Micro Evidence Relating to House Rents, Prices & Investors from a Matched Dataset

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Abstract: We examine matched rent-price ratios and rent transaction prices for single family houses in Miami-Dade County during March 2006 - April 2014. The primary data consists of both a property sale and a subsequent rental within 240 days of the sale. Each of the buyers in the sample are investors since each property included have a rental event implying they are not owner occupied. A subset of the data from 2009 - April 2014 allows us to identify whether a buyer belongs to an organization or is an entity purchasing a large volume of properties. In the regression models we examine the relationship between housing and market characteristics and the impact larger investors have on single family rents and rent-price ratios. We also calculate gross returns for properties that sell a second time in the data.

Introduction

In this project, we investigate matched house prices and rents in a market where investors purchased residential properties with the objective of buying to rent versus flipping. Entities such as New York-based Blackstone Group (NYSE: BX) and California-based American Homes 4 Rent (NYSE: AMH) and other national and local entities acquired hundreds of single-family dwellings in some markets particularly hard hit by the housing recession. We examine a matched sample of single-family sales and subsequent rental of properties to measure rent-price ratios directly and examine these actual rent-price ratios prior to, during and after the Great Recession (March 2006-April 2014). Our primary sample includes only investor properties where the property is sold and rented within 240 days after the sale.

Initially we find rent-price ratios doubled from the 2006/2008 period relative to 2010 with most of the increase attributed to falling housing prices. The peak rent-price ratios occurred in 2011 with a return to growth in rent and prices in 2012 and a slight decrease in rent-price ratios during 2012, 2013 and the first four months of 2014.

Next we examine whether size in terms of the number of purchases by the investors impacts rental rates, the rent-price ratios and/or the sales price in the market relative to properties purchased and rented by one to two buyers/renters using data from 2009-April 2014. The sample is restricted given that Miami-Dade County Property Appraiser's office only provided a complete record of grantee and grantor to their sales dataset starting in 2009. There are a few instances of grantee or grantor information prior to 2009. This data allows us to identify purchases by name and thus the number of purchases by each entity.

The results for the full sample of purchase and rental properties indicate that size or volume has a small impact on sale price, rents and rent-price ratios relative to investors

purchasing one property. All groups purchase at lower prices, with the largest two groups purchasing at the deepest discounts. Rents are lower for all groups other than the investor renting two properties compared to the investor renting one property. Annual rent to price ratios are lower for groups purchasing and renting more than one property.

The primary sample of 9,346 matched sales and rentals within 240 days suggest differences from the complete rental sample. The purchase price is higher for the unknown grantees, and lower only for investors purchasing three to nine properties. No statistical difference is found in the rents of this sample. But, the annual rent to price ratios are lower for groups purchasing and renting more than one property, similar to the results in the larger rental sample. The estimates in this smaller sample suggest that investor size does not unduly influence rents or prices in this market.[1] Prior research indicates that investors are able to purchase at lower prices compared to individuals purchasing single family homes for their own account, but not necessarily for rental.

Our final set of results provide new information on the returns to BTR properties that coincides with their increased popularity. We identify a subset of BTR properties that sold a second time during the period 2006 to 2019. We calculate the price-rent ratio and the capital gains yield for this sample. Results are show in Table 3. The mean time to next sale is forty-eight months with a gross return of approximately 22% for the sample of approximately 3000 resales.[2] The capital gains yield is about 9% and the income yield is about 13%. Using a flat rent, the number of months between sales, the first sale price and the second sale price, we calculate an IRR of 20.31%, similar to the 22% above. The first part of the sample that includes initial sales and rentals in the August 2005-2010 time period

[1] The higher sales price for the unknown property group in our primary sample is not surprising since most of these unknown grantees properties are purchased in 2006 and 2007.
[2] The 20% is similar to the weighted average return of 23.8% calculated from Table 4 of Bayer, et al, (2020).

is considerably different. We calculate an IRR of 4.8%, with a rent-price ratio of 9.21% and a capital gain of negative 4.90%. This occurs during the boom and subsequent downturn. The initial sale for the second half occurs during 2010 through 2014, with the second sale occurring through March 2019. Returns of 16.36% for the income yield and 22.51% for the capital gain yield results in approximately a 39% gross return. The IRR in this half is 35.80%. These results are consistent with a declining market in the first half. The second half of the sample is marked by lower initial prices, moderately increasing rents and higher prices for the second sale. In addition to the descriptive statistics on IRR, Total Yield, Income Yield (rent to price ratio), Annual Capital Gains Yield and Total gains yield (ignoring compounding), we examine the relationship between property characteristics and returns in a statistical model.

We are aware of two papers that have matched sales with subsequent rental of the same units. Bracke (2015) creates a matched data set with different property types in central London and directly measures their rent-price ratios with results indicating that rent-price ratios are higher for smaller and lower-value properties. Our results indicate that larger properties in terms of square feet have marginally higher rent-price ratios, with lower value properties having higher rent-price ratios consistent with Bracke's (2015) results. Bracke (2019) with a similar matched data set find that investors in buy to rent properties pay less than other buyers for the same properties. Empirical results such as Allen, et al. (2018) also indicate that investors purchase properties at lower prices compared to individuals after controlling for a large number of property characteristics, but the impact of investor size or activity on rent for a property and the rent-price ratio remains unexamined. Do investors pass along this savings in price to renters or are they able to charge market rates and earn abnormal returns based on the low transaction price? It is not clear whether entrance by big

players would impact, improve or decrease rent-price ratios or rental prices in the market. More specifically, we examine the rent and rent-price ratio for investors who acquire multiple single-family dwellings relative to individual investors in the market with investor size determined by the number of purchases in the market.

Larger players potentially bring liquidity, transactional efficiencies (i.e., sophisticated targeting of potential acquisition properties, superior negotiation skills and experience, streamlined closings, etc.), and operational efficiencies (i.e., property and portfolio management expertise) to local housing markets that individual investors in those markets may not have. On the one hand, purchases by big players could increase the overall demand in the market and push the prices and rents upwards. On the other hand, big players have some monopsony advantage and might be able to utilize their buying / bargaining power and negotiation skills to purchase properties at a discount to market value and consequently be able to offer lower rents since they purchase at lower prices.

Review of the Literature

Prior to 2008 and currently most single family rentals were owned by individuals or smaller local investors. Acquiring and maintaining a portfolio of single family homes may involve higher costs and more complex logistics compared to the costs and logistics of typical small local investors or investors in multi-family rental portfolios. It is well documented that during the financial crisis and the subsequent recovery, larger investors took a new interest in purchasing single family homes to rent. When prices of single family houses dropped and inventories increased, this investment strategy became more profitable, and multiple larger scale investors became active in this area, buying large portfolios of distressed properties across the nation. One of the largest, Invitation Homes (NYSE: INVH)

began investing in single family homes in 2012, and as of the second quarter of 2019 had grown the single family rental home portfolio to a net value over $16 billion. American Homes 4 Rent (NYSE: AMH) was founded in 2011 and has grown its single family rental portfolio to nearly $8 billion as of the second quarter of 2019. Single family rental investors typically focus on affordable and middle tier homes, and in 2018, investors are estimated to have purchased 20% of homes in the bottom third of the market.[3] At the same time, new home construction of affordable "starter" homes has been limited due to the lower profit margins in this category.

Because these developments are fairly recent, there is a relatively small set of related literature. A growing portion of this literature focuses on the question of whether or not investors in single family homes use market power or other advantages to the detriment of individual home buyers and renters. The negative impact on individuals might result from higher prices and gentrification in previously affordable neighborhoods, or because investors are able extract surplus rents. At the same time, larger scale investment may afford higher operating efficiency, which would allow higher profits without higher rents.

Investor Purchases and Prices

One strand of recent research examines the impact of investors on single family housing prices. Bracke (2019) examines the question of whether investors who buy to rent push up prices, forcing other buyers out of the market; or whether they provide liquidity and contribute to market clearing. He includes both single family properties and individual units in multifamily properties in the United Kingdom, and finds that buy to rent investors do not

[3] Core Logic estimate, https://www.nytimes.com/interactive/2019/06/20/business/economy/starter-homes-investors.html

pay more on average than other purchasers. Comparing an identified group of buy to rent purchasers to a mixed group of investors and individual purchasers, he finds that in a matched repeat sales comparison, the buy to rent group purchases at a discount between 1.6% and 3.9%. Allen et al. (2018) examine investor purchases relative to individual purchases in Miami-Dade county Florida, and find that investors buy single family properties at discounts between 7.7% and 13.6%, with larger portfolio investors obtaining the largest discounts. The analysis shows that investors purchase real estate owned (REO) properties at deeper discounts than individuals purchasing REOs. Allen, et al. (2018) also provides census tract evidence that the presence of investor buyers in a market is associated with marginally higher property values.

Similarly, G'Lima and Schultz (2019) examine the impact of eight large scale real estate investors on housing prices in 7 US states; and find evidence consistent with the hypothesis that buy to rent investors provide liquidity and reduce local supply, resulting in price appreciation of nearby houses. Using Zillow data on repeat sales of houses in close geographic proximity to houses purchased by large scale buy to rent investors, they find that returns on repeat sales completed after a nearby investor buy to rent purchase are higher than repeat sales completed before. Interestingly, this price appreciation is not entirely driven by investor purchase of foreclosed properties which might have previously been neglected. Repeat sale returns for properties close to non-foreclosed homes purchased by investors are almost as large as returns when the nearby investor purchased property is foreclosed. D'Lima and Schulz (2019) note that the large scale buy to rent investors typically spend $20,000 to $25,000 renovating single family properties prior to renting them. In addition to providing liquidity and reducing inventory, large scale investors may contribute to higher property values in part by this additional investment in repairs and renovation. The authors

interpret these findings positively, in part because the data studied is from the depths of the mortgage crisis when inventories were extremely high.

Mills, Molloy, and Zarutskie (2019) examine the 2012-2014 activity of the eight largest buy to rent investors as well as smaller investor groups in single family properties. While the analysis focuses on the primary reasons for the increase in larger scale buy to rent investments in single family homes (high inventory levels, tight mortgage financing conditions, and technological reductions in acquisition and managerial costs); it also provides evidence that prices rise more in zip codes that had previously had more purchase activity by buy to rent investors.

Gay (2015) studies data from the Chicago area MLS in the 2007-2014 time period. Contrary to the results of Bracke (2019) and Allen et al (2018) discussed above, his results indicate that investors both buy and sell at higher prices than individuals. Interestingly, the premium is positively related to foreclosure rates in the neighborhood. Clusters of investor purchasing activity are associated with higher prices of nearby properties. In addition, when investors sell properties, they do so at a premium to non-investors; and the premium cannot be fully explained by a proxy for renovations or improvements made by the investor. Using a measure of affordability based on people's income within a defined area, the conclusion is that the increase in investor activity leads to higher home prices, and has a negative effect on housing affordability for lower income households.

Taken as a whole, these recent studies indicate that investor purchases of single family homes are associated with either no price impact or marginally higher prices, and may contribute to housing affordability problems in some areas.

Rent to Price and Returns to Investors

Xiao and Xiao (2019) study three large mergers of institutional single family rental investors. They find that in the year following the merger, neighborhoods with more overlap of properties by the merging firms, and therefore higher market power post-merger, experience a greater increase in rent (1.6% increase) compared to non-overlapping neighborhoods also covered by the merging firms. The difference in rent increase is weaker in neighborhoods where the merged firm has competition from other institutional owners. This is consistent with the hypothesis that increased market power of institutional single family rental investors allows them to extract surplus rents. However, the analysis also shows that after the merger completion, neighborhoods with more overlap of properties by the merging firms experienced a significantly larger drop in burglaries, theft, and vandalism compared to non-overlapping neighborhoods covered by the merging firms. This suggests that the higher market power allows both higher rents and higher quality rental service; and is also suggestive of gentrification effects related to institutional investment in single family neighborhoods.

Eisfeldt and Demers (2018) use 1986 to 2016 city level (American Housing Survey) and zip code level (Core Logic) data to examine rental yields and price appreciation. The analysis of city level data indicates that rental yields are higher, but price appreciation is lower in lower price tier cities. House price appreciation increases with price tier, but rental yields decrease with price tier. Each component contributes roughly equally to total returns. Rental yields have lower volatility than price appreciation. At the zip code level, house price appreciation is strongly tied to city level outcomes, and declines with price tier within the city. This is consistent with observed gentrification and loss of affordable housing to lower income individuals in a number of cities as investors seek higher rental yields in lower income neighborhoods.

Bracke (2015) uses unit level data to examine prices and rents in Central London and finds that rental yields differ within the same geographical area. Rent-price ratios are lower for properties in apartment blocks and multilevel buildings, possibly because of lower maintenance costs due to economy of scale, as well as different amenities offered. Consistent with the results of Eisfeldt and Demers (2018) discussed above, Bracke (2015) finds that rental yields are also lower for properties in more prestigious and expensive neighborhoods. This is presumably driven by lower renter risk, lower vacancy rates, higher property appreciation expectations, as well as the fact that a larger proportion of value in these areas is composed of land value, which requires little maintenance. Again, these findings suggest that investors have incentive to purchase in lower income and more affordable neighborhoods in order to maximize the rental yields on single family rental portfolios.

Hattapoglu and Hoxha (2014) utilize two unique datasets from different neighborhoods in Houston, TX, to study how the formation of households' expectations regarding price appreciations affects housing market prices. Their results suggest that appreciation expectations are based on past price appreciation but at the same time they depend on the fundamental factors such as, locational and structural. Thus, market participants display a hybrid behavior of rational and adaptive expectations. They also show that these expectations could lead to unstable price and price-to-rent levels.

Broader analysis of rental housing units provide evidence suggests that rents exhibit mean reversion, and that the best predictor of rent level is initial rent (Verbrugge, Dorfman, Johnson, Marsh, Poole and Shoemaker, 2017). Similarly, Otto and Stapledon (2017) find that rent- price ratios are predictive of future growth rates of rents. Other analyses studying U.S. data have also found evidence of predictability in rents (Clark 1995, Sinai and Souleles

2005, and Gallin 2008). Due to competition from other institutional investors and smaller local investors, increased market power may still only allow limited ability to raise rents, and some perceived benefit or rental service may be required to justify significantly higher rents.

There is also a growing theoretical literature studying various aspects of the price-rent-to ratio in housing markets. Kishor and Morley (2015) focus on factors that determine price-rent ratio, Huang, Ka Yui Leung and Tse (2018) model joint determination of rent-to-price ratio and the turnover rate, Williams (2019) emphasizes the procylical volatility of prices and price-rent ratios, Gilbukh, Haughwout and Tracy (2017) examine the potential for the price-to-rent ratio to be used as a macroprudential tool, Liu, Wang, and Zha (2019) investigate how a credit supply shock can generate large comovements between the house price and the price-to-rent ratio.

Data

In most research regarding rent and price, the data does not allow for matching a specific house with a specific rent. Since price and rent information is typically obtained for different properties, this makes it more difficult to determine the impact of investor size in the market collectively. We overcome this shortcoming by matching sales with subsequent rents within a 240-day window for the same property to create a dataset that allows us to examine how larger buyers in a local housing market impact rents and rent-price ratios relative to smaller and typically local investors.

In order to conduct the empirical analysis, we obtain data from a number of datasets. The transaction/sales dataset contains information on properties in Miami-Dade County,

Florida, from March, 1971 through March 2019.[4] Miami-Dade County Property Appraisal sell their property data sets for a relatively low price and provide a number of property characteristics. The datasets includes names of the grantee and grantor from 2009. They also includes transaction price, transaction date, a unique property ID (Folio number), deed book and deed page, property address, square feet of the building, square feet of the land, number of bedrooms, number of bathrooms, number of stories, year built, effective year built, DORcode (type of variable which allows us to identify single family homes and townhouses) and SalesCode (type of sale variables: Transfer qualified as arm's length; Corrective deed, quit claim deed, etc.; Auction/Deeds from financial institutions; Deeds executed by bankruptcy trustees; Transaction involving affiliated parties; Sale not exposed to the open-market; and Forced sale or sale under duress).[5] A second dataset from Miami-Dade contains information about properties with pools that we use to create a pool dummy variable. A third set of yearly datasets are obtained from the Florida Department of Revenue (FDOR). Each year, every Florida County provides a dataset that contains the assessed value of the land and assessed value of each property to FDOR. The dataset also contains a quality description each year that we match with the sales data to obtain an estimate of the quality of the property.[6] In addition, census block group is available in the FDOR datasets and we use the census block group to control for location. We match the data from the above-described datasets with information from the local MLS rental

[4] In this data grantee and grantor information is typically available after December 2008. There are a few observation before this date that include buyer and seller information and a few after that date are missing grantee grantor information often due to state confidentiality regulations.
[5] See "Real Property Transfer Qualification Codes for use by DOR & Property Appraisers Beginning January 1, 2012" at:
http://dor.myflorida.com/dor/property/rp/dataformats/pdf/salequalcodes12.pdf
[6] While we use this variable, we are not convinced that it is a reliable measure of quality based on the regression results in some cases. Fortunately, other coefficients are only marginally impacted by the inclusion/exclusion of this set of dummy variables of relative quality.

information by the tax district's property information numbers (Folio number). We extract rent, asking rent, list date for the rental, rental date, time-on-the-market, bedrooms, bathrooms, dummies for property condition from the MLS remarks section and identify single family homes and townhouses using MLS style codes. To identify distressed properties, we primarily use the FDOR "SalesCode" that allows us to classify properties by quit claim deeds, deeds from financial institutions; deeds executed by bankruptcy trustees and forced sale or sale under duress as noted above.

We assume that all rental properties are purchased by investors. Using a first cut of sales rented within 240 days from the purchase date that have grantee names we count the number of purchases by each grantee to identify larger investors. We also create a dummy variable to classify grantees that are identified as a LLC, LP, Inc. or Corporation in an attempt to control for individuals and entities, however it is often the case that LLCs or LPs purchase only one property during the sample period, thus we rely more on the number of purchases to identify larger investors. We identify investors with 1 purchase, investors with 2 purchases, investors with 3 to 9 purchases and investors with 10 to 299 purchases.

We remove from the data obvious outliers and other problem data such as properties that were sold as a group with the sale price indicated as the price for the entire group, or properties missing square feet. The entire dataset including any sold property that could be matched before a rental occurs consists of approximately 46,426 single family houses and townhouses. There is large variation in this measure with some sales occurring as early as 1960 with a rental during 2006-April 2014. We concentrate on properties with a rental within 240 days of a sale. We exclude all monthly rents below $500 or above $12,500 and all sales with a price below $20,000 and above $4,000,000.

While we show descriptive statistics for the full set of rental properties in Table 1,

for our primary analysis we keep only sales that had a rental within 240 days after the sale occurred. This resulted in 9,346 matches. Of these 9,346 matches, we cannot identify the grantee of approximately 20% of the matches.[7]

Table 1 provides descriptive statistics for the full sample of rentals, the sample of matched sales and rentals and a subset of matched sales and rentals with a second sale price in the sales data that is available through April of 2014. The average number of days between a purchase and subsequent rental for the full sample is 1,859 days, with about half the properties renting within 3.5 years of the sale.[8] The matched sample has less than 241 days between the purchase and rental dates.

The time on the market for the rentals in the complete dataset is 61 days, 49 days for the matched dataset of sales and rentals, and 50 days for the subset where there is a later sale of the rental property. Rents are about $162 per month less for the matched sample than the full sample. Prices for the matched sample are approximately $240,000 compared to $261,000 for the full sample. The higher prices and higher rents for the full sample may be driven by the fact that the full sample of 46,297 rentals includes larger homes that are marginally more likely to have a pool, and are much less likely to be a distressed sale. The higher percentage of distress sales in the matched data sets may be because a large number of the complete rental data set were purchased on average 5 years

[7] In the initial sample there are 46,297 matched by a county FOLIO number. Of these 29,493 are missing grantee information primarily because the sale date is prior to 2009 when Miami-Dade County started providing the grantee information consistently. However 1,869 of the ones missing grantee information have a rental within 240 days of the sale. We classify these as unknown, but keep them in the sample of transactions of matched rental and sales. We identify 16,804 with grantee name. Of these, 7,477 are rented within 240 days of the sale. The joint number of sales with rentals within 240 days is 9,346 (1,869, +7,477).

[8] In the estimation of the days between purchase and subsequent rental, we obtain the rental data and then search for the earliest prior sale in the sales data. The 1857 days is a result of a number of properties that sold considerably earlier in the sales data, and are not important other than to suggest that properties are possibly purchased as an owner occupied property and are at some point become rentals that we see in the rental data.

before the rent incident with some rentals purchased as early as 1960, though most were purchased after 1998.

For the matched sample with a second sale in the data the initial sale is the highest at $265,073 and the second sale averages $289,577. However, the matched data set with a second sale does not have higher rent than the matched data set without a second sale, nor does it have significantly more square footage, bedrooms, or bathrooms. The matched data set with a second sale is slightly more likely to be a waterfront home compared to matched rentals that do not have a second sale.

The mean annual rent to price ratio for the matched data set without a second sale is 13.4%, while the rent to price ratio for the matched data set with a second sale is 12.8%. This is a gross measure that does not include transaction costs of the sale, renovation, maintenance or repairs to the property, or listing and rental costs. The mean rent to price ratio in this sample is higher than that found in other studies, for example, Bracke (2015) finds gross rent to price ratios for a sample of single family houses and apartments between 4.6% and 5.8% in London during the 2006 to 2012 period, and Eisfeldt and Demers (2018) find rent to price ratios between 2.92% and 6.12% in the full sample of national aggregate 1986-2014 data. Eisfeldt and Demers (2018) do note that the rent to price ratios for Miami are significantly higher than their full sample, with rent to price ratios between 11% and 14% depending upon the data source. This is similar to our findings.

Graph 1 shows changes in average annual rent and price over the sample period for the full sample and rent to price ratios for the matched data set of 9,346 sales and subsequent rentals within 240 days. Between 2006 and 2014, average annual rent trends upward, increasing approximately $2,315 or 10% over the time period in the full sample. Average sale prices decline precipitously between 2006 and 2010/2011, falling by

approximately 48% before rising more marginally in the 2012 to 2014 period. In the time series of mean rent to price ratios shown in Panel C, there is a dramatic increase in rent to price that corresponds to the decline in sales price from late 2006 through the 2010/2011. Rent to price averages for the matched sample are approximately 6% in 2006 and 2007, then peak at over 18% in early 2011 with a decline to approximately 12% in early 2014. It is clear that a significant portion of the variation in rent to price ratios in this sample is driven by the effects of the financial crisis on house values with rents relatively stable or growing.

Table 2 provides summary statistics by year for the matched sample. As discussed above, rent to price ratios increase over the sample period, doubling from 2006 to 2011, primarily as a result of the price drop in the Great Recession. After 2011 they are slowly descending thru 2014, primarily as a result of the increasing prices. In this matched sample average annual rents increase from $22,288 to $23,108 over the eight years at a compound rate of 0.48% per year. Average annual rents dropped from 2006 to 2009 and then started increasing. During this period (2006-2009) rents decreased at a rate of 3.8% per year. Average sale prices during this time are $358,606 in 2006 and approximately $212,385 in 2013, approximately a decline of 7.2% per year, though average sale prices reached their bottom in 2011 at $175,544 in this set of 9,346 sales with a rental within 240 days.

Graph 2 shows the univariate relation between the sale price and the percent rent to price. Rent to price ratios are highest for the most affordable houses, and decline steeply as price increases above $100,000. Rent to price ratios decline at a decreasing rate as price approaches $200,000. Now that real estate prices have recovered from the lows of the Great Recession, investors clearly have incentive to maximize rent to price ratios by investing in affordable homes.

In Table 3, returns are presented for the matched sample that had a subsequent sale in the Dade County dataset through March of 2019. We also divide the sample equally over time to examine prior to the approximate market bottom and the initial recovery during 2011-2014.There are 3,241 transactions in this sample. We treat the rent to price ratio as the income yield or rental yield, and also calculate the annualized capital gain between the first sale and the second sale. The gross returns for the full sample and the second half of the sample are quite impressive, though they might not be much better than what flippers in a market might earn. Total yield is calculated as rent to price plus the annual capital gain. Total yields of 21.6% are calculated for the full sample of 3,241 rentals. The first half of the sample, approximately 2005-2010, total yields are only 4.3%. The second half of the sample (2010-2014) total yields are approximately 39%. We also calculate the IRR for each observation assuming the rent is the same each month and report the averages in Table 3. They are similar to the total of the income yield and the capital gains yield, but slightly since we used the number of months and assumed the rent was the same throughout the time period, so this possibly overstates or understates depending on the time period. For the full sample, we see an IRR of 20.31%, an IRR of 4.8% for the first half and a 35.8% for the second half of the sample. The average time between sales is 48 months in this sample. One item of interest is when we aggregate the IRR according to the number of purchases, the group with no grantee information has an IRR of negative0.75% with initial sales primarily August 2005-2008 and rents 2006-2008. Groups with 1, 2, and 3 to 9 purchases had an IRR of approximately 28%, while the group with 10 plus purchases earned about 39% in gross returns. The low in returns to the group without grantee information are in part due to the overlap of this group with the earlier time period when prices were falling, and the average capital loss was approximately $33,000. The higher

returns to larger investors are investigated further in the regression analysis in the next section.

4. Methods

We estimate a model with census block group fixed effects and sale year or rent year fixed effects. The initial empirical model we estimate allows us to compare whether the size of the investor who purchases the property matters, and takes the following form:

$$y_i = \beta_0 + \beta_1 I_i + \beta_2 C + \beta_3 D + \beta_4 SC + \Sigma \beta_i R_i + \Sigma \beta_i P_i + \Sigma \beta_i X_i + \varepsilon_i, \quad (1)$$

where the dependent variable y is the rent to price, or rent or sales price, or in the case of returns it is the IRR, rent to price, or annual capital gain. I is a dummy variable indicating an investor purchased the property with variations (unknown, small, medium, larger), C is a dummy variable indicating the house is purchased with cash, D is a dummy for a distressed property, SC is a dummy for significant change after the sale, R is a dummy indicator for rent quartiles, P is set of dummy indicators for price quartiles. The vector X_i includes a full set of housing characteristics, including size, effective age, bathroom and bedroom counts, and pool, plus other characteristics derived from the MLS remarks about the rental property. The last term in (1), ε is a random error term.

We first measure and examine rent-price ratios during the entire sample period. In a first set of regressions presented in Table 4, the dependent variable is the annual rent to price ratio (model 1) for the residential properties with a large set of independent variables to examine what impacts rent where annual rent is divided by the sales price and multiplied by 100. Alternatively, the dependent variable will be the log of annual rent (model 2), and log of purchase price (Model 3). Table 5 repeats the models using only the matched sample of rents that occurred within 240 days of the sale.

In Table 6 we examine the impact of the similar variables on our measure of gross rental yield – IRR or total yield, income yield and capital gains yield as described in the univariate statistics of Table 3.

5. Results

Table 4 presents the results of the first set of regressions examining rent to price, log of annual rent, and initial sale price for the full set of 42,297 observations in which there was a sale and a subsequent rental. However, in the full sample, the rentals on average occur approximately five years after the initial purchase. This is possibly due to a number of owners renting properties that they may have purchased a number of years ago as either an owner-occupied property that they eventually decided to rent or as an investment property they have held for a number of years and continue to rent, ending up as a rental in our data of rentals during March 2006 – April 2014.

In the first model, the dependent variable is annual rent to price. As expected, rent to price ratios are negatively related to the price, as shown by the significant negative coefficients for the indicators of higher price group quartiles compared to the lowest. Rent to price ratios are also significantly higher for properties rented after a distress sale.

Comparing identified investor groups (one purchase, two purchases, three to nine purchases, and ten or more purchases) to the unidentified group in which grantee data is not available, we find that the group of investors with the most purchases (10 or more) earn a lower rental yield. But purchasers registered as LLCs, LPs, INCs, or Corporations earn a significantly higher rental yield, thus if they are larger investors, the net effect would be close to .50%.

As expected, rental yields are negatively related to square footage, consistent with

Bracke (2015), but positively related to the number of bedrooms or bathrooms, above average and excellent quality, and the inclusion of a pool. Rental yields are positively related to descriptions in the rental listing indicating that the property is unique, updated, remodeled, renovated, or upgraded. Thus, a portion of higher rents observed in this sample is likely explained by improvements to the property that we cannot directly measure, and costs that are significant. Unfortunately we do not have the data to determine these costs and thus we are unable to deduct them from gross returns. There are cost estimates of $20,000 to $25,000 per house (D'Lima and Schultz, 2019).

The second model presented in Table 4 examines the determinants of logged annual rent. In this case, price, size, number of bedrooms, bathrooms, presence of a pool, quality, improvements (updated, remodeled, renovated, or upgraded), and being located on a waterfront are positively related to log rent. Large investors and investors registered as LLCs, LPs, INCs, or Corporations do not earn significantly higher or lower rents compared to investors purchasing one property. Interestingly, a description of the property being in a "Great Location" is negatively related to log rent. As this is a description added by the agent presenting the listing, it may not accurately distinguish properties that truly are in a great location. Townhomes also rent for less than single family homes.

The third model presented in Table 4 examines the log of the sale price in the sale prior to renting. Sale prices are positively related to rent subsequently earned. Sale prices are also negatively related to all investor groups identified, relative to the one purchaser group. Taken together with the results of Models 1 and 2, this suggests that investors do not consistently rent at higher prices than the one property purchaser group, however they do consistently purchase at significantly lower prices.

Sale price is also negatively related to age, being a townhouse rather than a single

family home, and having a pool. This unexpected result may be caused by a higher percentage of pools being installed in older homes that sold earlier in the sample at lower prices. Sale price is also negatively related to descriptions of the property as updated, remodeled, or renovated in the rental listing. This suggests that between the rental and the sale, improvements were possibly made, and the property was in need of updates at the time of the sale.

Table 5 shows the same set of regressions models as Table 4, however, the sample is reduced to only those observations in which the initial sale transaction is followed by a rental within 240 days (9,346 observations). The dependent variable in Model 1 is annual rent to price. Again, rent to price decreases with price quartile, but increases with rent quartile. Rent to price is lower for larger investors (purchase 10 or more properties), but it is higher for properties owned by LLCs, LPs, INCs, or Corporations, relative to the one purchase investor group. Properties with more bedrooms, with a pool, with below average quality, and distressed and remodeled properties earn higher rental yields. The result related to low quality suggest that this group is affordable relative to rental potential at the time of sale, while the positive coefficient on the indicator that the property has been remodeled indicates some additional investment in improvements between the sale and the rental. Again, as expected, holding bedrooms constant, square footage is negatively related to rent to price. In this regression, age is not significantly positively related to rent to price. Results in models 2 and 3 show that age is negatively related to both rent and sale price.

The dependent variable in Model 2 of Table 5 show that log rents increase with price quartile. Log rent is also positively related to all investor groups except LLCs, LPs, INCs, or Corporations relative to unidentified purchasers. Square footage, number of bedrooms, number of bathrooms, pool, descriptions of the property as unique,

beautiful/wonderful/gorgeous, updated, remodeled, renovated or upgraded are all positively related to log rent. An indicator of a townhouse rather than a single family home is negatively related to log rent, as is an indicator that the listing agent for the rental has less than three years of experience. Unexpectedly, an indicator of below average quality compared to average quality is significantly positively related to log rent. Above average and excellent quality are also associated with higher log rent compared to average quality. In most cases, the quality variables behave as expected, with the exception of the below-average indicator discussed above. As mentioned in footnote 4, there may be some issues with this measure of quality, though the results in the price models are generally as expected for the quality measures with higher quality properties selling at higher prices.

In model 3, we examine the determinants of log sales price for the sale transaction prior to the rental event. As we found in the full sample regressions presented in Table 4, log sale price increases with rent quartile. We find that all identified investor groups except the large (ten or more purchases) purchase at significantly lower prices than unidentified purchasers. Interestingly, the marginally higher log rent and significantly lower log purchase prices for most investor groups do not result in a significantly higher rent to price ratio for investors as a whole, with the exception of the registered LLCs, LPs, INCs and Corporations.

Log sale price is positively affected by square footage, number of bathrooms, and above average or excellent quality. It is negatively affected by age, an indicator of distress, and an indicator that the property is remodeled prior to the rental. As with the regressions in Table 4, this may indicate that the property was dated or in poor repair at the time of sale, and was remodeled after the sale but prior to the rental.

Table 6 presents new evidence on gross returns. We estimate IRR, Total Yield, Rent to Price, Annual Capital Gain, and Total Capital Gain as discussed earlier in the presentation

of Table 3. In this set of regression, the calculated return data is trimmed at the 1% and 99% levels to reduce the possible effect of outliers at a loss of 65 observations. The second sale can occur any from 2006 through early 2019. Also, in this data, most of the properties purchased by the largest investors are not re-sold. While the regression models include all the determinants of rent and price included in the previous models, the primary variable of interest in this set of regressions is the effect of investor groups on returns relative to the return of the one investor purchase group.

The rent to price regression is presented in Model 3. In this smaller sample, the results with regard to price quartiles and rent quartiles are similar to those we found in the larger matched sample. The estimated coefficients for the investor size groups are not significant in this specification, except for the indicator of ten or more purchases. The estimated coefficient is marginally negative at less than one percent impact on the price to rent ratio.

In Model 4, the dependent variable is the annual capital gain. Here we find that the investor groups who purchase and sell two rental properties obtain marginally higher annual capital gains of 3.6% and groups that purchase 10 or more properties obtain a capital gain 5.8% higher than the investor that purchases and sells one property. The investors classified as LLCs, LPs, INCs, or Corporations earn higher annual capital gains. As we discussed in the purchase price regressions in Table 5, only the investor group of 3 to 9 properties purchase at lower prices than the investor purchasing one property. Similar to Eisfeldt and Demer's (2018) finding that price appreciation declines with price tier at the zip code level, we find that annual capital gain is lower in the highest two price quartiles compared to the lowest.

The dependent variable in Model 2 is the total yield. With the exception of the ten or more investor group, the remaining investor size groups obtain the same total yield.

Thus, in this sample, size/activity appear to be associated with higher total yields for the only the largest investor groups. Though, this sample does excludes most of the investors in the largest size category, as they held most of their properties for rental during the sample period. The investor group categorized as LLCs, LPs, INCs, or Corporations does earn a significantly higher total yield of 3.9%. This is largely driven by the capital gain component of the total yield.

Conclusion

Price-rent ratio is a critical indicator of future market expectations and speculative market behavior. However, price-rent ratios are difficult to measure accurately as it is difficult to obtain comparable rents for owner-occupied housing. In this paper, we overcome this problem by using a unique data set that consists of both a property sale and a subsequent rental within 240 days of the sale. Each of the buyers in the sample are investors since each property included have a rental event implying they are not owner occupied. A subset of the data also allows us to identify whether a buyer belongs to an organization or is an entity purchasing a large volume of properties. Using matched rent-price ratios for single family houses in Miami-Dade County during March 2006 - April 2014, we examine the relationship between housing and market characteristics and the impact larger investors have on single family rents and rent-price ratios. We also calculate gross returns for properties that sell a second time in the data.

Using matched rent-price ratios for single family houses in Miami-Dade County during March 2006 - April 2014, we measure rent-price ratios directly and examine these actual rent-price ratios prior to, during and after the Great Recession. We also investigate the

relationship between housing and market characteristics and the impact larger investors have on single family rents and rent-price ratios.

Between March of 2006 and March of 2014, average annual rent trends upward, increasing 10% over the time period. Average sale prices decline precipitously between 2006 and 2010, falling by approximately 50% before rising more gradually in the 2011 to 2014 period. Rent to price ratios average approximately 7% in 2006 and 2007, then peak at over 17% in early 2011 with a decline to approximately 14% in early 2014. It is clear that a significant portion of the variation in rent to price ratios in this sample is driven by the effects of the financial crisis on house values with rents relatively stable or growing.

Larger players potentially bring liquidity, transactional efficiencies (i.e., sophisticated targeting of potential acquisition properties, superior negotiation skills and experience, streamlined closings, etc.), and operational efficiencies (i.e., property and portfolio management expertise) to local housing markets that individual investors in those markets may not have. On the one hand, purchases by big players could increase the overall demand in the market and push the prices and rents upwards. On the other hand, big players have some monopsony advantage and might be able to utilize their buying / bargaining power and negotiation skills to purchase properties at a discount to market value and consequently be able to offer lower rents since they purchase at lower prices. Our results indicate that investor size does not influence rents or rent-price ratios, but is associated with a lower sale price for all groups compared to the group purchasing one property.

To estimate the price-rent ratio and the capital gains yield, we identify a subset of buy to rent properties that sold a second time during the period 2006 to 2019. The mean time to next sale is forty-nine months with an IRR of 20.3% where the capital gains yield is about 8.8% and the income yield is about 12.8%. The first part of the sample that includes

initial sales and rentals in the August 2005-2010 time period yields IRR of 2.86%, with a rent-price ratio of 9.2% and a capital gain of negative 4.9%. This occurs during the boom and subsequent downturn. For the second half of the sample, 2010 through 2014, we obtain returns of 16% for the income yield and 22% for the capital gain yield, associated with an IRR of approximately 36%. These results are consistent with a declining market in the first half. The second half of the sample is marked by lower initial prices, moderately increasing rents and higher prices for the second sale.

References:

Allen, Marcus T., Jessica J. Rutherford, Ronald Rutherford, Abdullah Yavas. 2018. Impact of Investors in Distressed Housing Markets. *Journal of Real Estate Finance and Economics,* 56(4), 622-652.

Bayer, Patrick, Christopher Geissler, Kyle Mangum, and James Roberts. 2020. Speculators and Middlemen: The Strategy and Performance of Investors in the Housing Market. Forthcoming, *Review of Financial Studies*.

Bracke, Philippe. 2015. House Prices and Rents: Micro Evidence from a Matched Dataset in Central London. *Real Estate Economics,* Vol. 43, 2: pp 403-431.

Bracke, Philippe. 2019. How much do Investors pay for houses? Real Estate Economics, 2019, Vol. 47?, 1-33

D'Lima W. and P. Schultz. 2019. How Wall Street Investors Rescued the Market for Single Family Homes. Working Paper, Old Dominion University.

Eisfeldt A. and A. Demers. 2018. Total Returns to Single Family Rentals. NBER Working Paper #21804.

Gay, S. 2015. Investors effect on household real estate affordability. Working Paper, University of Chicago.

Gilbukh, Sonia, Andrew Haughwout and Joseph Tracy, 2017, The Price to Rent Ratio: A Macroprudential Application, Working Paper.

Hattapoglu, M., Hoxha, I. The Dependency of Rent-to-Price Ratio on Appreciation Expectations: An Empirical Approach. *J Real Estate Finan Econ* **49,** 185–204 (2014). https://doi.org/10.1007/s11146-013-9423-2

Huang, Daisy J., Charles Ka Yui Leung and Chung-Yi Tse. 2018. What Accounts for the Differences in Rent-Price Ratio and Turnover Rate? A Search-and-Matching Approach, *J Real Estate Finan Econ,* 57:431–475.

Kishor, Kundan and James Morley, 2015, What factors drive the price–rent ratio for the housing market? A modified present-value analysis, *Journal of Economic Dynamics and Control*, 58, 235-249.

Liu, Zheng, Pengfei Wang, and Tao Zha, 2019, A Theory of Housing Demand Shocks, NBER Working Paper No. 25667

Mills, J., R. Molloy and R. Zarutskie. 2019. Large-Scale Buy-to-Rent Investors in the Single-Family Housing Market: The Emergence of a New Asset Class. *Real Estate Economics* 47(2): 399–430.

Otto, G. and N. Stapledon. 2017. How Predictable? Rent Growth and Returns in Sydney and Melbourne Housing Markets. Working Paper.

Verbrugge, R., A. Dorfman, W. Johnson, F. Marsh III, R. Poole, and O. Shoemaker. 2017. Determinance of Differential Rent Changes: Mean Reversion versus the Usual Suspects. *Real Estate Economics*. 45, 591-627.

Williams, Joseph. 2019. Procyclical Price-Rent Ratios: Theory and Implications, Working Paper.

Xiao, Steven Chong and Xiao, Serena Wenjing. 2019. Do Wall Street Landlords Undermine Renters' Welfare? Available at SSRN: https://ssrn.com/abstract=3410281

Table 1 - Summary Statistics for the Complete Samples Including Observations Without Grantee Information.
Descriptive statistics for the single-family and townhome sample of both Sales and Rentals. Sales are for the complete sample from March 2006 through April 2014. Rentals are from March 2006 through April2014. The data for the Sales is from the Miami-Dade County Appraisal District and the Florida Department of Revenue Tax Roll Data Files. The rental data is from the MLS and from the Florida Department of Revenue Tax Roll Data Files. Excluding residential properties with missing characteristics and obvious outliers the complete sales sample includes 174,407 properties with prices between $20,000 and $4,000,000. There are 46,297 rentals with monthly rents between $500 and $12,500. Of primary interest is the subsample where sales & rentals are matched, and the subsample where only matched properties with a second sale occurs by 2019. The MLS Rental data and Miami-Dade County Sales data classify properties differently and we use the MLS classification in the Rental data and Miami-Dade County classification in the Sales Dataset.

Summary Statistics of Key Variables	Matched Dataset Sales & Rentals	Matched Dataset when there is a Second Sale	Complete Dataset Sales 2006-2014	Complete Dataset Rentals 2006-2014
Number of Observations:	9,346	3,241	174,407	46,297
Mean Asking Rent (monthly)	1,867	1,861	-	2,046
Mean Rent (monthly)	1,811	1,800	-	1,973
Mean Sale Price before Rented or Sale Price for the Sample	239,735	265,073	266,233	261,026
Mean gross annual rent-price ratio (price in hundreds)	13.410	12.788	-	12.703
Mean Second Sale Price if Sold after Rented	-	289,577	-	-
Mean Values for Variables below:				
Square Feet (mean)	1,703	1,707	1,895	1,806
Effective Age (mean)	23.62	22.61	28.39	26.32
Bedrooms	2.977	2.927	3.210	2.971
Bathrooms	2.246	2.243	2.048	2.275
Stories	1.232	1.254	1.274	1.236
Pool	0.343	0.354	0.191	0.373
Distress sale (includes REO, quitclaim)	0.323	0.296	0.284	0.142
Property Characteristics changed Significantly after Transfer	0.030	0.032	0.055	0.033
Townhouse	0.320	0.328	0.164	0.292
Days on the Market (Rent Sale date - Rent List date)	48.52	50.26	-	60.68
Days between Sale date and Rental date	104.53	104.95	-	1857.09
Percent Rent Overpriced (Rent SP- Rent LP)/Rent SP	-0.029	-0.032	-	-0.034
List Agent Rookie	0.220	0.244	-	0.163
List Agent Experienced	0.620	0.591	-	0.704
Year Leased	2010.76	2009.97	-	2010.08
Year Sold 1st time	2010.45	2009.66	2009.92	2005.00
Year Sold 2nd time	-	2013.75	-	-
Waterfront	0.174	0.192	-	0.190
Low Quality	0.153	0.192	-	0.193
Fair quality	0.251	0.211	-	0.217
Average quality	0.487	0.507	-	0.448
Above Average quality	0.079	0.059	-	0.091
Excellent quality	0.029	0.031	-	0.051
Dummy variables calculated from MLS rental remarks:				
Beautiful, Wonderful, Gorgeous	0.467	0.481	-	0.479
Unique	0.030	0.035	-	0.037
Great Location	0.183	0.175	-	0.205
Updated	0.085	0.070	-	0.095
Remodeled	0.130	0.120	-	0.109
Renovated	0.077	0.082	-	0.065
Upgraded	0.066	0.069	-	0.070

Table 2 Summary Statistics by Year for the Matched Sample where Rent to Price Ratio equals Annual Rent Divided by Sale Price

Rent Year or Sale Year	N	Mean Rent to Price Ratio	Median Rent to Price Ratio	Mean Annual Rent	Median Annual Rent	N	Mean Sale Price	Median Sale Price
						136	334,596	279,250
2006	752	0.078	0.065	22,288	19,200	863	358,606	300,000
2007	769	0.067	0.059	22,210	19,800	649	385,595	335,800
2008	478	0.078	0.069	22,469	19,200	549	324,032	275,000
2009	768	0.122	0.103	19,845	17,400	859	217,684	157,500
2010	953	0.143	0.115	19,865	17,040	948	208,248	139,450
2011	1146	0.174	0.157	20,275	17,400	1198	175,544	118,500
2012	1326	0.164	0.149	21,579	18,600	1602	203,366	140,100
2013	2259	0.148	0.132	22,958	20,400	2360	212,385	172,500
2014_April	895	0.139	0.122	23,108	21,600	182	196,150	133,000
All Years	9346	0.134	0.113	21,736	19,200	9346	239,735	182,500

Table 3 Average Gross Returns across time and Groups

Groups by Date of Purchase and Groups by number of Purchases when Grantee is Identified	Internal Rate of Return**	Annual Rent to Price Plus Annualized Capital Gain	Annual Rent to Price Ratio	Annualized Capital Gain/Loss Rate	N
Means First Half of Sample (2005 - 2010)	4.80%	4.31%	9.21%	-4.90%	1620
Means Second Half of Sample (2010 - 2014)	35.80%	38.88%	16.36%	22.51%	1621
Means Full Sample (2005 - 2014)	20.31%	21.60%	12.79%	8.81%	3241
Standard deviation First Half of Sample	35.64%	37.71%	6.20%	35.08%	1620
Standard deviation Second Half of Sample	83.32%	84.78%	8.75%	81.37%	1621
Standard deviation Full Sample	65.93%	67.85%	8.38%	64.13%	3241
No Grantee Available (Primarily Aug 2005-2008)	-0.75%	-2.47%	7.21%	-9.67%	977
1 Purchase	27.28%	29.38%	14.09%	15.29%	1074
2 Purchases	28.99%	32.05%	15.82%	16.22%	398
3 to 9 Purchases	28.02%	30.92%	16.15%	14.77%	479
10 Plus Purchases	39.27%	42.49%	16.74%	25.74%	313

**Because our data does not include capital expenditures, closing costs, depreciation or taxes, our estimates of returns represent the upper bound of average gross returns.

	Average Months Between Sales	Average 1st Sale Price	Average Monthly Rent	Average 2nd Sale Price	N
Means First Half of Sample*	60	$333,107	$1,856	$298,144	1620
Means Second Half of Sample*	37	$197,081	$1,744	$281,016	1621
Means Full Sample*	48	$265,073	$1,800	$289,577	3241

*First Purchase occurs during August 2005 - March 2014; Second Sale occurs during May 2006 - March 2019

Table 4, Fixed effects models using the complete sample of rented properties with a matching prior sale. The dependent variables are log of Annual Rent to Price ratio with price in hundreds, log of Annual Rent and log of Sale Price.

	(1) Annual Rent to Price		(2) Log Annual Rent		(3) Log Sale Price	
VARIABLES	coef	tstat	coef	tstat	coef	tstat
Second price group quartile	-9.746**	-163.90	0.047**	18.41		
Third price group quartile	-14.517**	-212.08	0.073**	26.63		
Fourth price group quartile	-18.746**	-220.97	0.133**	41.58		
Second rent group quartile	1.553**	24.46			0.166**	24.82
Third rent group quartile	3.271**	42.96			0.311**	39.67
Fourth rent group quartile	5.255**	55.05			0.468**	48.46
Unknown grantee	0.206**	2.76	-0.010**	-3.97	-0.036**	-4.55
Two purchases	-0.165*	-2.22	0.001	0.39	-0.025**	-3.19
Three to nine purchases	0.158*	2.17	-0.015**	-4.53	-0.061**	-7.86
Ten or more purchases	-0.609**	-5.86	-0.016**	-3.50	-0.057**	-5.12
LLC, LP, INC, or Corporation	0.300**	4.36	-0.006*	-2.04	-0.016*	-2.22
Square feet (100s)	-0.017**	-5.23	0.004**	31.02	0.022**	66.98
Age (10s of years)	-0.011	-0.63	-0.017**	-21.73	-0.028**	-15.90
Bedrooms	0.505**	15.29	0.102**	71.73	0.009**	2.61
Baths	0.335**	8.47	0.131**	73.89	0.050**	11.84
Stories	-0.035	-0.81	-0.013**	-6.80	-0.002	-0.33
Pool	0.359**	8.37	0.053**	27.23	-0.019**	-4.28
Minimum/Low Cost Quality	0.031	0.50	-0.021**	-7.38	0.006	1.00
Below Average Quality	0.019	0.30	0.059**	20.94	0.005	0.71
Above Average Quality	0.264**	3.24	0.093**	25.40	0.026**	3.15
Excellent Quality	0.873**	8.33	0.134**	28.21	0.080**	7.48
Water Front	-0.137*	-2.53	0.032**	13.15	0.066**	11.53
Beautiful Wonderful Gorgeous	0.130**	3.76	0.031**	20.06	0.008*	2.19
Unique	0.127	1.40	0.035**	8.57	0.010	1.04
Great Location	-0.049	-1.17	-0.009**	-4.91	-0.002	-0.48
Updated	0.253**	4.17	0.035**	12.80	-0.021**	-3.23
Remodeled	0.571**	10.18	0.029**	11.59	-0.045**	-7.56
Renovated	0.430**	6.04	0.038**	11.71	-0.021**	-2.78
Upgraded	0.134*	2.02	0.021**	7.11	0.013	1.80
Distress sale (includes REO, quitclaim)	0.920**	15.10	0.001	0.19	-0.180**	-27.95
Property Characteristics changed Significantly after Transfer	-0.192	-1.91	-0.020**	-4.47	-0.125**	-11.69
Listing agent - Rookie (1-3 years exp.)	0.001	0.02	0.001	0.27		
Listing agent experienced (5 plus years)	0.003	0.05	0.004	1.59		
Townhouse	-0.095	-1.71	-0.037**	-14.88	-0.041**	-6.99
Rental days on the Market	0.000	0.28	0.000**	2.83		
Constant	19.123**	118.40	9.261**	1,421.88	11.420**	734.04
Year Dummies, Rental Date	√		√			
Year Dummies, Sale Date	√				√	
Census Block Group Fixed effects	√		√		√	
Observations	46,297		46,297		46,297	
R^2	0.798		0.865		0.756	

Table 5, Matched Sale and Rental within 240 Days sample with fixed effects models,
dependent variables are Rent to Price ratios (price in hundreds), log of Annual Rent and log of Sale Price.

	(1)		(2)		(3)	
	Annual Rent to Price		Log Annual Rent		Log Sales Price	
VARIABLES	coef	tstat	coef	tstat	coef	tstat
Second price group quartile	-10.354**	-74.07	0.048**	9.35		
Third price group quartile	-15.194**	-96.08	0.081**	13.87		
Fourth price group quartile	-18.803**	-93.66	0.135**	18.23		
Second rent group quartile	1.462**	9.65			0.187**	11.83
Third rent group quartile	3.095**	16.16			0.352**	17.91
Fourth rent group quartile	4.861**	19.44			0.474**	18.39
Unknown grantee	0.009	0.02	-0.010	-0.68	0.104**	3.05
Two purchases	-0.432**	-3.27	-0.001	-0.16	-0.008	-0.56
Three to nine purchases	-0.179	-1.42	-0.009	-1.78	-0.034*	-2.55
Ten or more purchases	-0.880**	-5.62	-0.011	-1.88	0.005	0.30
LLC, LP, INC, or Corporation	0.312**	3.03	-0.002	-0.43	-0.007	-0.66
Square feet (100s)	-0.026**	-2.66	0.006**	15.92	0.026**	25.34
Age (10s of years)	0.076	1.57	-0.017**	-9.22	-0.031**	-6.20
Bedrooms	0.362**	4.38	0.086**	28.50	-0.000	-0.05
Baths	0.224*	2.06	0.125**	30.61	0.049**	4.31
Stories	-0.025	-0.24	-0.009*	-2.36	0.004	0.37
Pool	0.307**	2.90	0.038**	9.45	-0.006	-0.54
Minimum/Low Cost Quality	0.241	1.37	-0.000	-0.05	-0.018	-1.00
Below Average Quality	0.184	1.15	0.067**	11.14	0.007	0.40
Above Average Quality	0.157	0.71	0.091**	10.92	0.098**	4.24
Excellent Quality	0.212	0.61	0.129**	9.84	0.291**	7.99
Water Front	-0.040	-0.30	0.022**	4.45	0.024	1.74
Beautiful Wonderful Gorgeous	0.151	1.81	0.018**	5.82	-0.014	-1.56
Unique	0.112	0.46	0.029**	3.19	0.016	0.64
Great Location	-0.006	-0.06	-0.009*	-2.09	0.013	1.10
Updated	0.235	1.46	0.033**	5.37	0.010	0.57
Remodeled	0.652**	5.08	0.018**	3.60	-0.065**	-4.79
Renovated	0.235	1.42	0.015*	2.43	-0.024	-1.39
Upgraded	0.049	0.30	0.024**	3.82	0.025	1.46
Distress sale (includes REO, quitclaim)	0.726**	7.14	0.003	0.69	-0.169**	-16.00
Property Characteristics changed Significantly after Transfer	-0.332	-1.22	-0.005	-0.51	-0.183**	-6.42
Listing agent - Rookie (1-3 years exp.)	0.005	0.04	-0.014**	-2.80		
Listing agent experienced (5 plus years)	0.181	1.56	-0.004	-0.98		
Townhouse	-0.143	-1.09	-0.034**	-6.83	-0.023	-1.66
Rental days on the Market	0.001	1.20	0.000	0.09		
Constant	20.218**	56.28	9.240**	708.22	11.276**	325.64
Year Dummies, Rental Date	√		√			
Year Dummies, Sale Date	√				√	
Census Block Group Fixed Effects	√		√		√	
Observations	9,346		9346		9346	
R-squared	0.822		0.883		0.791	

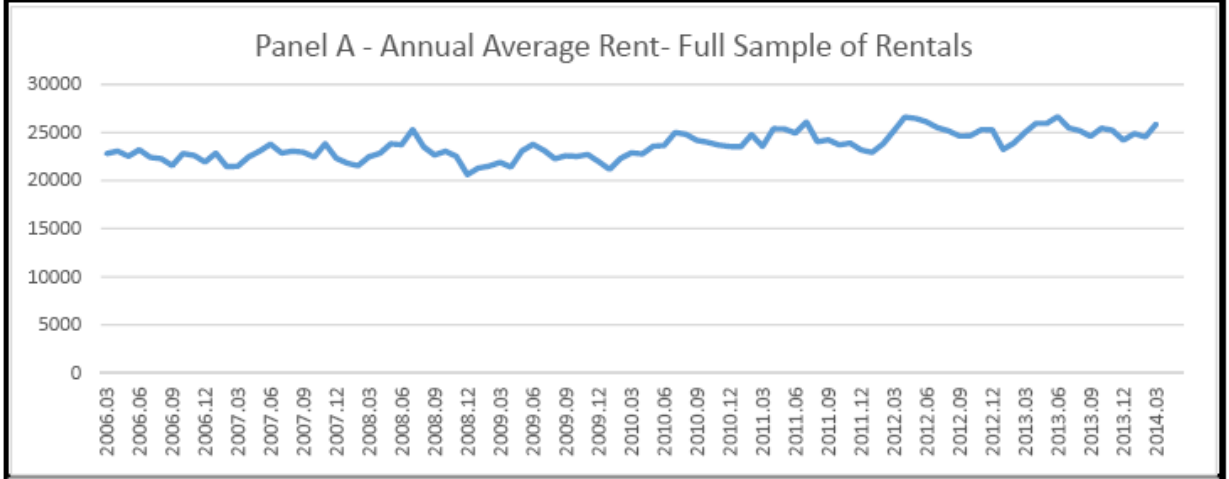
Table 6, The sample is matched Sale and Rentals within 240 Days of the first sale with a repeat sale on average at 48 months. The regressions are fixed effects models where the dependent variables are Rent to Price ratios, log of Annual Rent and log of Sale Price. In this set of regressions the return data is trimmed at the 1% and 99% levels to reduce the effect of outliers at a loss of 65 observations.

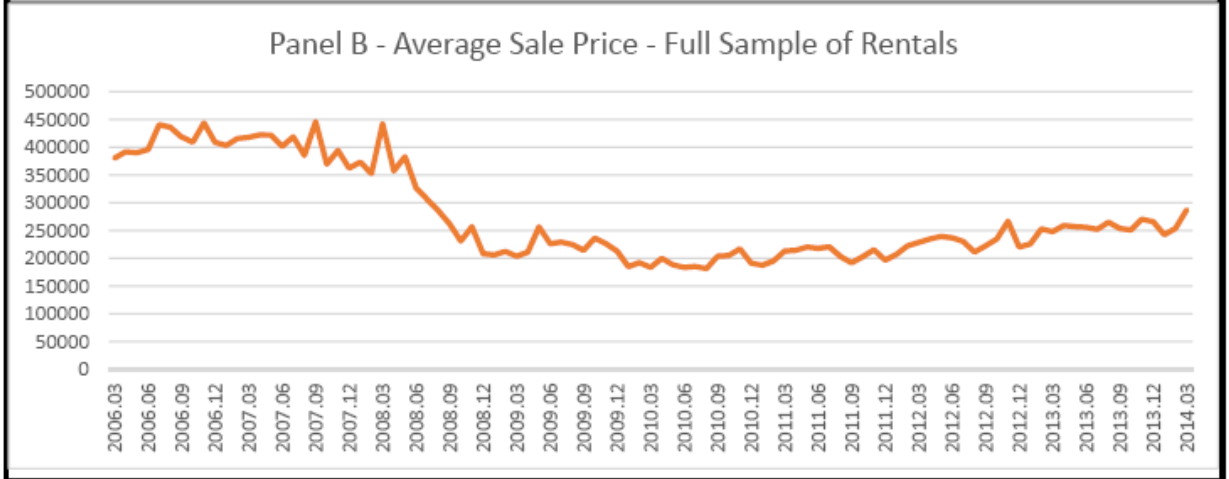
	(1) IRR		(2) Total Yield		(3) Rent to Price		(4) Annual Capital Gain		(5) Total Capital Gain	
VARIABLES	coef	tstat	coef	tstat	coef	tstat	coef	tstat	coef	tstat
Second price group quartile	-28.998**	-16.39	-33.730**	-18.07	-10.198**	-38.24	-23.532**	-13.33	-78.383**	-19.49
Third price group quartile	-48.843**	-25.62	-56.111**	-27.89	-15.092**	-52.51	-41.019**	-21.56	-138.588**	-31.97
Fourth price group quartile	-65.470**	-26.77	-74.136**	-28.73	-18.654**	-50.59	-55.482**	-22.73	-180.305**	-32.43
Second rent group quartile	7.865**	4.68	8.403**	4.73	1.359**	5.36	7.044**	4.20	5.072	1.33
Third rent group quartile	12.928**	5.83	14.029**	6.00	2.931**	8.77	11.098**	5.02	14.864**	2.95
Fourth rent group quartile	20.631**	7.03	22.454**	7.26	4.913**	11.11	17.540**	5.99	33.176**	4.98
Unknown grantee	1.854	0.55	1.903	0.53	-0.338	-0.66	2.241	0.66	-10.517	-1.36
Two purchases	3.101	1.88	3.378	1.94	-0.250	-1.01	3.628*	2.20	9.157*	2.44
Three to nine purchases	2.297	1.41	2.407	1.40	-0.036	-0.15	2.443	1.51	2.998	0.81
Ten or more purchases	4.888*	2.43	5.110*	2.41	-0.664*	-2.19	5.774**	2.88	10.349*	2.26
LLC, LP, INC, or Corporation	3.442**	2.60	3.814**	2.73	0.291	1.45	3.524**	2.66	4.168	1.38
Square feet (100s)	0.554**	4.76	0.611**	4.98	-0.016	-0.91	0.627**	5.40	3.087**	11.67
Age (10s of years)	-0.490	-0.82	-0.500	-0.79	0.104	1.15	-0.604	-1.01	1.941	1.42
Bedrooms	-0.432	-0.44	-0.285	-0.28	0.415**	2.80	-0.700	-0.71	1.289	0.58
Baths	-0.598	-0.46	-0.493	-0.36	0.248	1.27	-0.741	-0.57	-4.081	-1.38
Stories	-1.826	-1.58	-1.895	-1.56	-0.095	-0.55	-1.801	-1.56	-1.665	-0.63
Pool	0.702	0.54	0.701	0.51	0.288	1.47	0.412	0.32	-1.338	-0.45
Minimum/Low Cost Quality	-0.148	-0.08	-0.310	-0.16	0.016	0.06	-0.326	-0.17	-8.447*	-1.98
Below Average Quality	-2.191	-1.18	-1.732	-0.88	0.034	0.12	-1.767	-0.95	5.879	1.39
Above Average Quality	-0.098	-0.03	-0.204	-0.06	-0.237	-0.52	0.033	0.01	-3.116	-0.46
Excellent Quality	2.739	0.70	2.096	0.50	-0.004	-0.01	2.100	0.53	10.731	1.20
Water Front	-0.355	-0.23	-0.555	-0.35	-0.300	-1.31	-0.255	-0.17	-3.728	-1.08
Beautiful Wonderful Gorgeous	0.832	0.84	0.948	0.90	0.144	0.96	0.803	0.81	-0.882	-0.39
Unique	-1.076	-0.39	-0.991	-0.34	0.177	0.43	-1.168	-0.43	-6.542	-1.05
Great Location	-0.740	-0.56	-0.752	-0.54	-0.048	-0.24	-0.705	-0.53	1.169	0.39
Updated	-0.335	-0.15	-0.482	-0.21	-0.022	-0.07	-0.460	-0.21	-2.073	-0.42
Remodeled	-1.169	-0.69	-1.085	-0.61	0.409	1.60	-1.494	-0.88	3.682	0.95
Renovated	2.344	1.14	2.571	1.18	0.589	1.90	1.982	0.96	0.086	0.02
Upgraded	1.448	0.76	1.351	0.67	-0.191	-0.67	1.542	0.81	-7.519	-1.74
Distress sale (includes REO, quitclaim)	1.037	0.80	1.356	0.99	0.892**	4.57	0.463	0.36	0.187	0.06
Property Characteristics changed Significantly after Transfer	3.853	1.22	3.998	1.20	-0.460	-0.97	4.458	1.42	-7.726	-1.08
Listing agent - Rookie (1-3 years exp.)	-0.558	-0.36	-0.344	-0.21	-0.006	-0.02	-0.338	-0.22	5.839	1.67
Listing agent experienced (5 plus years)	-0.912	-0.67	-0.652	-0.46	0.060	0.30	-0.713	-0.53	8.049**	2.62
Townhouse	-0.438	-0.29	-0.684	-0.43	0.003	0.02	-0.687	-0.46	-3.477	-1.02
Rental days on the Market	0.004	0.42	0.006	0.53	0.003	1.64	0.003	0.31	0.003	0.12
Number of Months between Sales	-0.118**	-6.22	-0.095**	-4.76	-0.001	-0.25	-0.094**	-4.99	0.620**	14.41
_Is1year_2005	8.930	1.82	8.057	1.56	-0.683	-0.92	8.740	1.79	-7.017	-0.63
_Is1year_2006	-3.961	-0.99	-6.231	-1.48	-0.535	-0.89	-5.696	-1.43	-28.313**	-3.12
Is1year_2007	-10.803**	-2.69	-13.133**	-3.10	-0.836	-1.38	-12.297**	-3.07	-27.806**	-3.04
Is1year_2008	-8.015*	-2.55	-9.259**	-2.79	-0.483	-1.02	-8.776**	-2.79	-13.818	-1.93
_Is1year_2009	-4.852*	-2.20	-6.030**	-2.59	-1.041**	-3.13	-4.989*	-2.27	-16.386**	-3.27
_Is1year_2010	-3.955	-1.92	-4.617*	-2.13	-0.085	-0.27	-4.533*	-2.21	-13.066**	-2.79
_Is1year_2011	1.302	0.71	1.267	0.66	0.464	1.68	0.803	0.44	-1.864	-0.45
_Is1year_2013	1.629	0.89	1.814	0.94	-0.880**	-3.18	2.695	1.47	7.347	1.76
_Is1year_2014	10.132	1.68	9.864	1.55	-1.796*	-1.98	11.661	1.94	-11.871	-0.87
Constant	47.415**	10.93	50.814**	11.10	20.043**	30.65	30.771**	7.11	53.731**	5.45
Year Dummies, Rental Date	√		√		√		√		√	
Census Block Group fixed effects	√		√		√		√		√	
Observations	3,176		3,176		3,176		3,176		3,176	
R-squared	0.639		0.666		0.876		0.583		0.737	

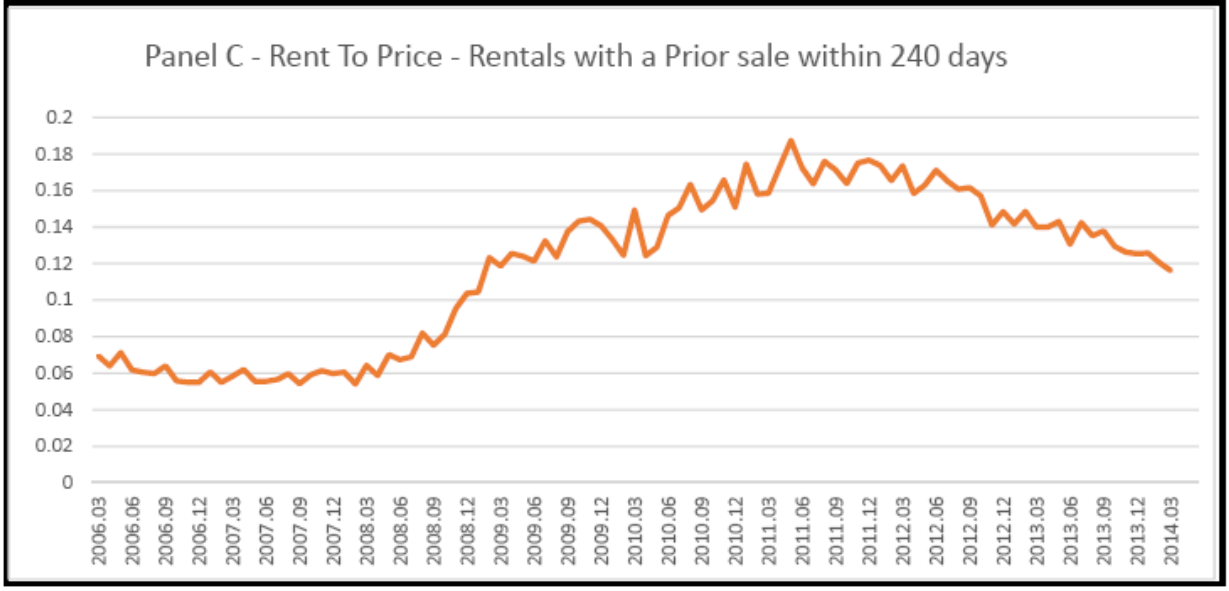
Graph 1

Rents, Price, and Rent to Price for the Sample Period

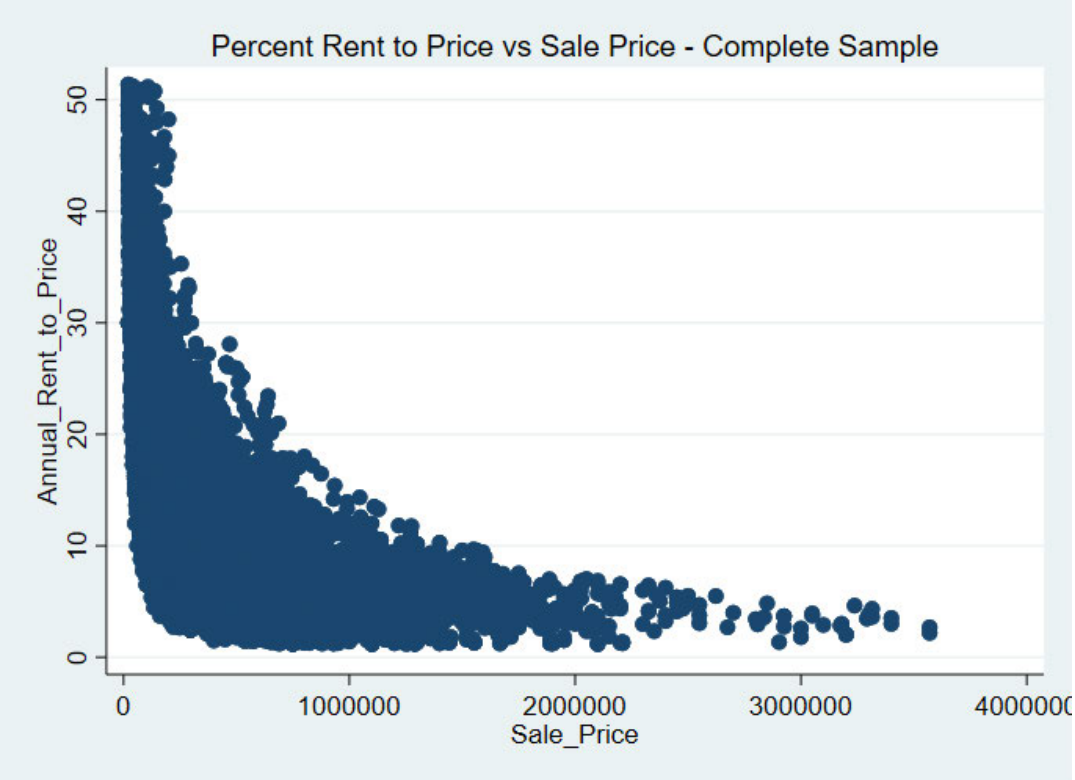
Average rents are for the full sample of rentals; average sale price is for the full sample of sales over the March 2006 - April 2014 period and rent to price ratios are based on the sample of properties that sold and rented within 240 days after the sale date.



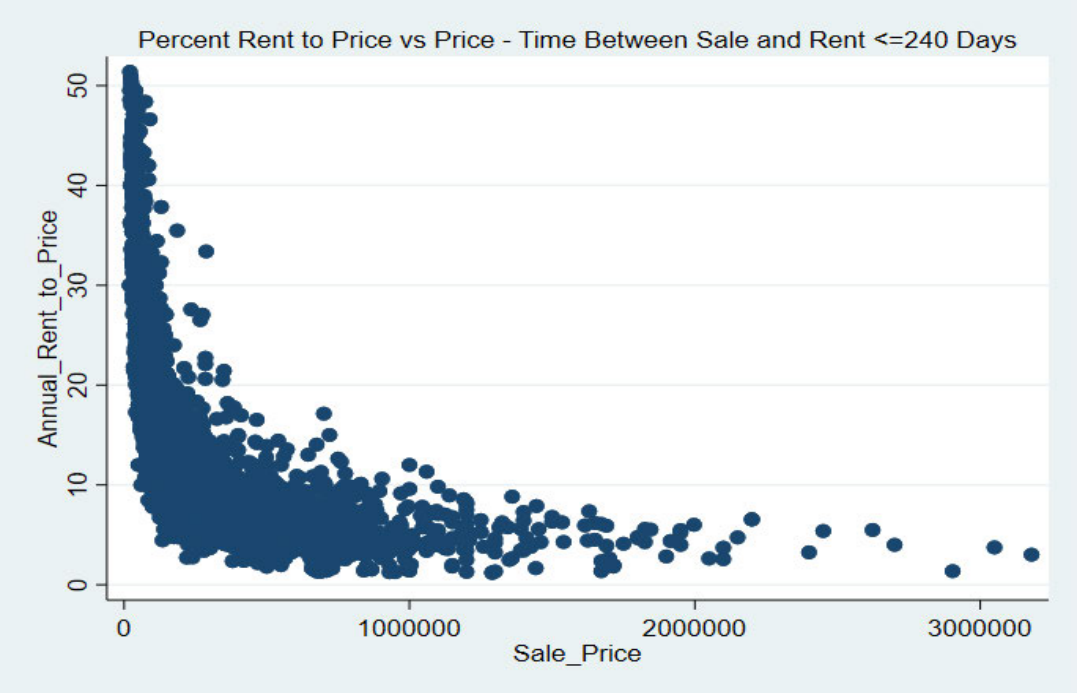




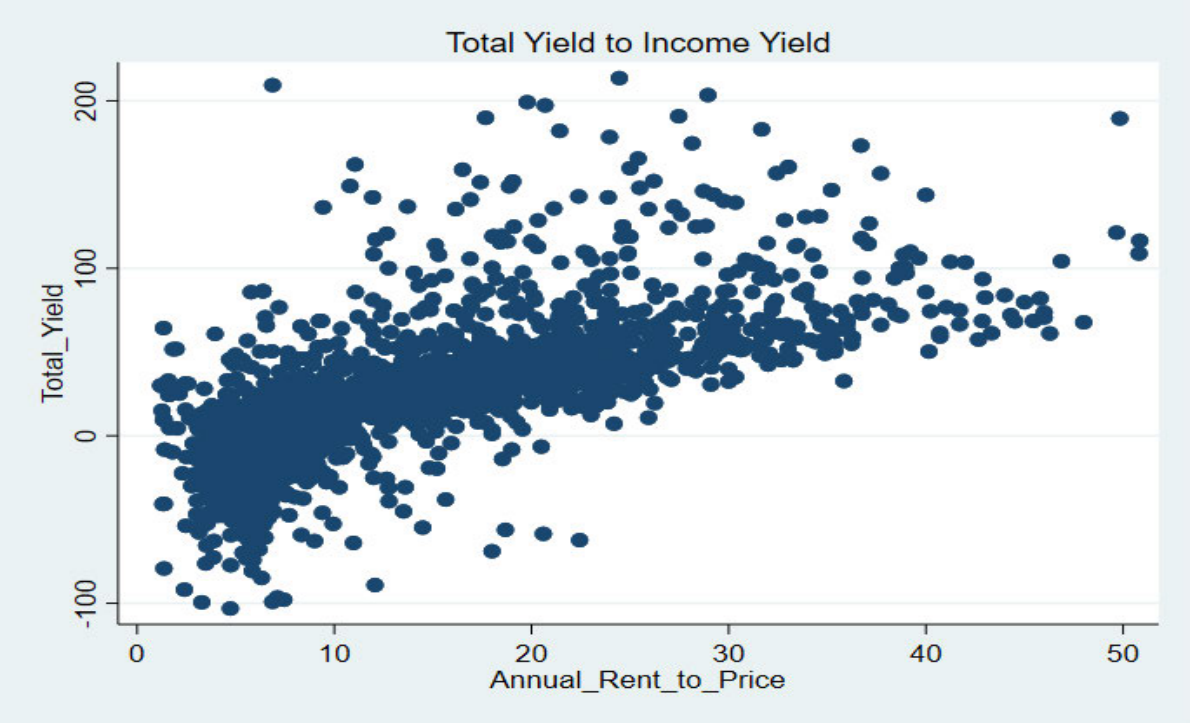
Graph 2 Complete Sample of rentals.



Graph 3 Matched Sample with Rent within 240 days of the Sale.



Graph 4 Total Yield to Rent to Price/Income Yield for the Matched Sample with a Second Sale.



Graph 5
CPI, CPI Rents 1990-2018, Miami Dade County Average Prices 1990-2018
and Average Market Rents (March 2006- March 2014) 1984=100