Slow-moving capital and firesales in real estate markets*

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Abstract

Owners of real assets often have informational advantages over other investors about asset-specific cash flows and local market conditions. Sudden declines in local property values can significantly constrain investors currently active in the local market. These investors may have to sell their assets quickly and have less access to credit due to the decline in the value of their collateral. This opens up the market to outside investors who lack the same informational advantages. In this paper we document the characteristics of transactions in the commercial real estate over a full boom and bust cycle. We find that in times of stress, the volume of transactions in hard-hit markets falls. The composition of transactions changes, with entry from out-of-market buyers. Out of market buyers consistently pay less for properties, by about 14 basis points, both during boom and bust markets.

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1 Introduction

Commercial real estate is a unique financial investment. Buildings are by definition defined by their location within local markets. CRE as a segment tends to be quite cyclical and tied to the national business cycle, but individual buildings carry a significant amount of idiosyncratic risk reflecting both differences across and within local markets. Investors currently active in a local market have an informational advantage over outside investors. Sudden sharp drops in local property values, resulting in stress on local investors and providing opportunities to outside investors, can disrupt this equilibrium.

Investment in CRE is often indirect through financial intermediaries such as REITs in the equity market and CMBS in the bond market. Local markets are often split between small, local, private investors and larger institutional investors that are active in multiple geographical markets. Investors with experience in the local market have more accurate valuations of properties, providing them an advantage when bidding against an outside investor whose valuations are less precise due to their lack of market experience. A sudden and sharp decline in property values can disrupt this market equilibrium providing a greater opportunity for outside investors.

Investors compete for available CRE buildings via an implicit auction process, with sellers receiving bids from a range of potential investors. Investors naturally fear the "winner's curse", the risk of significantly overpaying for a given building. Neither in-market or out-of-market investors know the true value of a given property with certainty, they are both aware that their valuations include an error term. Investors who are currently active in the local market benefit in this process thanks to their informational advantage both about asset-specific cash flows and the local market conditions. This translates to a smaller error term for their valuations, providing them with an advantage when bidding against outside investors. The transactions are often financed through mortgages with the property as a collateral.

Sharp declines in property values in local markets can disrupt this equilibrium in two different ways. Investors with significant exposure in a local market that has recently experienced a sharp decline may want to reduce their exposure to that market via selling off properties in that market. If the shock was significant enough to destabilize the investor, they may have to sell assets

in the local market as they can no longer manage the debt service on those properties. This "fire sale" effect is the direct impact of the local market shock, but there is also an indirect impact. The decline in the local property values has had an impact of the balance sheets of investors active in the market. The decline in the value of their collateral has increased their overall leverage. This will hinder the ability of in-market investors from accessing debt markets, preventing them from bidding on new properties. The direct impact of the local market shock is an increase in the number of distressed properties on the market, the indirect impact is a reduction in the number of investors with experience and knowledge of local market conditions.

The impacts of the decline in local property values, both the direct impact on the supply of properties and the indirect impact on the reduction in competition, changes the competitive balance between the in-market and the out-of-market investors. In-market investors have either switched from buyers to sellers due to financial distress or are at least no longer active as buyers due to a reduction in their lending capacity. Out-of-market investors can then enter the market, no longer at a disadvantage to better informed in-market investors. They have not been impacted by the local market shock, and thus have "dry powder" to deploy to purchase buildings they normally would not be competitive for. They purchase these buildings at a discount. The discount has two potential sources. The purchase of a building from a distressed seller has a "fire sale" discount. The purchase of a building that is not from a distressed seller still has a discount, as the local market shock has reduced the number of bidders with informational advantage, resulting in a lower winning bid.

We use data on commercial real estate transaction from Real Capital Analytics to test this hypothesis empirically. Investors are defined in or out-of-market based on their recent observed real estate holdings. We then find a strong correlation between the share of out-of-market investors and recent declines in local market prices, with the share of out-of-market investors higher in markets with greater decline. This pattern persists in both good and bad economic times. We estimate a series of regressions that shows a significant and negative relationship between recent price changes and the share of recent transactions by out-of-market investors. This result is robust across a wide range of specifications. Finally we document how out-of-market investors consistently pay less for

properties, but that this price differential is fairly consistent across local market cycles. Out-of-market investors will increase their market share in a distressed market, but this does not translate into them bidding even lower on properties than their usual strategy.

This paper is related to three different strands of research. The first is work in finance on asset fire sales, which has primarily focused on the markets for specialized financial assets or physical goods used as inputs by specialized firms. Allen and Gale (1994) theorized that investors must choose to specialize in a limited number of markets, as there is a fixed cost to an investor to enter a given market. Once you assume limited market participation you see greater sensitivity to small aggregate liquidity shocks that result in significant price volatility. Shleifer and Vishny (1992) also argued that markets dependent on auctions might not be efficient when the high-valuation bidders are financially impaired. In our case the high-valuation bidders are the in-market bidders with informational advantages. Shleifer and Vishny (2011) argued that fire sales can have real macroeconomic effects, and did so during the recent financial crisis. They also in this paper highlighted the role of debt contracts supported by collateral resulting in constraints on industry specialists. In their model specialists may actually drop out of the market due to the costs of market participation (Allen and Gale (1994)) or the role of slow-moving capital (Grossman and Miller (1988) and Duffie (2010)).

Several papers have extended this line of research with empirical tests of the implications. Coval and Stafford (2005) found that when mutual funds were forced to sell due to capital outflows, funds that purchased assets from them saw excess returns. Ramey and Shapiro (2001) used equipment level data from aerospace plants closed in the 1990s. They found that other aerospace buyers were more frequent buyers, assets sold at a substantial discount, and aerospace companies pay more than industry outsiders. This last finding maps to our hypothesis that out-of-market CRE investors will bid less for buildings that in-market investors as their less precise valuation estimates increases their risk of the "winner's curse". Mitchell, Pedersen, and Pulvino (2007) looks at the impact of specialized arbitrageurs, specifically convertible bond markets and mergers after the 1987 market crash. They find that when specialized arbitrageurs lose significant amounts of capital they transition from being suppliers of liquidity to being demanders of liquidity. Pulvino

(1998) finds evidence of "fire sales" in commercial aircraft transactions, with financially constrained airlines receiving lower prices than less constrained firms, unconstrained airlines increasing buying when liquidity is constrained, and constrained airlines are more likely to sell to industry outsiders.

The second thread of related literature is on the function of institutional investors in the commercial real estate markets. One closely related paper is Hochberg and Muhlhofer (2017) that explores market-timing in the sale and purchase of buildings among REITs. They found little evidence that market timing leads to excess profits, with the exception of non-NYSE REITS in the immediate aftermath of the financial crisis. This may be due to limits REITs have on market timing (MÃijhlhofer (2017), or it could reflect our hypothesis. We would argue that the observed excess return is not due to market timing in the classic sense, but due to unconstrained real estate investors taking advantage of reduced competition from local informed investors and entering distressed markets. Ling, Naranjo, and Scheick (2016) looks at differences in geographic portfolio allocations between public and private real estate investors. The authors highlight the costs associated for an investor to enter a market, similar to the arguements in Allen and Gale (1994). Ling, Naranjo, and Scheick (2016) compares the impact of investors choosing which geographical areas to invest in to the impact of individual property selection within geographical areas, finding that the second factor dominates the first. Ghent (2019) looks at the role of liquidity in the composition of investors in local real estate, with institutional investors preferring more liquid markets. Sagi (2015) documents how the presence of illiquidity can result in pronounced differences between short- and long-term holding strategies.

The final line of research that relates to this paper is on fire sales in the residential markets. Several papers have looked at the impact of fire sales on financial institutions impacted by the declines in collateral value. Bord, Ivashina, and Taliaferro (2015) finds that banks in markets with biggest drop in real estate prices contracted their credit to small business, relative to less affected banks. The authors also found that exposed banks were also more likely to leave such markets, while healthy banks were more likely to expand. Driscoll (2019) finds that home builders with large write-downs in one area sell homes in unaffected healthy areas at a discount. Much of the research in the residential markets is focused on the direct impact that foreclosures have on

residential prices (Campbell, Giglio, and Pathak (2011) and M. Brasington and F. Sarama (2008)) or the spill-over foreclosures have on the prices on local undistressed properties (Anenberg and Kung (2014) and Harding, Rosenblatt, and Yao (2009)). Our approach has an important distinction from this literature. While we do posit that some of the discount on a sale of property in a distressed market is due to the actual property in question being distressed, we also are focused on how the market level shock has changed the composition of the pool of investors bidding on the properties. Much of the residential literature is focused on the direct negative impact local foreclosures have on the values of surrounding properties, not the impact on the composition of potential buyers.

Our contribution to the literature is to extend the study of the impact of "fire sales" in the finance literature using transactions of CRE properties. We differ from much of the existing CRE literature as we are not focused on market timing or the equilibrium composition of investor types in the local market. We are instead interested in how a shock to the local market can temporarily disrupt the investor composition. We control for the direct impact of distressed and foreclosed properties, which has been documented in the residential real estate literature, but are focused on the impact the local market shock has on the competitive balance between in and out of market investors, contributing to fire sales to account for the discount coming from informational asymmetry

We discuss the primary data source, Real Capital Analytics (RCA) for our paper in the next section. We use this data to document how the share of the out-of-market buyers in a market has no relationship to local market real estate prices when times are good, but a very strong and negative relationship during the financial crisis. We show that this impact is persistent even when we control for the impact of distressed properties. We also show that out-of-market investors who have had a positive value shock to their portfolio are more likely to enter a given market, documenting the impact of having "dry powder". The out-of-market investors are purchasing properties at a discount, measures as approximately 20 basis points in terms of a capitalization rate or 5 percent in terms of price per share foot.

2 Data

The transaction data come from Real Capital Analytics (RCA). The RCA data is a property based transaction dataset, including commercial buildings with a minimum transaction value of 2.5 million dollars. We restrict our sample to include only purchase transactions between 2001.Q1 and 2018.Q2. Transaction volumes grew steadily in the 2000's, mirroring the strong fundamentals experienced throughout U.S. real estate markets (See figure 1). Starting in 2007, however, volumes fell sharply in the onset to the financial crisis and into the Great Recession. The decline in transactions was due to both worsening fundamentals, which reduced the demand for and value of commercial space, and the aggregate shock to credit markets that made it difficult to finance any kind of real estate transaction. The shock to real estate markets was widespread, but did vary in intensity across different marekts. This variation in the shock plays a key role in our empirical approach.

We use house prices as a proxy for local economic conditions. House prices and CRE prices share a common component that is the value of the underlying land. House prices, like CRE prices, capitalize future expectations about economic conditions. The benefit of using house prices instead of CRE prices is that there is much better cross-sectional coverage in the house price series. CRE price datasets typically offer price indexes on fewer than one hundred local markets defined at the Metropolitan Statistical Area (MSA). In the data used in this study we have house price data for more than 2,000 U.S. counties.

In figure 2 we report an index of average house prices in the counties represented in the RCA data, as well as average CRE price indexes for the industrial, multi-family, and office property sectors. The house price series are from CoreLogic. The CRE prices are from CBRE. All series are normalized to 100 in 2008.Q1. Though both house prices and CRE prices display the same basic patterns around the time of the economic downturn, some differences in timing are apparent. The decline in house prices came somewhat earlier than for CRE. This makes sense, seeing as the core weakness in real estate markets at the time was attributed to overheating in the housing market and not necessarily in CRE. The decline in CRE prices was more sudden, going from peak to trough in about two years, compared to roughly five years for our house price index. [1]

[1] We also find that the rank correlation between MSA-level house prices and MSA level CRE prices is quite high.

Buyers (and sellers) are identified in RCA by a unique firm identifier code, which is essentially a 1-1 mapping to the firm name. The database includes both purchases, refinances, and entity level transactions.[2] We limit the sample for our main empirical analysis to arm's length sales transactions, however we do include all other transactions in the RCA database when identifying in and out-of-market buyers. This allows us to include many more transactions, including refinancings, which accounts for about one-third of the sample. In figure 3 we show the frequency plot of the number of transactions per unique buyer. Note that by far the most common number of observed transactions is just a single transaction. The vast majority of the single-transaction buyers are limited partnerships. Note that figure 3 shows the distribution of total purchase transactions truncated at the 98th percentile. The distribution has a very long right tail. There are several institutional investors with more than one thousand observed purchases in our sample period.

We measure in-market and out-of-market buyer identities by whether we have observed recent transactions by the same buyer in the same market. Throughout the empirical analysis our definition of a market will be a county. A buyer is designated as an in-market buyer if it meets one or more of the following three criteria. First, a buyer is in-market if we can observe an earlier purchase transaction by the same buyer in the same market. Second, a buyer is in-market if we observe the same buyer refinancing a different property in the same market, but we observe *no record* of the original purchase of that same property. In this case we assume that the buyer made the original purchase prior to beginning of our sample and should be considered as an in-market participant for the entire sample period. Similarly, the third way a buyer can be labeled as in-market is if we observe a buyer who is also a seller of a different property in the same market, but we observe . no record of the original purchase of that same property. In this case we would designate the seller as an in-market participant whenever we observe that seller on the purchase side of a transaction in the market in question.

Throughout our empirical work it will be more convenient to work with an out-of-market transaction variable, which is the mirror opposite of the in-market variable just described. Though our in- and out-of-market measures will make use of all transaction types in the data: entity-level

[2] An entity level transaction is when an entire firm's portfolio of properties is transfered to a new owner who has purchased or mergered with the original firm.

portfolio transactions, refinancings, and sales, all our empirical work will focus on the arm's length sales. This will result in our dropping about one-third of the sample observations (see table 1). In figure 4 we plot two versions of the average out-of-market share across all markets and over time. The purchase only measure (blue solid line in figure 4) plots the out-of-market share when we restrict our designation to criterion one: the buyer is labeled as out-of-market if there is no previous purchase activity in the market. The measure that incorporates the full set of criteria, including refinancing activity and sales activity in the same market, is plotted in dashed red in figure 4. Clearly these added filters are helping us build a better picture of in- and out-of-market status early in the sample. The simple measure based on only purchases significantly overstates the actual market presence of the market participants, particularly in the early part of the sample.[3] The other key feature to note about figure 4 is the pronounced increase in the out-of-market share just prior to the financial crisis that persisted well into the recession period. This period of high out-of-market activity will correspond to what we will designate as the period of real estate firesale activity.

3 Empirical Results

Our analysis of firesales relates the probability of a purchase by an out-of-market participant to proxies for recent changes in market values. Before turning to the regression results, it is helpful to view graphically the relationship between out-of-market status and two-year changes in market-level house prices. Figures 5 and 6 show the cross-sectional dimension of this relationship. We know from figure 4 that out-of-market shares were relatively low during the boom years prior to the financial crisis. In figure 5 we see that during this boom period, out-of-market shares were particularly low in markets that had relatively more past price appreciation. We see the same basic relationship emerging in the bust years, although the sensitivity of out-of-market share appears to be slightly stronger (more negative) during these years. Thus, in the aggregate, we see that high out-of-market shares correspond with bad economic times. But in the cross-section, we always see a negative

[3]The RCA data collection starts in 2001. We do not observe the holdings of properties purchased prior to 2001. This inflates our simple measure early in the sample. The expanded definition helps address this bias.

relationship between out-of-market activity and our proxy for market fundamentals. Combining these two facts, we develop a picture of transaction flow where, in good times, the incumbent market participants are relatively more active. Good times imply robust property valuations and net worth for property owners. This position of relative strength, combined with their familiarity with the market, leads to high shares of the transaction flow going to in-market participants. On the flip side, in poor economic times the in-market participants will not have strong balance sheets and will not be able to take advantage of their informational advantages. This provides an opening to out-of-market buyers.

The regression analysis seeks to document these basic insights more precisely. The basic summary statistics for our estimation sample are in table 2. Over our estimation sample almost 30 percent of the purchase transactions are by out-of-market participants. This mean is slightly lower than what we reported in figure 4 and is due to observations that are lost to the requirement that we have a full set of non-missing control variables.[4] There is a large amount of variation in market conditions, as proxied by the two-year house price change. The mean house price change in our sample is about 10%, with a standard deviation of about 13%. We also include a "firesale" market indicator, which corresponds to a transaction occurring in the bottom quartile of the house price change distribution. About 25% of the transactions are accounted for by institutional investors.[5]

We also enclose summary statistics for the pricing measures in the data base. We do not actually use the raw transaction price in the regressions, but include the statistics for completeness. The sample draws from a very broad slice of property market, ranging from a minimum transaction price of $2.5 million (the RCA cutoff) to $5.4 billion at the upper end. We do make use of relative valuation measures, such as the cap rate and the log price per square foot. Note, however, that the coverage for these valuation measures is more spotty, particularly for the cap rate.

The basic regression that we run is a linear probability model at the transaction level:

[4]The primary constraint here is the requirement that the property is a county with a full time-series of CoreLogic house price index.

[5]The institutional investor designation is assigned by RCA. The institutional investor label does not guarantee a large number of observed transactions in our regression sample. The mean number of institutional purchases in our sample is 28, with a standard deviation of 165.

$$y_{ijt} = \beta \Delta HP_{jt} + \Gamma X_{ijt} + c_j + prop_j + d_t + \epsilon_{it}. \tag{3.1}$$

The indicator variable y_{ijt} is equal to 1 if the transaction of buyer i in market j and time t is out-of-market, as defined above. The main coefficient of interest is β, the sensitivity of the out-of-market indicator to the last two years of house price appreciation. The specifications also include control variables, X, and various configurations of fixed effects, including county j (c_j), and property ($prop_j$), and time (d_t). The specifications are estimated using the high-dimensional fixed-effects package of Correia (2016). Standard errors are clustered at the county level.

The base estimation results are in table 3. The coefficient on local house price appreciation (β) is significant and negative in all our specifications; the probability of an out-of-market is negatively related to the proxy for market conditions. The coefficient on the distressed property control variable is consistently positive, indicating that the out-of-market buyers appear be attracted to properties where owners have a strong incentive to sell.

In table 4 we show that this basic result is robust to different sub-samples of the data where we are increasingly selective in terms of discarding transactions by buyers with too few transactions. Indeed, the coefficient on the local house price appreciation is quite stable across the different classes of property buyers. Likewise, we see a consistent preference of the out-of-market investors for the distressed properties.

In tables 5 and 6 we show the results of the pricing regressions. We discussed previously how out-of-market buyers lack the same informational advantages as in-market buyers, thus making them more wary about overpaying for a property and suffering from the "winner's curse". This suggests that out-of-market buyers may only compete for properties when the risk of the "winner's curse" is mitigated in some way. If the differences in the informational advantages are significant, that would imply that out-of-town buyers are low bidders, resulting in their successful purchases are a lower price. It is only the in-market buyers with their informational advantages that are willing to bid higher on properties, perhaps reflecting higher private valuations. We also want to see if the price differential for out-of-market buyers is at all sensitive to our measures of local market conditions. We found previously that the market-share of out-of-market buyers increases when

local markets are distressed, but do the out-of-market buyers pay more or less in these markets than they would usually? The specifications take the following form:

$$p_{ijt} = \alpha B_{it} + \beta \Delta HP_{jt} + \theta B_{it} \times \Delta HP_{jt} + \xi B_{jt} \times FireSale_{jt} + \Gamma X_{ijt} + c_j + prop_j + d_t + \eta_{it}. \quad (3.2)$$

Here, p_{ijt} is the price measure, B is an indicator variable equal to one if out-of-market buyer, and ΔHP is the usual trailing two-year house price appreciation measure used in the earlier regressions. In some specifications we will also include interaction terms of the out-of-market buyer with the past appreciation variable ($B \times \Delta HP$) or with a firesale market indicator ($B \times FireSale$) equal to one if the transaction is occurring in a market with house price appreciation in the bottom quartile.

The results in tables 5 and 6 show a consistent and differential effect on prices associated with out-of-market buyers. Cap rates (table 5) are 13-14 basis point higher (i.e., prices are lower) for out-of-market buyers compared to buyers with a recent transaction history. We see similar results in table 6 for log price per square foot. These results are consistent with our informational advantage story, with out-of-market buyers being hesitate to bid high as they are away of the informational advantage of the in-market buyers. Interestingly, what we don't see is a strong effect coming from the interaction terms. Prices overall are lower in markets with low price appreciation, which makes sense. All buyers in a local market downturn are taking advantage of the recent decline in prices. What we do not see is lower prices for out-of-market buyers when local prices are falling. This is consistent with the out-of-market buyers not significantly changing their bidding strategy in these markets, i.e. they still bid low reflecting out of concern that in their ignorance of local market fundamentals they will overpay. What is happening is that they are winning more of the auctions for new properties and increasing their market share of transactions.

4 Conclusion

We provide evidence in this paper on the effect of firesales in commercial real estate. This is not the commonly studied spillover or contagion effect of distressed real estate, though we do control

for this effect in our analysis. In this paper we are using firesales in the sense of what happens in a market for specialized financial assets or physical goods used as inputs by specialized firms when those specialized firms encounter distress. We define the in-market investors as specialized firms in this paper, with the out-of-market investors having less market specific knowledge.

Commercial real estate, unlike financial assets, are ultimately tied to a specific real world structure in a specific local market. Information about both the structure itself and the nature of the local market can provide a valuable edge to a potential buyer of that property. A in-market buyer can with that informational advantage be more confident when bidding high on a specific property. Even if the out-of-market bidder has the same private valuation of that building, their confidence around that valuation is not as high as the in-market buyer. While both buyers run the risk of overpaying for the property, and suffering the "winner's curse", the differences in information will lead to different bidding strategies. In this case, with the same internal valuation, the out-of-market investor would offer a lower bid than the in-market investor, due to the differences in informational advantage.

We see evidence consistent with this hypothesis, with out-of-market investors consistently paying less for buildings than in-market buyers. This is true when markets have seen recent appreciation in prices and when markets have seen recent declines. What we do see is a difference in the composition of investors when markets are in decline. Sharp decline in local market values can put financial pressure on in-market investors. The value of their collateral has falls, reducing their ability to tap debt markets to fund future acquisitions. Overall transaction activity falls in markets with recent price declines, and the share of the out-of-market investors increases significantly. The out-of-markets investors are continuing to offer lower bids on properties, but with fewer in-market investors to compete with they are offering more winning bids. Distressed properties and properties in distressed markets both trade a lower prices, but out-of-market investors do not pay lower prices in declining markets than they would in thriving markets. They instead increase market share in the distressed markets.

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Figure 1

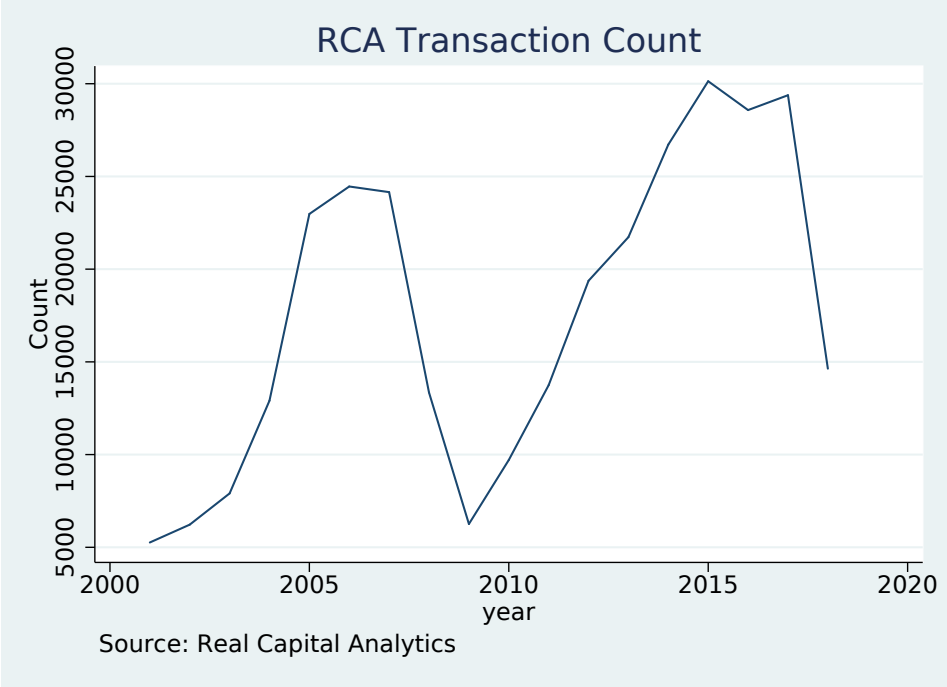
RCA Transaction Count
Count
5000
10000
15000
20000
25000
30000
2000
2005
2010
2015
2020
year
Source: Real Capital Analytics

Figure 2

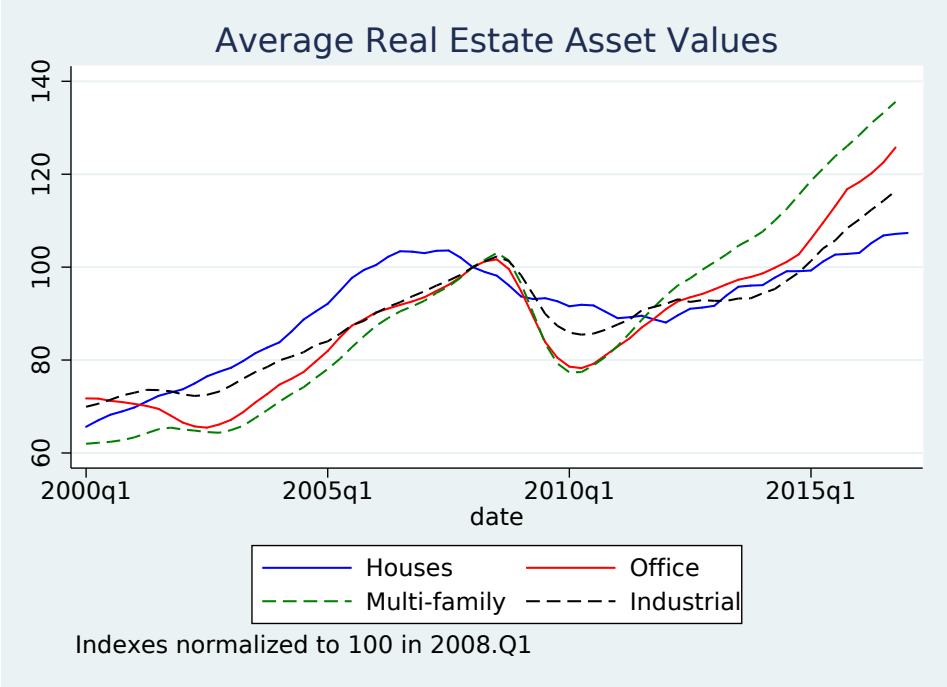
Average Real Estate Asset Values
60
80
100
120
140
2000q1
2005q1
2010q1
2015q1
date
Houses
Office
Multi-family
Industrial
Indexes normalized to 100 in 2008.Q1

Figure 3

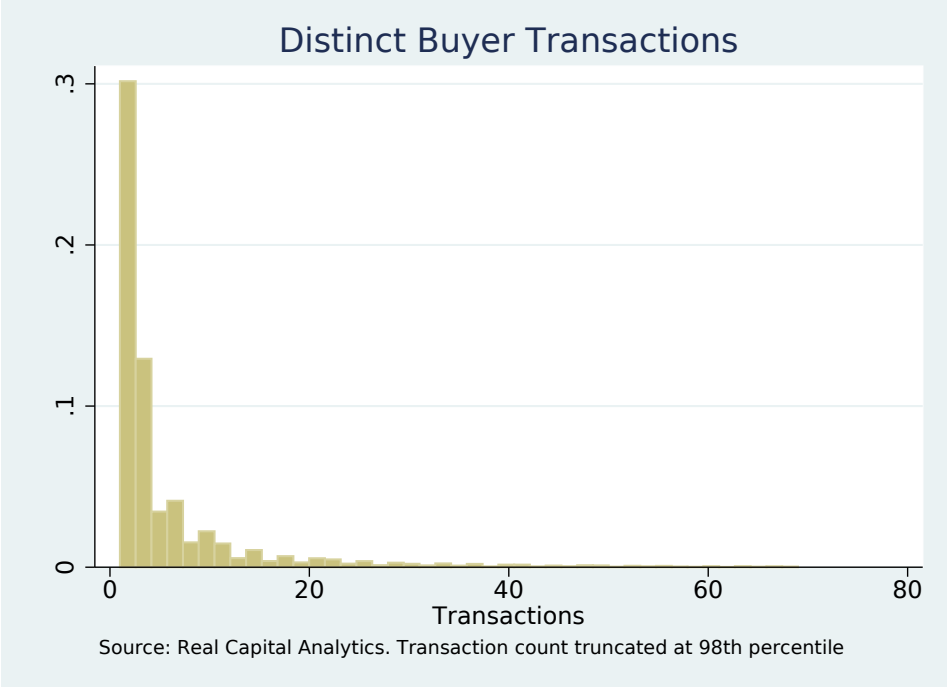
Distinct Buyer Transactions
0
.1
.2
.3
0
20
40
60
80
Transactions
Source: Real Capital Analytics. Transaction count truncated at 98th percentile

Figure 4

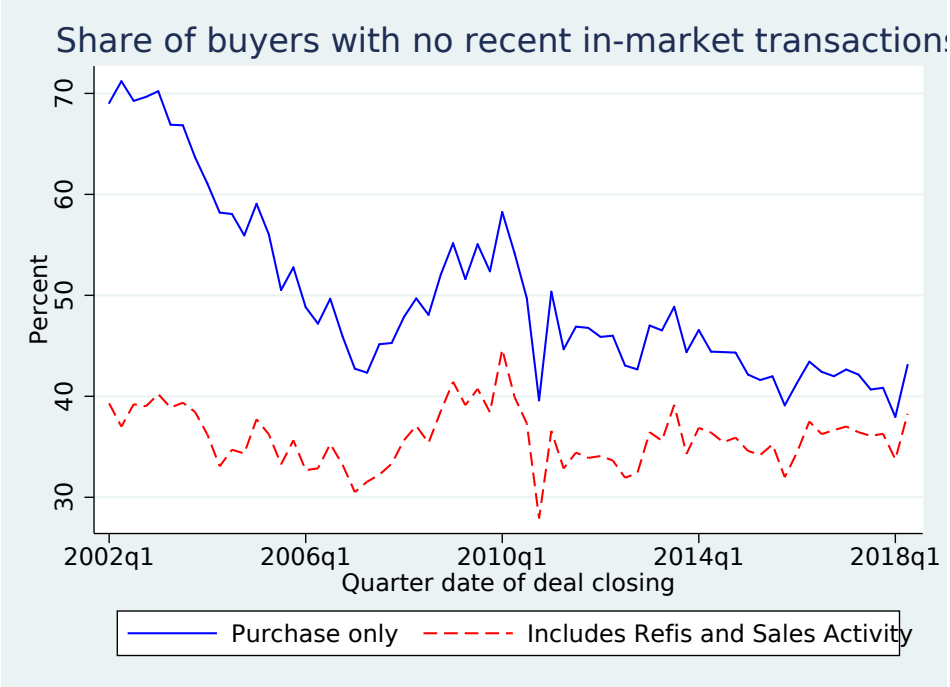
Share of buyers with no recent in-market transactions
Percent
70
60
50
40
30
2002q1
2006q1
2010q1
2014q1
2018q1
Quarter date of deal closing
Purchase only
Includes Refis and Sales Activity

Figure 5

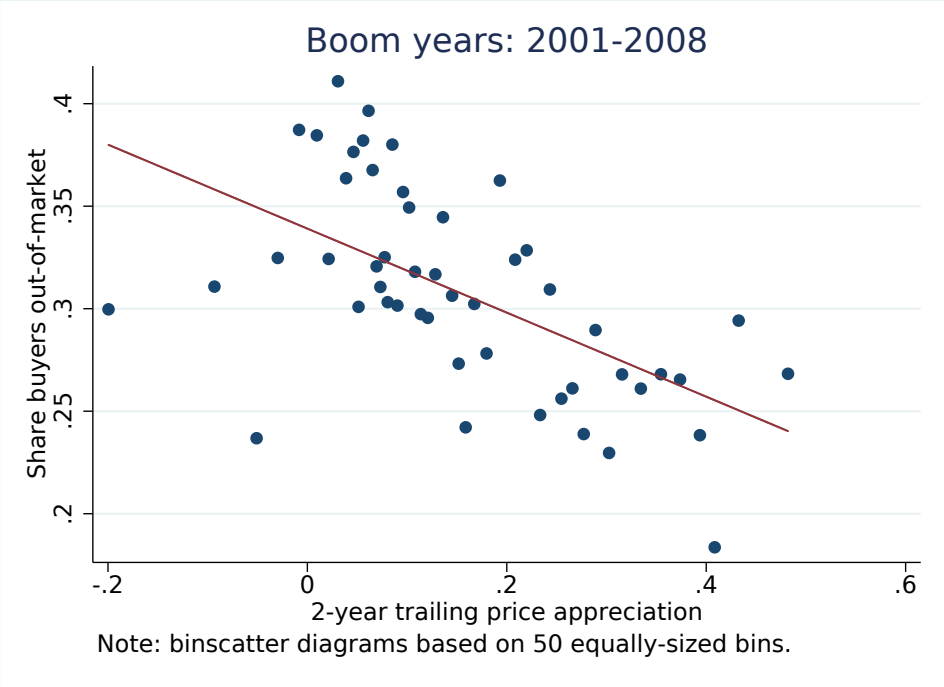
Boom years: 2001-2008
Share buyers out-of-market
.2
.25
.3
.35
.4
-.2
0
.2
.4
.6
2-year trailing price appreciation
Note: binscatter diagrams based on 50 equally-sized bins.

Figure 6

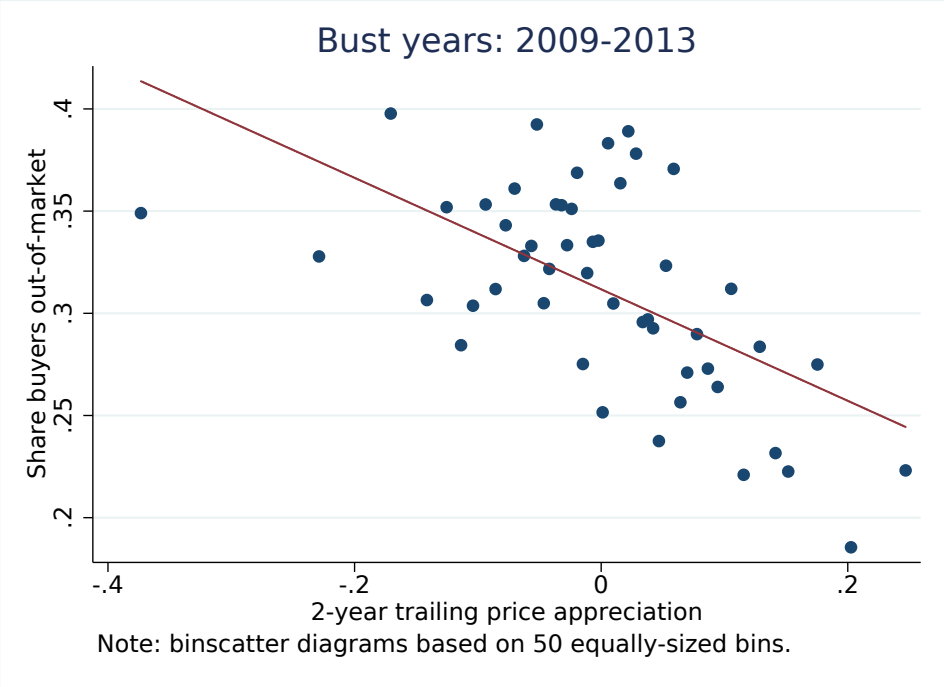
Bust years: 2009-2013
Share buyers out-of-market
.2
.25
.3
.35
.4
-.4
-.2
0
.2
2-year trailing price appreciation
Note: binscatter diagrams based on 50 equally-sized bins.

Table 1: Transaction Types

Entity-level (non arm's length)	3.1%
Refinance	30.7%
Sales	66.2%

This table shows distribution of transaction types in the RCA database that is matched to local markets with house and CRE price indexes. All transaction types are used to construct in and out-of-market buyer identifiers. Only sales transactions are used in the empirical analysis.

Table 2: Summary statistics

	Obs	Mean	Std. Dev	Min	Max
Distressed transaction	132,387	0.007			
Estimated change in buyer wealth	132,387	0.120	0.104	-.684	0.557
House price appreciation (2-yr)	132,387	0.102	0.130	-0.700	0.557
Fire sale market (bottom quartile HPA)	132,387	0.238			
Institutional investor	132,387	0.258			
Out-of-market buyer	132,387	0.287			
Multi-family	132,387	0.325			
Development Site	132,387	0.060			
Hotel	132,387	0.058			
Industrial	132,387	0.176			
Office	132,387	0.208			
Retail	132,387	0.170			
Transaction price ($000s)	132,387	23,942	64,281	2,500	5,400,000
Cap rate (%)	30,503	6.730	.1676	1.0	13.5
Log price sq. ft.	108,776	4.299	1.695	0.736	9.032

This table shows the summary statistics for the variables used in main regression tables. The sample ranges from 2001.Q1 to 20018.Q2. Transactions include sales transactions only. Note that change in buyer wealth can be calculated only for buyers with multiple transactions.

Table 3: Likelihood of out-of-market purchaser

	Buyer out-of-market						
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Local appreciation	-0.583***	-0.056**	-0.045**	-0.057**	-0.057**	-0.040**	-0.063**
	(0.095)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Distressed property				0.032**	0.032**	0.033**	0.032**
				(0.013)	(0.013)	(0.013)	(0.013)
Buyer property value change						-0.098***	
						(0.025)	
Buyer wealth change top quartile							0.010
							(0.017)
Observations	132,630	132,498	132,498	132,498	132,498	132,498	132,498
R-squared	0.01	0.19	0.20	0.19	0.19	0.19	0.19
Year FE	yes	yes	yes	yes	yes	yes	yes
County FE	no	yes	yes	yes	yes	yes	yes
Property type FE	no	no	yes	no	no	no	no

This table shows results of linear probability models of the event that a property transaction involves a buyer with no recent (out-of-market) history in the market. Columns indicate the inclusion (no/yes) of specific fixed effects (FE). Standard errors in parentheses are clustered at the county level. *** p<0.01, ** p<0.05, * p<.1.

Table 4: Likelihood of out-of-market purchaser: repeat buyers

	Buyer out-of-market: by transaction counts			
	All buyers b/se	>10 transactions b/se	>50 transactions b/se	Institutional b/se
Local appreciation	-0.060**	-0.075***	-0.085***	-0.065**
	(0.020)	(0.017)	(0.018)	(0.024)
Distressed property	0.027**	0.030**	0.034**	0.049*
	(0.014)	(0.013)	(0.016)	(0.026)
Observations	132,433	166,049	119,156	50,307
R-squared	0.19	0.20	0.22	0.21
Year FE	yes	yes	yes	yes
County FE	yes	yes	yes	yes

This table shows results of linear probability models of the event that a property transaction involves a buyer with no recent (in-market) history in the market. Each column represents regression output from restricted subsamples based on number buyers exceeding a minimum number of transactions. Column (iv) restricts the sample to include only buyers flagged by RCA as institutional investors. Columns indicate the inclusion (no/yes) of specific fixed effects (FE). Standard errors in parentheses are clustered at the county level. *** p<0.01, ** p<0.05, * p<.1.

Table 5: Capitalization rate regressions

	Transaction cap rate					
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	b/se	b/se	b/se	b/se	b/se	b/se
Out-of-market buyer	0.148***	0.137***	0.135***	0.137***	0.135***	0.143***
	(0.021)	(0.022)	(0.031)	(0.022)	(0.031)	(0.024)
Local appreciation		-0.476**	-0.481**	-0.476**	-0.481**	
		(0.206)	(0.243)	(0.206)	(0.243)	
Out-of-market × Appreciation			0.015		0.015	
			(0.190)		(0.190)	
Distressed property				0.010	0.011	0.010
				(0.071)	(0.072)	(0.071)
Fire Sale market						0.002
						(0.038)
Out-of-Market × Fire Sale						0.027
						(0.043)
Observations	36,201	32,953	32,953	32,953	32,953	36,201
R-squared	0.36	0.35	0.35	0.35	0.35	0.36
Year FE	yes	yes	yes	yes	yes	yes
County FE	no	yes	yes	yes	yes	yes
Property type FE	no	no	yes	no	no	no

This table shows results of regressions of cap rates on the out-of-market buyer indicator, and other controls. Columns indicate the inclusion (no/yes) of specific fixed effects (FE). Standard errors in parentheses are clustered at the county level. *** p<0.01, ** p<0.05, * p<.1.

Table 6: Price per square foot regressions

	Log price per square foot					
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	b/se	b/se	b/se	b/se	b/se	b/se
Out-of-market buyer	-0.044**	-0.039**	-0.023	-0.039**	-0.023	-0.012
	(0.017)	(0.017)	(0.023)	(0.017)	(0.023)	(0.021)
Local appreciation		0.273**	0.318**	0.274**	0.318**	
		(0.111)	(0.123)	(0.111)	(0.124)	
Out-of-market × Appreciation			-0.138		-0.138	
			(0.103)		(0.103)	
Distressed property				-0.083	-0.083	-0.021
				(0.062)	(0.062)	(0.066)
Fire Sale market						0.033
						(0.035)
Out-of-Market × Fire Sale						0.045
						(0.035)
Observations	28,134	25,245	25,245	25,245	25,245	28,134
R-squared	0.60	0.60	0.60	0.60	0.60	0.53
Year FE	yes	yes	yes	yes	yes	yes
County FE	yes	yes	yes	yes	yes	yes

This table shows results of regressions of price per square foot on the out-of-market buyer indicator, and other controls. Columns indicate the inclusion (no/yes) of specific fixed effects (FE). Standard errors in parentheses are clustered at the county level. *** p<0.01, ** p<0.05, * p<.1.