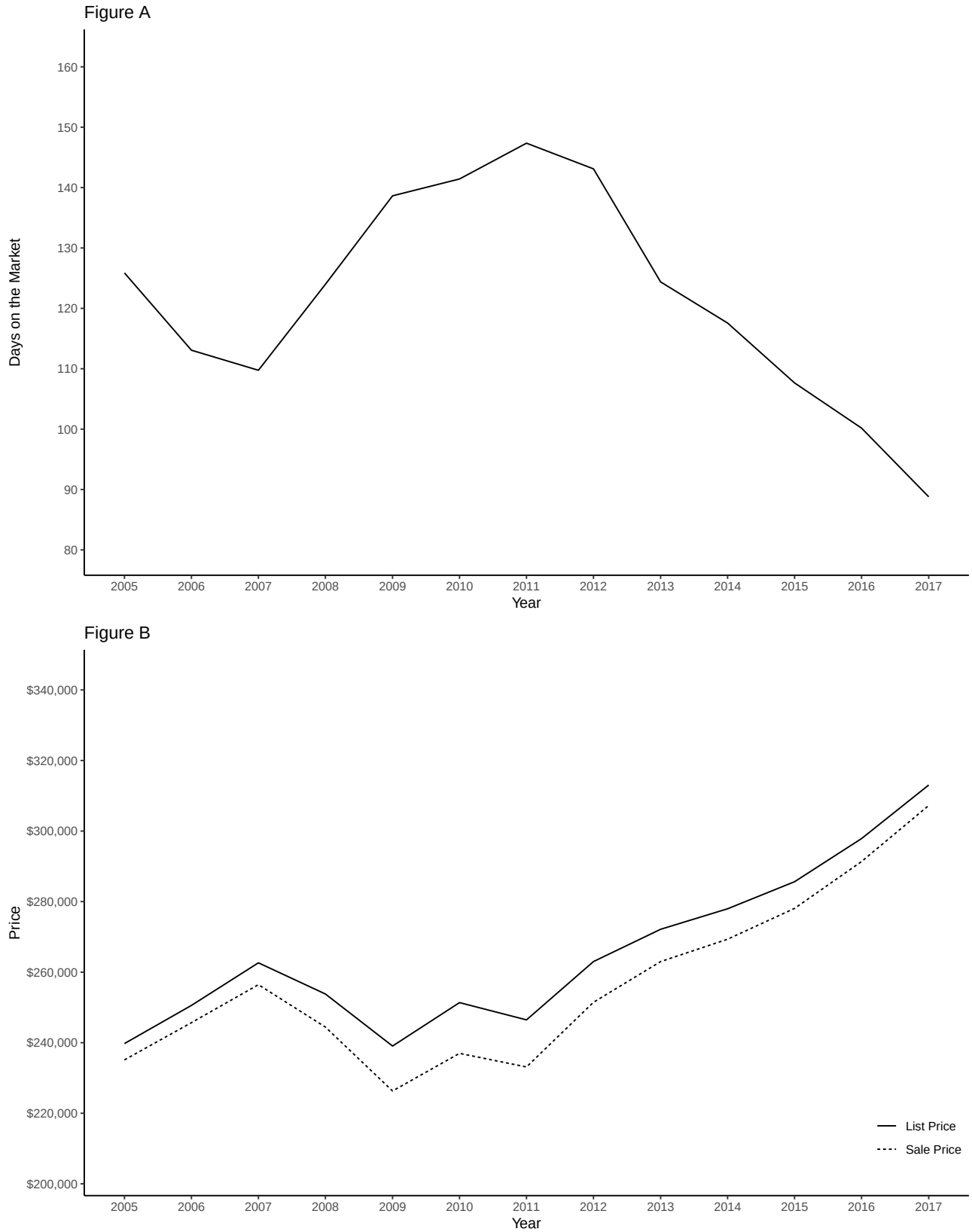
This figure shows the total number of single−family home sales by investors and the percentage of homes sold by investors. Investors are defined as non−individuals that are not banks, mortgage/credit lenders, relocation companies, building companies, nor government entities. Institutional investors are investors that have filed as a publicly traded company, that have filed as a REIT with the SEC, or that have filed a Form D with the SEC.

Figure 7: To Whom Did Investors Sell Homes?



This figure shows the total number of single−family homes that were sold by institutional investors and the total number of single−family homes that were sold by non−institutional investors. The total number is broken down by the group that subsequently bought the home. These groups are: institutional investors, non−institutional investors, and non−investors. Investors are defined as non−individuals that are not banks, mortgage/credit lenders, relocation companies, building companies, nor government entities. Institutional investors are investors that have filed as a publicly traded company, that have filed as a REIT with the SEC, or that have filed a Form D with the SEC.

Figure 8: Days on the Market, List Price, and Sale Price by Year



This figure shows the average days on the market, the average listing price, and the average sales price for single−family homes in the Charlotte region. The data used was the matched data between Metrostudy and MLS. This match is a unique match between Metrostudy and MLS by sale date and address. Only observations found in both data sets were kept.

Table 1: Summary Statistics

Variables	Mean	Median	Min	Max	Std. Dev
Total Observations	336,878				
Has Mortgage	82.55%				
Purchased By Investor	14,850				
Type of Sale					
New	82,321				
Regular Resale	230,655				
REO Sale	23,902				
Sale Characteristics					
Sale Price	$256,231.98	$195,000.00	$30,000.00	$8,350,000.00	$223,763.99
Age	18.67	11.00	0.00	238.00	22.04
Bathrooms	2.40	2.50	1.00	10.50	0.84
Bedrooms	3.48	3.00	1.00	20.00	0.81
Lot Acres	0.49	0.28	0.01	20.15	0.95
Sqft Finished	2,343.47	2,118.00	336.00	15,391.00	1,068.77
Loan Characteristics					
Loan Amount	$221,303.80	$179,900.00	$5,000.00	$5,000,000.00	$158,639.71

Note:
Data set covers Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, and Union county from 2005-2017. Investors are defined as non-individuals that are not banks, mortgage/credit lenders, relocation companies, building companies, nor government entities. Institutional investors are investors that have filed as a publicly traded company, that have filed as a REIT with the SEC, or that have filed a Form D with the SEC.

Table 2: Investor Purchases vs Non-Investor Purchases

	Investor					Non-Investor				
Variables	Mean	Median	Min	Max	Std. Dev	Mean	Median	Min	Max	Std. Dev
Total Observations	14,850					322,028				
Has Mortgage	12.42%					85.78%				
Type of Sale										
New	1.65%					25.49%				
Regular Resale	81.46%					67.87%				
REO Sale	16.89%					6.64%				
Sale Characteristics										
Sale Price	$167,710.56	$140,000.00	$40,500.00	$8,350,000.00	$210,156.86	$260,314.06	$199,500.00	$30,000.00	$7,836,833.00	$223,527.90
Age	25.68	15.00	0.00	164.00	23.14	18.34	10.00	0.00	238.00	21.94
Bathrooms	2.17	2.50	1.00	9.00	0.73	2.41	2.50	1.00	10.50	0.85
Bedrooms	3.25	3.00	1.00	10.00	0.70	3.49	3.00	1.00	20.00	0.81
Lot Acres	0.36	0.23	0.01	19.56	0.79	0.50	0.29	0.01	20.15	0.95
Sqft Finished	1,909.81	1,757.50	480.00	11,977.00	819.90	2,363.47	2,140.00	336.00	15,391.00	1,074.65
Loan Characteristics										
LTV	11.99%	0.00%	0.00%	198.70%	32.90%	75.80%	90.00%	0.00%	200.00%	34.16%
Loan Amount	$19,381.16	$0.00	$0.00	$5,000,000.00	$102,729.27	$190,208.84	$161,413.00	$0.00	$4,000,000.00	$165,349.56

Note:
Data covers Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, and Union county from 2005-2017. Data used is the full MetroStudy data. All cash sales were kept. The summary statistics in the table are for all home sale observations. These calculations include both observations with a mortgage and observations with cash. Investors are defined as non-individuals that are not banks, mortgage/credit lenders, relocation companies, building companies, nor government entities.

Table 3: Institutional Investor Purchases vs Non-Institutional Investor Purchases

	Institutional Investor					Non-Institutional Investor				
Variables	Mean	Median	Min	Max	Std. Dev	Mean	Median	Min	Max	Std. Dev
Total Observations	7,365					7,485				
Has Mortgage	0.00%					24.65%				
Type of Sale										
New	1.94%					1.36%				
Regular Resale	86.83%					76.18%				
REO Sale	11.23%					22.46%				
Sale Characteristics										
Sale Price	$171,191.88	$164,000.00	$40,500.00	$2,400,500.00	$69,007.95	$164,285.06	$96,500.00	$40,500.00	$8,350,000.00	$287,958.59
Age	13.85	12.00	0.00	116.00	10.46	37.33	36.00	0.00	164.00	26.10
Bathrooms	2.33	2.50	1.00	5.50	0.48	2.01	2.00	1.00	9.00	0.88
Bedrooms	3.40	3.00	1.00	8.00	0.63	3.11	3.00	1.00	10.00	0.74
Lot Acres	0.22	0.19	0.04	4.64	0.14	0.50	0.27	0.01	19.56	1.09
Sqft Finished	2,059.06	1,986.00	675.00	5,547.00	602.72	1,762.96	1,507.00	480.00	11,977.00	965.85
Loan Characteristics										
LTV	0.00%	0.00%	0.00%	0.00%	0.00%	23.78%	0.00%	0.00%	198.70%	43.20%
Loan Amount	$0.00	$0.00	$0.00	$0.00	$0.00	$38,451.61	$0.00	$0.00	$5,000,000.00	$142,145.75

Note:
Data covers Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, and Union county from 2005-2017. Data used is the full MetroStudy data. All cash sales were kept. The summary statistics in the table are for all home sale observations. These calculations include both observations with a mortgage and observations with cash. Investors are defined as non-individuals that are not banks, mortgage/credit lenders, relocation companies, building companies, nor government entities. Institutional investors are investors that have filed as a publicly traded company, that have filed as a REIT with the SEC, or that have filed a Form D with the SEC.

Table 4: Hedonic Results: Quantile Regression

	Baseline			$\tau = 0.25$			$\tau = 0.50$			$\tau = 0.75$		
Variable	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Panel A: Without Recent Investor Activity Dummy												
Purchased By Investor	-0.195***	-0.095***		-0.200***	-0.103***		-0.160***	-0.114***		-0.142***	-0.130***	
	(-72.908)	(-33.320)		(-46.766)	(-18.269)		(-56.343)	(-34.178)		(-67.075)	(-45.472)	
Purchased By Non-Institutional Investor			-0.293***			-0.352***			-0.309***			-0.232***
			(-80.358)			(-59.232)			(-57.309)			(-39.539)
Purchased By Institutional Investor			-0.114***			-0.081***			-0.097***			-0.112***
			(-30.779)			(-25.206)			(-39.160)			(-53.205)
No Mortgage		-0.143***			-0.144***			-0.058***			-0.015***	
		(-93.454)			(-48.476)			(-28.619)			(-9.464)	
Intercept	10.959***	10.987***	10.974***	10.758***	10.788***	10.781***	11.064***	11.076***	11.057***	11.153***	11.155***	11.157***
	(353.364)	(358.791)	(358.113)	(111.433)	(126.810)	(113.102)	(216.870)	(230.214)	(221.806)	(297.820)	(293.506)	(283.296)
R^2	0.767	0.773	0.773	0.542	0.548	0.549	0.582	0.583	0.584	0.608	0.608	0.608
N	336,878	336,878	336,878	336,878	336,878	336,878	336,878	336,878	336,878	336,878	336,878	336,878
Panel B: With Recent Investor Activity Dummy												
Purchased By Investor	-0.193***	-0.091***		-0.195***	-0.096***		-0.158***	-0.110***		-0.141***	-0.128***	
	(-71.337)	(-31.398)		(-61.779)	(-18.774)		(-89.917)	(-101.694)		(-106.161)	(-71.106)	
Purchased By Non-Institutional Investor			-0.291***			-0.350***			-0.308***			-0.233***
			(-78.627)			(-65.573)			(-76.828)			(-69.865)
Purchased By Institutional Investor			-0.114***			-0.081***			-0.098***			-0.112***
			(-30.762)			(-26.137)			(-37.761)			(-49.252)
No Mortgage		-0.146***			-0.148***			-0.060***			-0.016***	
		(-92.745)			(-40.849)			(-40.832)			(-10.077)	
Recent Investor Activity	0.006***	0.006***	0.006***	0.004***	0.004***	0.003***	0.005***	0.005***	0.005***	0.006***	0.006***	0.006***
	(9.896)	(10.327)	(9.326)	(5.646)	(5.405)	(4.360)	(10.305)	(10.838)	(9.256)	(11.407)	(11.710)	(10.905)
Intercept	11.058***	11.087***	11.069***	10.950***	10.931***	10.975***	11.124***	11.130***	11.123***	11.192***	11.208***	11.221***
	(348.368)	(353.919)	(353.000)	(108.801)	(149.634)	(142.700)	(212.777)	(242.498)	(219.482)	(303.242)	(323.216)	(285.251)
R^2	0.768	0.775	0.774	0.544	0.550	0.550	0.583	0.584	0.585	0.607	0.607	0.608
N	319,423	319,423	319,423	319,423	319,423	319,423	319,423	319,423	319,423	319,423	319,423	319,423

Note:

*** indicates significance at the 1% level, ** indicates significance at the 5% level, * indicates significance at the 10% level

[a] The log sale price is the independent variable in each regression. Each regression also includes housing characteristics, transaction type, zip code fixed effects, and quarter-year fixed effects. t-statistics are in parenthesis.

[b] Baseline is the hedonic regression using ordinary least squares. τ represents the τth quantile of the log sales price.

[c] Purchased By Investor is a dummy variable that equals 1 if the home is purchased by a non-individual that is not a bank, mortgage/credit lender, relocation company, building company, nor government entity and 0 otherwise. Purchased By Non-Institutional Investor is a dummy variable that equals 1 if the home is purchased by a non-institutional investor and 0 otherwise. Purchased By Institutional Investor is a dummy variable that equals 1 if the home is purchased by an investor that has filed as a publicly traded company, that has filed as a REIT with the SEC, or that has filed a Form D with the SEC and 0 otherwise.

[d] Recent Investor Activity is the percentage of homes purchased by institutional investors in the previous 6 months within each county. For example, if a home was bought in August of 2013 in Mecklenburg county, then recent investor activity would be the percentage of homes purchased by institutional investors in Mecklenburg county from January to July of 2013 relative to the total number of homes purchased in Mecklenburg county in that same time frame.

Table 5: Hedonic Results: By Area Subset

	Income				Minority Population	
Variable	< $35,100	$35,100-$44,600	$44,600-$58,000	$58,000 <	Low Minority Population	High Minority Population
Purchased By Non-Institutional Investor	-0.284***	-0.265***	-0.264***	-0.252***	-0.251***	-0.302***
	(-31.686)	(-35.019)	(-37.977)	(-42.158)	(-49.676)	(-61.365)
Purchased By Institutional Investor	-0.184***	-0.110***	-0.097***	-0.121***	-0.131***	-0.063***
	(-7.233)	(-9.268)	(-14.672)	(-26.969)	(-28.067)	(-11.307)
Recent Investor Activity	-0.002	0.010**	0.004	0.004**	0.005**	0.005**
	(-0.197)	(2.261)	(1.278)	(2.199)	(2.104)	(2.133)
Intercept	10.888***	10.899***	11.222***	9.976***	11.092***	10.883***
	(139.428)	(202.242)	(324.547)	(34.116)	(351.668)	(148.293)
R^2	0.607	0.656	0.678	0.749	0.764	0.665
N	22,165	35,215	68,713	193,241	244,669	74,665

Note:

*** indicates significance at the 1% level, ** indicates significance at the 5% level, * indicates significance at the 10% level

[a] The log sale price is the independent variable in each regression. Each regression also includes housing characteristics, transaction type, zip code fixed effects, and quarter-year fixed effects. t-statistics are in parenthesis.

[b] The income groups are based on census tract median incomes split into quartiles. The median income comes from the ACS 5-Year estimates between 2007-2011. The minority population groups are based on census tracts with a minority population greater than 50% and census tracts with a minority population less than or equal to 50%. The minority population comes from the ACS 5-Year estimates between 2007-2011.

[c] Purchased By Investor is a dummy variable that equals 1 if the home is purchased by a non-individual that is not a bank, mortgage/credit lender, relocation company, building company, nor government entity and 0 otherwise. Purchased By Non-Institutional Investor is a dummy variable that equals 1 if the home is purchased by a non-institutional investor and 0 otherwise. Purchased By Institutional Investor is a dummy variable that equals 1 if the home is purchased by an investor that has filed as a publicly traded company, that has filed as a REIT with the SEC, or that has filed a Form D with the SEC and 0 otherwise.

[d] Recent Investor Activity is the percentage of homes purchased by institutional investors in the previous 6 months within each area. For example, if a home was bought in August of 2013 in a High Minority Population, then recent investor activity would be the percentage of homes purchased by institutional investors from January of 2013 to July of 2013 in census tracts with a minority population greater than 50% relative to the total number of homes purchased in that same time frame in census tracts with a minority population greater than 50%.

Table 6: Metrostudy vs Metrostudy+MLS

Variables	MetroStudy	MetroStudy+MLS
Total Observations	336,878	244,453
Has Mortgage	82.55%	82.62%
Purchased By Investor	14,850	10,694
Type of Sale		
New	24.44%	16.65%
Regular Resale	68.47%	73.70%
REO Sale	7.10%	9.64%
Sale Characteristics		
DOM		117.58
List Price		$268,707.65
Sale Price	$256,231.98	$260,723.86
Age	18.67	19.67
Bathrooms	2.40	2.42
Bedrooms	3.48	3.49
Lot Acres	0.49	0.50
Sqft Finished	2,343.47	2,325.89
Loan Amount	$221,303.80	$226,970.21

Note:
Each data set covers Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, and Union county from 2005-2017. "MetroStudy+MLS" is the unique merge between MetroStudy and MLS. Only observations found in both data sets were kept. Investors are defined as non-individuals that are not banks, mortgage/credit lenders, relocation companies, building companies, nor government entities. Institutional investors are investors that have filed as a publicly traded company, that have filed as a REIT with the SEC, or that have filed a Form D with the SEC.

Table 7: Logit Results: With List Price

	Model 1		Model 2		Model 3	
Variable	Estimate	Marginal Effect	Estimate	Marginal Effect	Estimate	Marginal Effect
Purchased By Investor	-1.149***	-0.188	-0.791***	-0.129		
	(-35.793)		(-22.878)			
Purchased By Non-Institutional Investor					-0.553***	-0.081
					(-12.459)	
Purchased By Institutional Investor					-1.624***	-0.175
					(-34.881)	
No Mortgage			-0.478***	-0.078		
			(-28.179)			
Recent Investor Activity	0.029***	0.005	0.029***	0.005	0.031***	0.005
	(4.783)		(4.793)		(5.075)	
Intercept	-1.194**		-1.132**		-1.169**	
	(-2.476)		(-2.339)		(-2.423)	
Pseudo-R^2	0.066		0.070		0.068	
N	233,694		233,694		233,694	

Note:

*** indicates significance at the 1% level, ** indicates significance at the 5% level, * indicates significance at the 10% level

[a] The probability of a home selling for more than the list price is estimated in each logit regression. Each regression also includes housing characteristics, transaction type, zip code fixed effects, and quarter-year fixed effects. z-statistics are in parenthesis.

[b] Purchased By Investor is a dummy variable that equals 1 if the home is purchased by a non-individual that is not a bank, mortgage/credit lender, relocation company, building company, nor government entity and 0 otherwise. Purchased By Non-Institutional Investor is a dummy variable that equals 1 if the home is purchased by a non-institutional investor and 0 otherwise. Purchased By Institutional Investor is a dummy variable that equals 1 if the home is purchased by an investor that has filed as a publicly traded company, that has filed as a REIT with the SEC, or that has filed a Form D with the SEC and 0 otherwise.

[c] Recent Investor Activity is the percentage of homes purchased by institutional investors in the previous 6 months within each county. For example, if a home was bought in August of 2013 in Mecklenburg county, then recent investor activity would be the percentage of homes purchased by institutional investors in Mecklenburg county from January to July of 2013 relative to the total number of homes purchased in Mecklenburg county in that same time frame.

Table 8: Logit Results: With Estimated Home Price

	Model 1		Model 2		Model 3	
Variable	Estimate	Marginal Effect	Estimate	Marginal Effect	Estimate	Marginal Effect
Purchased By Investor	-1.678***	-0.324	-1.644***	-0.317		
	(-39.769)		(-37.385)			
Purchased By Non-Institutional Investor					-1.458***	-0.207
					(-22.932)	
Purchased By Institutional Investor					-1.832***	-0.235
					(-32.517)	
No Mortgage			-0.043***	-0.008		
			(-2.781)			
Recent Investor Activity	0.038***	0.007	0.038***	0.007	0.038***	0.007
	(7.030)		(7.032)		(7.097)	
Intercept	-0.718**		-0.711**		-0.712**	
	(-2.262)		(-2.239)		(-2.245)	
Pseudo-R^2	0.067		0.067		0.067	
N	217,512		217,512		217,512	

Note:

*** indicates significance at the 1% level, ** indicates significance at the 5% level, * indicates significance at the 10% level

[a] The probability of a home selling for more than the estimated home price is estimated in each logit regression. The estimated home price of home *i* at time *t* is an imputed price from a 6-month rolling hedonic regression from time *t-6* to time *t-1*. Each logit regression also includes housing characteristics, transaction type, zip code fixed effects, and quarter-year fixed effects. z-statistics are in parenthesis.

[b] Purchased By Investor is a dummy variable that equals 1 if the home is purchased by a non-individual that is not a bank, mortgage/credit lender, relocation company, building company, nor government entity and 0 otherwise. Purchased By Non-Institutional Investor is a dummy variable that equals 1 if the home is purchased by a non-institutional investor and 0 otherwise. Purchased By Institutional Investor is a dummy variable that equals 1 if the home is purchased by an investor that has filed as a publicly traded company, that has filed as a REIT with the SEC, or that has filed a Form D with the SEC and 0 otherwise.

[c] Recent Investor Activity is the percentage of homes purchased by institutional investors in the previous 6 months within each county. For example, if a home was bought in August of 2013 in Mecklenburg county, then recent investor activity would be the percentage of homes purchased by institutional investors in Mecklenburg county from January to July of 2013 relative to the total number of homes purchased in Mecklenburg county in that same time frame.

Table 9: Propensity Score Matched Samples

	Matched With All Individuals		Matched With Individuals With Mortgage		Matched With Individuals Without Mortgage	
Variable	Institutional Investor	Owner-Occupier	Institutional Investor	Owner-Occupier	Institutional Investor	Owner-Occupier
Total	7,365	7,365	7,365	7,365	4,121	4,121
Age	13.85	13.74	13.85	13.81	14.61	19.38
Bathrooms	2.33	2.32	2.33	2.32	2.27	2.21
Bedrooms	3.40	3.38	3.40	3.40	3.42	3.34
Lot Acres	0.22	0.22	0.22	0.23	0.24	0.29
Sale Price	$171,191.88	$192,391.62	$171,191.88	$194,766.73	$175,347.54	$199,204.75
Sqft Finished	2,059.06	2,046.87	2,059.06	2,054.61	2,062.24	2,044.04

[a] Each institutional investor observation is matched with a home purchased by an individual by year by zip code. The match was obtained using Propensity Score Matching with a nearest neighbor matching algorithm. Three matches were made: institutional investor home matched with any owner-occupier home, institutional investor home matched with an owner-occupier home with a mortgage, and institutional investor home matched with an owner-occupier home without a mortgage.

[b] Institutional investors are investors that have filed as a publicly traded company, that have filed as a REIT with the SEC, or that have filed a Form D with the SEC.

Table 10: Hedonic Results: With Propensity Score Matching

Variable	Matched With All Individuals	Matched With Individuals With Mortgage	Matched With Individuals Without Mortgage
Panel A: Without Recent Investor Activity Dummy			
Purchased By Institutional Investor	-0.078***	-0.102***	-0.016*
	(-14.996)	(-20.265)	(-1.823)
Intercept	11.811***	11.735***	11.575***
	(52.978)	(54.885)	(28.653)
R^2	0.436	0.444	0.425
F-Statistic	128.547	133.007	69.410
N	14,730	14,730	8,242
Panel B: With Recent Investor Activity Dummy			
Purchased By Institutional Investor	-0.079***	-0.102***	-0.016*
	(-15.047)	(-20.239)	(-1.754)
Recent Investor Activity	0.002	0.004	-0.004
	(0.587)	(1.526)	(-0.899)
Intercept	11.815***	11.744***	11.567***
	(52.972)	(54.909)	(28.632)
R^2	0.436	0.444	0.426
F-Statistic	126.983	131.514	68.865
N	14,730	14,730	8,242

Note:

*** indicates significance at the 1% level, ** indicates significance at the 5% level, * indicates significance at the 10% level

[a] Each institutional investor observation is matched with a home purchased by an individual by year by zip code. The match was obtained using Propensity Score Matching with a nearest neighbor matching algorithm. Three matches were made: institutional investor home matched with any owner-occupier home, institutional investor home matched with an owner-occupier home with a mortgage, and institutional investor home matched with an owner-occupier home without a mortgage.

[b] The log sale price is the independent variable in each regression. Each regression also includes zip code fixed effects and quarter-year fixed effects. t-statistics are in parenthesis.

[c] Purchased By Institutional Investor is a dummy variable that equals 1 if the home is purchased by an investor that has filed as a publicly traded company, that has filed as a REIT with the SEC, or that has filed a Form D with the SEC and 0 if purchased by an individual.

[d] Recent Investor Activity is the percentage of homes purchased by institutional investors in the previous 6 months within each county. For example, if a home was bought in August of 2013 in Mecklenburg county, then recent investor activity would be the percentage of homes purchased by institutional investors in Mecklenburg county from January to July of 2013 relative to the total number of homes purchased in Mecklenburg county in that same time frame.

Table 11: Spillover Effect on Owner-Occupier Home Purchases

	Within 1-Year Window		Within 2-Year Window	
Variable	Model 1	Model 2	Model 1	Model 2
$\delta_{Close,Before} - \delta_{Close,After}$	0.002	-0.002	0.005***	0.000
	(0.916)	(-0.850)	(3.161)	(0.151)
$\delta_{Far,Before} - \delta_{Far,After}$		0.003**		0.003***
		(2.340)		(3.921)
R^2	0.608	0.608	0.609	0.609
F-Statistic	47,049.686	39,224.878	47,080.090	39,255.989
N	308,449	308,449	308,449	308,449

Note:
*** indicates significance at the 1% level, ** indicates significance at the 5% level, * indicates significance at the 10% level

[a] The log sale price is the independent variable in each regression. Only homes purchased by owner-occupiers are included within the regression. Each regression also includes housing characteristics, transaction type, and census tract-year fixed effects. Standard errors are clustered at the census tract-year level. t-statistics are in parenthesis.

[b] Close represents the number of homes purchased by institutional investors within 0.1 miles of an owner-occupier home one/two year before and one/two year after the sale. $\delta_{Close,Before} - \delta_{Close,After}$ represents the effect of an additional home purchased by an institutional investor within 0.1 miles before the owner-occupier home sale. Far represents the number of homes purchased by institutional investors within 0.25 miles of an owner-occupier home one/two year before and one/two year after the sale. $\delta_{Far,Before} - \delta_{Far,After}$ represents the effect of an additional home purchased by an institutional investor within 0.25 miles before the owner-occupier home sale.

[c] Institutional investors are investors that have filed as a publicly traded company, that have filed as a REIT with the SEC, or that have filed a Form D with the SEC.

Appendix

Imputed Race

As a robustness check for the hedonic results by area in Table 5, we include in our main specification the race/ethnicity of the purchaser. We do this because our results by area may miss on some of the heterogeneity within the area. Since the race/ethnicity of the purchaser is not originally included within our dataset, we must impute this value. We use the methodology laid out by Elliott et al. (2009) and subsequently used by the Consumer Financial Protection Bureau (2014) and Diamond, McQuade, and Qian (2019). This methodology uses Bayes Theorem to impute the race of the individual based on the individual's surname and census tract location.

Specifically, for each individual purchaser with surname n in census tract ct, we estimate the probability of race r for each of the six categories defined by the Census Bureau. These six categories are: White, Black, Asian and Native Hawaiian and Other Pacific Islander, American Indian and Alaska Native, Two or More Races, and Hispanic or Latino Origin. We use the Summary File 1 from the 2010 Census to identify the percentage of the population of race/ethnicity r in a given census tract. Also from the 2010 Census, we obtain the frequency of each surname by race/ethnicity r. Using Bayes Theorem, we can obtain the probability of race/ethnicity r given the surname n and census tract ct:

$$Pr(r|ct,n) = \frac{Pr(r|n)Pr(ct|r)}{\sum_{r' \in R} Pr(r'|n)Pr(ct|r')} \tag{A1}$$

where R is the set of six race/ethnic categories. The main assumption that we must impose is that the probability of living in a specific location, given one's race, is independent of the individual's surname. Similar to Diamond, McQuade, and Qian (2019), we assign a final probability of race/ethnicity to be the maximum posterior probability if that probability is greater than 80%. Otherwise, the individual's race is left unclassified.

In addition, to ensure that our results are not driven by this imputation process, we merge our full Metrostudy data with the Home Mortgage Disclosure Act (HMDA) data. HMDA

data is collected by the U.S. government and is the most comprehensive data set on mortgage originations. The most important aspect of the HMDA data is that it includes the applicant's race and ethnicity. Following Bayer, Ferreira, and Ross (2018) and Diamond and McQuade (2019), we merge our Metrostudy data with HMDA based on the sale year, loan amount, lender name, state, county, and census tract. This procedure results in a high level match between the two data sets.

We run our main specification (Equation (1)) on the imputed data set as well as the merged data set. These results can be seen in Table A1 and are consistent with the results in Table 5. That is, institutional investors still purchase at a discount regardless of race/ethnicity, and a one percentage point increase in institutional investors leads to about a 0.26%-0.62% increase in the price owner-occupiers pay for a single-family home.

Table A1: Hedonic Results: By Race Subset

Variable	Minorities with Mortgage	All Minorities	Non-Minorities with Mortgage	All Non-Minorities
Panel A: Full Metrostudy Data				
Purchased By Institutional Investor	-0.064***	-0.037***	-0.183***	-0.173***
	(-17.937)	(-9.806)	(-53.013)	(-45.863)
Recent Investor Activity	0.005***	0.006***	0.005***	0.004***
	(3.142)	(3.848)	(7.442)	(6.139)
Intercept	11.038***	11.040***	11.034***	11.010***
	(86.499)	(79.351)	(324.513)	(322.086)
R^2	0.829	0.816	0.817	0.793
N	35,904	40,032	143,877	163,456
Panel B: Merged Metrostudy and HMDA Data				
Purchased By Institutional Investor	-0.085***		-0.178***	
	(-27.187)		(-56.097)	
Recent Investor Activity	0.004***		0.003***	
	(3.055)		(3.587)	
Intercept	11.339***		11.007***	
	(77.002)		(294.917)	
R^2	0.822		0.825	
N	39,656		107,257	

Note:

*** indicates significance at the 1% level, ** indicates significance at the 5% level, * indicates significance at the 10% level

[a] The log sale price is the independent variable in each regression. Each regression also includes housing characteristics, transaction type, zip code fixed effects, and quarter-year fixed effects. t-statistics are in parenthesis.

[b] Minorities uses the 2010 Census demographic definitions and includes Blacks, Asians and Native Hawaiians and Other Pacific Islanders, American Indians and Alaska Natives, Two or More Races, and Hispanic or Latino Origins. The top panel uses Bayes Theorem to impute the race of a purchaser given the individual's surname and census tract location. The bottom panel uses the race/ethnicity in the merged Metrostudy-HMDA data.

[c] Purchased By Institutional Investor is a dummy variable that equals 1 if the home is purchased by an investor that has filed as a publicly traded company, that has filed as a REIT with the SEC, or that has filed a Form D with the SEC and 0 otherwise.

[d] Recent Investor Activity is the percentage of homes purchased by institutional investors in the previous 6 months within each county. For example, if a home was bought in August of 2013 in Mecklenburg county, then recent investor activity would be the percentage of homes purchased by institutional investors in Mecklenburg county from January to July of 2013 relative to the total number of homes purchased in Mecklenburg county in that same time frame.