How Bank Liquidity and Capital Affect Asset Sales?

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Abstract

I examine how bank liquidity and capital affect banks' behavior in asset sales using data on sales of bank owned real estate. I find that: (1) banks with lower liquidity levels post lower asking prices and receive lower sale prices; (2) banks with lower capital levels post higher asking prices, which then lead to longer time on the market. Further analyses show that the results are unlikely to be driven by omitted variables related to local conditions, property characteristics, or bank characteristics.

Keywords: REO; Fire sale; Liquidity; Regulatory capital requirements

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1 Introduction

This paper studies how bank liquidity and capital affect banks' behavior in asset sales. The asset fire sale theory, as developed by Shleifer and Vishny (1992), argues that firms in financial distress are forced to sell industry specific assets at fire sale prices when the entire industry is in distress. Whereas the theory of fire sale is well received, the empirical literature has produced mixed and inconclusive results. For example, Brown, James, and Mooradian (1994) find that firms experience negative stock return reactions when they liquidate assets to pay off debt, which is consistent with the fire sale theory. Conversely, Lang, Poulsen, and Stulz (1995) find that firms experience positive stock return reactions when they use the proceeds from asset sales to pay down debt.

One reason for these conflicting results is the inability to accurately measure fundamental values of assets. With very few exceptions (Pulvino, 1998, for example), previous studies have relied on stock price reactions following asset sales to infer fire sales. As argued by Lang, Poulsen, and Stulz (1995), it is difficult for studies relying on stock market reactions to disentangle fire sale effects from signaling effects, i.e., asset sales convey information about the firm, which moves the stock price of the firm. Lang, Poulsen, and Stulz (1995) conclude that large samples of less significant asset sales may help resolve these issues.

Using data from real estate transactions, this paper achieves exactly this objective. There are several advantages of using real estate transactions, especially REO transactions, to test the fire sale theory. First, prices of individual REO transactions are available, which makes it easier to directly test the fire sale theory without having to rely on stock price reactions. Second, there are a large number of REO sales and even larger numbers of sales comparables, which makes it possible to accurately estimate the fundamental values of the REO properties. Third, in addition to information on sale prices, information on asking prices and time on the market is also available for REO sales, which makes it possible to test the implications of the fire sale theory on the timing and selling strategies of REO sales. Finally, REO properties are non-core assets of banks and do not affect banks' daily operation, which makes such properties "less significant assets" Lang, Poulsen, and Stulz (1995) called for.

The sample period examined in this paper features both a sharp decline of asset prices and a sharp decline in the availability of commercial mortgage debt, which provides both a large number of observations and an ideal environment to test the fire sale theory. Similar to the housing market, the commercial and multifamily real estate market experienced substantial decline during the financial crisis. Property prices for all property types dropped over 25% from the peak in 2008 to the trough in 2010. Consequently, the foreclosure rate of commercial mortgages increased dramatically from less than 2% in 2007 to more than 8% in 2010 (U.S. Census). Many of these foreclosed commercial properties ended up as REOs in the portfolios of commercial banks.

REOs are properties purchased by banks or foreclosed properties that do not receive bids or are bid at very low prices. REO properties are recorded on banks' balance sheets as Other Real Estate Owned. Regulation (12 USC 29) permits banks to hold REO properties for no longer than five years. The Depository Institutions Deregulation and Monetary Control Act of 1980 amended 12 USC 29 to permit a bank to hold Other Real Estate Owned for an additional five-year period beyond the original five-year term, with the approval of the Comptroller. Generally, bank regulation requires that banks dispose of REO properties expeditiously but in accordance with prudent business judgment.

According to FAS 15 and FAS 144, REO properties are recorded on the balance sheet as the lower of (1) the fair value of the asset less cost to sell the asset or (2) the cost of the asset. According to regulation, the fair value of REO properties should be the transaction price of a fair sale, which means that the buyer and the seller are each acting prudently, knowledgeably, and under no necessity to buy or sell, i.e., other than a forced or liquidation sale. In the context of REO sales, banks are forced to sell REO properties, and therefore REO sale prices are likely to be below their fair values. Furthermore, sale prices are further depressed by the limited availability of commercial mortgage credit. According to data compiled by the Mortgage Bankers Association, commercial mortgage origination decreased more than 80% from 2007 to 2009 and more than two trillion dollars of commercial mortgages must be refinanced from 2010 to 2014.

In addition to testing the fire sale theory, I also examine the effects of regulatory capital requirements on asset sales in financial distress. The major concern of industrial firms in financial

distress is to raise liquidity to pay down debt and to avoid bankruptcy. Regulated banks, however, must also comply with regulations that delimit minimum capital requirements in addition to facing the same liquidity problems as industrial firms. Selling illiquid and risky assets can have two different, and often opposite effects on a bank's risk-based capital ratio, which is defined as the ratio of bank capital to total risk-weighted assets. On one hand, exchanging risky assets for cash decreases the total amount of risk-weighted assets, the denominator of the risk-based capital ratio. On the other hand, selling these assets will either increase or decrease capital depending on whether the assets have unrealized gains or losses. In the case of REOs, both theoretical predictions (Milbradt, 2012) and empirical evidence (Fitzpatrick and Whitaker, 2012) suggest that most REO properties are substantially over-valued on banks' balance sheets and carry large unrealized losses. Given the magnitude of the unrealized losses, selling REOs is likely to decrease most banks' risk-based capital ratios.[1] Therefore, it is expected that banks with low capital will engage in gains trading or cherry picking (e.g., Laux and Leuz, 2009, Boyson, Helwege, and Jindra, 2010, and Ellul, Jotikasthira, Lundblad, and Wang, 2012), i.e., banks in financial distress are unwilling to sell over-valued assets and will choose to sell assets with unrealized gains instead. However, banks are under constant regulatory pressure to sell REO properties, which makes it nearly impossible for banks not to sell such assets. As a result, low capital banks either delay selling REO properties or sell them only when their capital ratios improve.

The discussion above suggests that liquidity and capital levels may have different effects on asset sales by commercial banks, whereas liquidity and leverage often have similar effects on asset sales for industrial firms (Pulvino, 1998). To test the different effects, I use the CoStar commercial real estate transaction data and estimate the effects of bank liquidity and bank capital on asking prices, sale prices, and time on the market of REO sales by banks.

I use a two-step matching procedure for estimation. In the first step, I estimate hedonic regressions on REO properties and properties matched by location, property type, time of sale, and size. In the second step, I regress the difference between the residuals on the REO properties

[1]Selling REOs results in decreased capital ratios only when the unrealized losses are large enough. If the unrealized losses are small, selling REOs can in fact increase capital ratios because it decreases risk-weighted assets by converting risky assets to risk-free cash.

and average residuals of their matched properties on bank liquidity, bank capital, and other bank characteristics. The two-step procedure allows accurate estimation of fundamental values of REO properties. Furthermore, because the properties are matched by location, this procedure can mitigate the potential bias caused by correlations between local bank conditions and the local real estate market.

The results from the two-step matching procedure show that the effect of liquidity is consistent with the fire sale theory, in which low liquidity banks post lower asking prices and receive lower sale prices when they sell REO properties. I also find evidence consistent with the implications of risk-based capital regulation, in which low capital banks post higher asking price, which causes the properties to remain on the market longer.

The identification of the two-step matching procedure can be weakened by omitted variables that are correlated with bank liquidity or capital. To address the identification challenges, I explicitly consider three different sets of omitted variables. The first set of omitted variables are related to local economic conditions, which can lead to the the mechanical correlation between local bank conditions and the local real estate market, which I call the local correlation effect. The correlation may come either from the local bank's exposure to the local real estate market or from common local factors that simultaneously affect the local bank and the local real estate market. The two-step procedure is able to partially mitigate the local correlation effect. If local bank conditions are equally correlated with REO properties and their matching properties, the two-step matching procedure, using differences of the residuals from the first-step hedonic regression as the dependent variable in the second-step regression, can eliminate that correlation. To further show that the local correlation effect does not drive the results, I focus on two sub-samples, on which the effects of local correlation are expected to be weak. The first sub-sample is composed of REO sales by national banks, i.e., banks regulated by Office of the Comptroller of the Currency (OCC), and the second sub-sample is composed of REO sales for which the selling bank and the property are in different metropolitan areas. I find that the results hold on these two sub-samples, which suggests that the local correlation effect is unlikely to drive the results. I also show, in a falsification test, that bank capital and liquidity have no effect on non-REO sales of properties

in the same city, which also suggests that the local correlation alone is not sufficient to drive the effects of bank liquidity and capital on REO sales.

The second set of omitted variables are unobserved property characteristics that are potentially correlated with bank liquidity or capital. Banks may choose to sell REO properties with certain unobserved characteristics, which then cause the effects on asking prices, sale prices and time on the market. I use a two-step repeated sales regression method to address this issue. In the first step, I run hedonic regressions on the REO properties and their previous transactions. In the second step, I regress the residual differences between the REO transactions and their previous transactions on bank liquidity, bank capital, and other bank controls. Using residual differences from repeated sales mitigate the biases caused by time invariant unobserved property characteristics. I find that the results hold with the two-step repeated sales regression.

The third set of omitted variables are unobserved bank characteristics such as managerial ability. Higher managerial ability may lead to both better bank conditions and better outcomes of REO sales. To address this issue, I include bank fixed effects in the regressions and the results still hold. Furthermore, I run bank fixed effects regressions excluding banks who experienced management turnovers during the sample period to reduce the biases caused by time variant managerial ability, and the results still hold.

This paper makes several contributions to the literature. First, it provides a clean and direct test of the fire sale theory based on a large sample of REO sales with observable prices. Second, it contributes to the debate regarding asset fire sales by financial institutions during financial crises. Whereas many recent papers argue that financial institutions have engaged in asset fire sales and created the downward spiral of asset prices during financial crises (e.g., Allen and Gale, 2000, Allen and Carletti, 2008, and Diamond and Rajan, 2011), others argue that financial institutions do not engage in asset fire sales and instead choose to sell assets with unrealized gains to improve their capital positions (for example Boyson, Helwege, and Jindra, 2010 and Ellul, Jotikasthira, Lundblad, and Wang, 2012). Whereas most of the foregoing papers have focused on financial asset sales, this paper focuses on REO sales to provide a fresh perspective on asset fire sales by financial institutions. Third, studying REO sales is important in itself because of the large number

of residential mortgage foreclosures during the recent financial crisis and the potentially large number of commercial mortgage foreclosures forthcoming in the next several years. Whereas the recent literature has focused on causes and consequences of mortgage foreclosures (e.g., Demyanyk and Van Hemert, 2011, Keys, Mukherjee, Seru, and Vig, 2009, 2010, Piskorski, Seru, and Vig, 2010, Campbell, Giglio, and Pathak, 2011), this paper looks instead at bank behavior during the foreclosure process, which leads to a better understanding of the mechanism and the potential economic impact of mortgage foreclosures.

The rest of the paper is organized as follows. Section 2 reviews related literature and develops the hypotheses to be tested in the paper. Section 3 describes the economic environment and the data. Section 4 reports the empirical results, and Section 5 concludes.

2 Literature Review and Conceptual Framework

2.1 Asset Fire Sales

Shleifer and Vishny (1992) developed the theoretical foundation of asset fire sales. The empirical literature has tested the implications of the Shleifer and Vishny model using data on asset sales from both inside and outside the United States. Pulvino (1998) examines aircraft sales by airlines and finds that transaction prices are lower when the selling companies are financially constrained. Brown (2000) shows that financially distressed mortgage REITs (real estate investment trusts) experience significant negative stock returns when they dispose of foreclosed real estate. Acharya, Bharath, and Srinivasan (2007) find that creditor recovery rates are significantly lower when the industry of defaulted firms is in distress. Officer (2007) finds that liquidity constrained sellers often sell unlisted targets at deeper discounts when debt capital is relatively more expensive to obtain. Eckbo and Thorburn (2008) find that automatic bankruptcy auction leads to fire sales only for piecemeal liquidation but not for going-concern auctions.

Parallel to the literature on real asset sales by non-financial firms is the literature that focuses on financial asset sales by financial institutions. Bolton, Santos, and Scheinkman (2011) argue from a theoretical perspective that banks may meet liquidity demand either through inside liquidity (cash

reserve) or outside liquidity (asset sales), and suggest a substitution effect between cash reserve and asset fire sales. Diamond and Rajan (2011) argue that banks are forced to sell assets when they are hit by liquidity shocks, which leads to asset fire sales, particularly when coupled with the limited resources that potential buyers have. Coval and Stafford (2007) conduct an empirical study of fire sales of stocks induced by mutual fund redemptions. Ellul, Jotikasthira, and Lundblad (2011) examine corporate bond sales by insurance companies following bond downgrades and find that insurance companies that are more constrained by regulation are more likely to sell downgraded bonds at discounted prices. In contrast, Boyson, Helwege, and Jindra (2010) find little or no evidence of asset fire sales by commercial banks, investment banks, and hedge funds. In this paper, I study real asset sales by commercial banks.

To fix the idea, consider a bank hit by a liquidity shock. Bolton, Santos, and Scheinkman (2011) argue that the bank can meet the liquidity demand either by inside liquidity, i.e., cash reserve, or by outside liquidity, i.e., asset sales. If the bank has limited cash reserve, the bank has to rely on asset sales. Whereas there are many assets the bank can sell, REO properties are probably on top of the list for several reasons. First, regulation requires the bank to sell REO properties within five years after acquisition. Second, REO properties are not core assets of the bank and selling them will not affect its operation. Furthermore, the bank with a low level of liquidity often has insufficient liquid assets to resort to, and the markets for other illiquid assets (such as industrial loans and mortgage-backed securities) either do not even exist or suffer from substantial information costs (Boyson, Helwege, and Jindra, 2010 and Ellul, Jotikasthira, Lundblad, and Wang, 2012). The bank, therefore, finally resorts to REO properties for liquidity.

During a financial crisis, potential buyers of REO properties often have limited resources because of the dramatic decrease of commercial mortgage lending, which gives rise to the deviation of sale prices from the fundamental values of the REO properties, i.e., asset fire sales, according to Shleifer and Vishny (1992). The discussion above suggests that low liquidity levels in banks lead to fire sales of REO properties.

In addition to sale prices, I also test the implications of fire sales on asking prices and time on the market of REO properties. Whereas the existing literature often does not explicitly model

asking price and time on the market, the fire sale theory and the nature of the liquidity shock would suggest that it is important for a low liquidity bank to restore liquidity quickly to meet its liquidity demand. Therefore, it is expected that banks with low levels of liquidity would post lower asking prices for REO properties and the REO properties would thus experience shorter time on the market.

According to the above conceptual framework, I develop the following hypotheses:

Hypothesis-F 1. *Banks with low liquidity levels will post lower asking prices for REO properties.*

Hypothesis-F 2. *Banks with low liquidity levels will sell REO properties at lower prices.*

Hypothesis-F 3. *Banks with low liquidity levels will sell REO properties with shorter time on the market.*

Furthermore, the conceptual framework suggests that the link between liquidity and fire sale exists only when the bank's cash reserve (or insider liquidity, as in Bolton, Santos, and Scheinkman, 2011) is insufficient to meet its liquidity demand. Therefore, I develop the following hypothesis, which will be referred to as the nonlinearity of the effect of liquidity.

Hypothesis-F 4. *The effects of bank liquidity on REO sales are stronger when bank liquidity is low.*

Banks often have multiple methods for increasing liquidity, such as issuing equity, issuing debt or increasing deposits. During financial crises, deposits are arguably cheaper than most other methods of restoring liquidity. If banks have easy access to deposits, they do not have to sell REO properties at deeper discounts. Following the arguments of Ashcraft, Bech, and Frame (2010), Acharya, Shin, and Yorulmazer (2011), and Boyson, Helwege, and Jindra (2010), among others, banks financed with short term borrowing are more vulnerable to liquidity shocks and banks with broader existing depositor bases have lower costs of taking more deposits. This suggests that the effects of bank liquidity on REO sales will be reduced if the bank has higher levels of existing deposits, which leads to the following hypothesis:

Hypothesis-F 5. *The effects of bank liquidity on REO sales are weaker if the bank has higher levels of deposits.*

2.2 Regulatory Capital Requirements

The recent literature has suggested the importance of regulatory capital requirements on bank behavior during financial crises. A large number of studies examine how banks use loan loss allowance and charge-offs to manage bank capital (for example, Scholes, Wilson, and Wolfson, 1990, Collins, Shackelford, and Wahlen, 1995, Beaver and Engel, 1996, and Ahmed, Takeda, and Thomas, 1999), which suggests that banks might take discretionary actions to manage their capital levels. Specifically, the literature explores how regulatory capital requirements affect trading and asset sale decisions. For example, Beatty, Chamberlain, and Magliolo (1995) find that the level of bank capital affects whether banks choose to sell assets with unrealized gains or assets with unrealized losses, in addition to affecting the timing of such asset sales. Boyson, Helwege, and Jindra (2010) document that financial institutions are reluctant to sell assets with unrealized losses and instead sell assets with unrealized gains, the so-called "cherry picking", during financial crises. Ellul, Jotikasthira, Lundblad, and Wang (2012) find that insurance companies hit by negative capital shocks selectively sell securities with unrealized gains to improve their capital positions.

To put the regulatory capital requirements to work in the case of REO sales, consider a bank with a low capital level that is forced to sell assets to raise its regulatory capital ratio. As the cherry picking literature suggests, the bank will first select assets with unrealized gains to sell, which simultaneously increases capital (the numerator of the risk-based capital ratio) and decreases risk-weighted assets (the denominator of the risk-based capital ratio); this would unambiguously raise the risk-based capital ratio. However, selling REO properties might have negative effects on the capital ratio, because REO properties are usually substantially over-valued on the bank's balance sheet.

According to the accounting rules, REO properties are recorded on the bank's balance sheet as the lower of (1) the fair value of the asset less the cost to sell the asset or (2) the cost of the asset. In reality, because market prices for identical properties are never available for REO properties, REO properties are categorized at best as level 2 assets, and often as level 3 assets and the valuations

of REO properties often require substantial non-observable assumptions.[2] Milbradt (2012) shows how financial institutions can manipulate their level 3 assets. Empirically, Beatty, Chamberlain, and Magliolo (1995), Ball, Kothari, and Robin (2000), and Ramanna and Watts (2007) find that financial institutions are reluctant to take write-downs even when assets are substantially impaired. Specifically, Fitzpatrick and Whitaker (2012), Mallach (2010), and Theologides (2010) document that REO properties are substantially over-valued on banks' balance sheets. Thus, taken together, these evidence suggests that REO properties are likely to be substantially over-valued on a bank's balance sheet, and selling these REO properties would most likely decrease the bank's capital ratio. Therefore, the bank with low capital will not be willing to sell its REO properties. However, the low capital bank is under constant regulatory pressure to sell the REO properties (Immergluck, 2010 and Theologides, 2010), and the bank may have to list the properties to alleviate the regulatory pressure. To mitigate or delay the negative effects of REO sales on its capital position, the bank can post higher asking prices, and thus the REO properties will stay on the market longer.

Under the conceptual framework described above, I develop the following hypotheses based on the effects of regulatory capital requirements.

Hypothesis-C 1. *Banks with low levels of capital will post higher asking prices for REO properties.*

Hypothesis-C 2. *Banks with low levels of capital will sell REO properties at higher prices.*

Hypothesis-C 3. *REO properties listed by banks with low levels of capital will stay on the market longer.*

Finally, regulatory capital requirements are binding only when capital is already low, which suggests that the effects of bank capital on REO sales should be nonlinear.

[2]Level 1 assets are assets that have readily observable prices, and therefore a reliable fair market value. Level 2 assets are assets that do not have regular market pricing, but whose fair value can be readily determined based on other data values or market prices. Level 3 assets are assets whose fair value cannot be determined by using observable measures, such as market prices or models. Level 3 assets are typically very illiquid, and fair values can only be calculated using estimates or risk-adjusted value ranges.

Hypothesis-C 4. *The effects of bank capital requirements on REO sales are stronger when bank capital is low.*

In the discussion above, I consider a low liquidity bank and a low capital bank separately. However, it is also possible that a bank with low liquidity also has a low capital level, or vice versa. Because the discussion above suggests that a low liquidity bank and a low capital bank behave differently, it is necessary to examine the interactive effects of liquidity and capital on REO sales. Intuitively, the incentive of a bank to post higher asking prices and therefore delay the disposition of REO properties will be limited if the bank also has low liquidity, or the willingness to engage in fire sale and recognize large losses will be limited if the bank's capital is low. I therefore develop the following hypothesis summarizing this interactive effect.

Hypothesis-FC 1. *The effects of bank capital on REO sales are stronger if bank liquidity is high, and the effects of liquidity on REO sales are stronger is bank capital is high.*

3 Economic Environment and Sample Construction

3.1 Commercial Real Estate and Commercial Mortgage Markets

The commercial real estate market experienced a sharp decline similar to the housing market during the 2008-2009 financial crisis, but with a slight lag. Panel A of Figure 1 plots the commercial real estate quarterly return indices for all property types from the National Association of Real Estate Investment Fiduciaries (NCREIF). The quarterly returns began to turn negative in 2008 and reached almost -8% in the second quarter of 2008. Overall, property prices dropped almost 25% from their peak in 2008 to their trough in 2010. The sharp decline of property prices led to a sharp increase in the rate of commercial mortgage default. Panel B of Figure 1 plots the commercial delinquency rates from 2000-2010 across different investor groups. The commercial mortgage delinquency rates increased more than ten times from 2007 to 2010. Consequently, many of these delinquent properties found their ways into lenders' portfolios as other real estate owned.

The sharp decline in commercial property prices was accompanied by the decrease in the avail-

ability of commercial debt capital. Panel C of Figure 1 plots the quarterly commercial/multifamily mortgage origination volume from 2002-2011 and shows that the quarterly commercial mortgage origination decreased more than 90% from its peak in 2006 to its trough in 2009. Furthermore, over two trillion dollars of commercial mortgages were originated during the boom period of 2004-2007; most of these mortgages are maturing in the next three to five years, which will create tremendous refinancing pressure for commercial real estate investors. The decline in asset prices and the constraints on debt financing thus provide an ideal environment for asset fire sales as in Shleifer and Vishny (1992).

3.2 The Sample of REO Properties

The sample of commercial REO property sales is from the CoStar database and includes sales of 3,137 bank-owned multi-family and commercial properties during the 2008-2010 period. The actual number of observations used in each regression will depend on the availability of the variables, especially the availability of the dependent variables. Some REO transactions report only asking prices and time on the market, which are usually available from the listings, but sale prices are not available. Some REO transactions report only sale prices as those transactions are privately negotiated without listing. The results, however, are not driven by any of these sample problems. In robustness checks, I show that the results hold on a smaller sample of REO transactions where all relevant variables are available.

Table 1 presents the distribution of the REO properties by year and state. The CoStar data contain information on asking price, sale price, time on the market, and other property characteristics. Panel A of Table 2 presents summary statistics of property level variables. Some variables have extreme values. For example, the minimum sale price is zero. Because the specific reason why the price is zero is unknown, I still include these transactions in the baseline regressions. However, excluding observations with extreme values does not change the results, nor does winsorizing the variables.

3.3 The Sample of Selling Banks

The CoStar data report the seller names for all property transactions. For the sample of REO sales, there are 657 different banks as sellers of REO properties. I use a text-matching program to match seller names of REO sales with bank names from the WRDS bank regulatory database. All matches are manually examined to ensure accuracy. I then use the WRDS bank regulatory data to construct bank variables, which are all measured at the bank level (instead of at the bank holding company level).

3.3.1 Bank liquidity measures

In this paper, I use five measures of bank liquidity and examine their impact on REO sales. The primary measure, *Liquidity*, is defined as bank cash holding plus available for sale securities divided by total assets, which captures the most readily available bank liquidity. The second measure, *Cash and Investment Securities*, is defined as the sum of cash, investment securities, federal funds sold, and trading assets, minus pledged securities divided by total assets, which captures the amount of liquidity that can be obtained by selling all liquid assets of the bank. The third measure, *On-Balance-Sheet Net Liquidity*, is defined as all liquid assets (cash + investment securities + federal funds sold + trading assets) minus all on-balance-sheet liquid liabilities (transaction deposits + savings deposits + federal funds purchased + trading liabilities) divided by total assets, which captures the potential negative effect of all on-balance sheet liquidity liabilities. The fourth measure, *Off-Balance-Sheet Net Liquidity*, is defined as the sum of all liquid assets minus all on-balance-sheet liquid liabilities minus all off-balance-sheet liabilities (unused commitments, net standby letter of credit, commercial and similar letters of credit, and all other off-balance sheet liabilities).[3]Finally, the fifth measure, *Total Bank Illiquidity*, is defined as the bank liquidity creation of Berger and Bouwman (2009) divided by total assets.

[3]This classification of liquid assets and liquid liabilities follows Berger and Bouwman (2009).

3.3.2 Bank capital measures

I use three measures of bank capital. The primary measure, *Tier 1 Capital Ratio*, is defined as tier 1 capital divided by risk-weighted assets. The second measure, *Tier 1 Leverage Ratio*, is defined as tier 1 capital divided by the average consolidated total assets. The third measure, *Total Capital Ratio*, is defined as total capital divided by risk-weighted assets. All three measures are often used by regulatory agencies in assessing capital adequacy of commercial banks.

3.3.3 Control variables

I also include the following control variables in various regressions, which are defined as follows:

- *Bank Size*–the natural logarithm of bank total assets.
- *Risk-Weighted Assets*–Net risk-weighted assets divided by total assets.
- *Core Deposits*–Transactions deposits plus time deposits less than $100,000 divided by total assets.
- *Real Estate Exposure*–Total real estate loan divided by total assets.
- *REO*–Total other real estate owned divided by total assets.
- *ROA*–Total net income divided by total assets.
- *Loan Loss Allowance*–Loan loss allowance divided by total loan.

Panel B of Table 2 presents summary statistics of bank variables, which are similar to the summary statistics reported in recent banking literature (e.g., Berger and Bouwman, 2009).

4 Empirical Results

4.1 Empirical Methodology

In the baseline specifications, I use a two-step matching procedure to estimate the effects of liquidity and capital on asking prices, sale prices, and time on the market of REO sales. To

implement the procedure, I identify five properties that are in the same city, of the same property type (same secondary property type if available), sold in the same year, and of similar size (five properties that have the smallest size difference with the REO property) as the the REO property for each REO transaction in the sample. I then pool the matching properties with the REO sample to create the matching sample, and run hedonic regressions of asking price, sale price, and time on the market on the matching sample. The hedonic regression is as follows:

$$P_{ijkt} = \alpha_j + \alpha_k + \alpha_t + \alpha_{jk} + \alpha_{jt} + \alpha_{kt} + \gamma REOProperty + \beta X_{ijkt} + \epsilon_{ijkt}, \quad (1)$$

where P_{ijkt} is the natural logarithm of *Asking Price*, *Sale Price*, or *Time-on-Market* of property i with property type j in city k at time t, α_j is the property type fixed effects, α_k is the city fixed effects, and α_t is the time fixed effects (quarter). *REO Property* is a dummy variable, which equals one if the transaction is an REO sale, and equals zero otherwise. X_{ijkt} is a vector of property characteristics, which include *Size*-the logarithm of the square footage of the property, *Size Squared*-square of *Size*, *Age*-age of the property, *Age Squared*-square of *Age*, *Vacancy*-percentage of space vacant within the property, *Recently Renovated*-whether the property was renovated within the last 15 years, *Land Size*-log of square footage of the land.

The results of the hedonic regressions are presented in Table 3. Most property characteristics carry expected signs. The results show that REO transactions have significantly lower asking prices (24% lower) and sale prices (34.1% lower), but longer time on the market (12.5% higher). More importantly, the hedonic regressions are able to explain 91.6% variations of asking price and 88.8% variations of sale price, which leaves little room for unobserved property characteristics to affect asking prices and sale prices.

I then calculate *Excess Asking Price*, *Excess Sale Price*, and *Excess Time-on-Market* of REO sales as the differences between the hedonic residuals of the REO property and the average of the hedonic residuals of its matched properties. Summary statistics of *Excess Asking Price*, *Excess Sale Price*, and *Excess Time on the Market* are also presented in Panel A of Table 2. In the second step, I regress *Excess Asking Price*, *Excess Sale Price*, and *Excess Time-on-Market* on

bank liquidity, bank capital, and other bank control variables.

Because the dependent variable in the second step is a generated variable, it will generally lead to imprecise estimates in the second step, i.e., larger standard errors. However, a generated dependent variable usually does not cause biased or inconsistent estimates. Therefore, the generated dependent variable in the second-step regression would only bias against any significant findings.

An alternative to the two-step procedure would be a one-step procedure, in which *Asking Price*, *Sale Price*, and *Time on the Market* are regressed on property characteristics, bank liquidity, bank capital, other bank control variables, and property type, time, and city dummies. There are several advantages of using the two-step procedure. First, the two-step procedure uses a larger sample to estimate the hedonic regressions, which results in more accurate hedonic prices and more accurate fundamental values of the REO properties. Second, using *Excess Asking Price*, *Excess Sale Price*, and *Excess Time-on-Market* as the dependent variables, instead of merely using the hedonic regression residuals,[4] mitigates the effect of unobserved local conditions. To see why the two-step procedure can mitigate the local correlation effect, consider a local bank whose liquidity or capital is positively correlated with local real estate prices. If bank liquidity or capital is equally correlated with the REO price and with the prices of the matched properties, taking the difference between the hedonic regression residuals, the two-step procedure should be able to remove the correlation. Furthermore, matching properties in the same city and with the same secondary property types also rules out the possibility that the results are driven by unknown city or secondary property type characteristics.

4.2 Effects of Bank Liquidity and Bank Capital on REO Sales

I present the second step regression results in Table 4. In the baseline regressions, I only report the results with *Liquidity* as the liquidity measure and *Tier 1 Capital Ratio* as the capital measure. I will discuss the results based on other liquidity and capital measures in robustness checks. Panel A reports separate effects of *Liquidity* only and *Tier 1 Capital Ratio* only and Panel B reports combined effects of *Liquidity* and *Tier 1 Capital Ratio* in the regressions.

[4]The method used in Pulvino (1998) and Eckbo and Thorburn (2008)

Columns (1)-(3) of Panel A report the separate effects of *Liquidity* on REO sales. Consistent with Hypotheses F1 and F2, *Liquidity* has positive and statistically significant effects on both *Asking Price* and *Sale Price*. Columns (4)-(6) of Panel A report the separate effects of *Tier 1 Capital Ratio*. Consistent with Hypotheses C1 and C3, *Tier 1 Capital Ratio* has positive and statistically significant effects on *Asking Price* and *Time-on-Market*. Overall, the results are consistent with the hypotheses.

I next turn to the combined effects of *Liquidity* and *Tier 1 Capital Ratio* in Panel B of Table 4 in detail. The first column reports the OLS regression results for *Excess Asking Price*. Consistent with Hypothesis F1, the liquidity measure *Liquidity* has a positive and statistically significant effect on *Asking Price*, which suggests that banks with low liquidity levels post lower asking prices for REO properties. Economically, one standard deviation decrease of *Liquidity* decreases the asking price by 5.93%. Consistent with Hypothesis C1, the capital measure *Tier 1 Capital Ratio* has a negative and statistically significant effect on the *Asking Price*, which suggests that banks with low capital levels post higher asking prices for REO properties. Economically, one standard deviation decrease of *Tier 1 Capital Ratio* increases the asking price by 6.16%.

The second column reports the results for *Excess Sale Price*. Consistent with Hypothesis F2, the liquidity measure *Liquidity* also has a positive and statistically significant effect on *Sale Price*. The economic significance on *Sale Price* is similar to that on *Asking Price*, and one standard deviation decrease of *Liquidity* decreases the sale price by 5.62%. Conversely, the effect of *Tier 1 Capital Ratio* is much smaller and statistically insignificant, which suggests that higher asking prices posted by banks with low capital levels may not lead to higher sale prices.

The third column reports the results for *Excess Time-on-Market*. Consistent with Hypothesis F3, the liquidity measure *Liquidity* has a positive effect on *Time on the Market*; however, the effect is statistically less insignificant. On the other hand, the capital measure *Tier 1 Capital Ratio* still has a negative and statistically significant effect on *Time on the Market*. The economic significance of the effect is much larger than that on *Asking Price*. One standard deviation decrease of bank capital increases *Time on the Market* by 19.67%, or approximately 53 days.

Whereas the above results show that banks choose selling strategies that are consistent with

the hypotheses, comparing the results in the three columns of Panel B shows that the strategies may not always lead to outcomes that these banks desire. Banks with low liquidity levels post lower asking prices and attempt to restore liquidity quickly. However, the low asking price leads only to a lower sale price, but not to a shorter time on the market, which is what such a bank wants the most. On the other hand, low capital banks post higher asking prices and attempt to mitigate the negative impact of REO sales on capital. However, the high asking price leads only to a longer time on the market, but not to a higher sale price.

Overall, the results in Table 4 support the notion that banks with low liquidity levels engage in fire sales when selling REO properties and banks with low capital levels are not willing to recognize losses associated with REO sales.

4.3 The Local Correlation Effect

Whereas the two-step procedure may mitigate the local correlation effect, it is based on the assumption that local bank conditions are equally correlated with REO properties and their matched properties under the null hypothesis. To the extent that this assumption may not hold, the results from the two-step procedure may still pick up the effects of the local correlation effect. In this subsection, I present further evidence to show that the results are not driven by the local correlation effect.

For the local correlation effect to drive the results, bank must have substantial exposure to the local economy, which happens if the bank is a local bank and concentrates most of its business locally. Therefore, it is sufficient to show that the results are not driven by local banks. I first identify all banks regulated by the Office of the Comptroller of the Currency (OCC), which are all national banks. I then present the second-step regression results for these national banks and other non-national banks separately in Panel A of Table 5. The results show that the effects of *Liquidity* and *Tier 1 Capital Ratio* are in fact stronger on national banks, which suggests that the results are unlikely to be driven by local banks.

To show this further, I divide the sample into two sub-samples according to whether the bank and the REO property are in the same metropolitan areas (MSA) and then run the second-step

regressions on the sub-samples separately. The results are presented in Panel B of Table 5, which shows that the effects of *Liquidity* and *Tier 1 Capital Ratio* on REO sales remain robust even for the sub-sample in which the bank and the property are not in the same metropolitan area.

Finally, for the local correlation effect to drive the results, bank conditions must be correlated with the local real estate market. Therefore, if I can show that is not the case, that possibility may be excluded. To accomplish this, I perform a falsification test by regressing the hedonic regression residuals of matched properties (non-REO properties) on bank characteristics and the results are presented in Panel C of Table 5. The results show that most bank characteristics are statistically and economically insignificant, which suggests that bank conditions are not highly correlated with non-REO properties.

Overall, the evidence in Table 5 suggests that the results found in Table 4 are unlikely to be driven by omitted local economic conditions that can simultaneously affect local banks and local real estate markets, or reverse causality in which local real estate market conditions drive local bank conditions.

4.4 Unobserved Property Characteristics and Repeated Sales Regression

Whereas the two-step matching procedure mitigates the bias caused by missing characteristics about property types and property locations, it is unable to address the bias caused by unobservable property characteristics. In this subsection, I use the repeated sales method to control for time invariant unobservable property characteristics. To implement the repeated sales method, I search the CoStar database for previous transactions of the REO properties. I am able to find previous transactions for 2,135 of the REO properties in the sample. I pool the REO transactions and the previous transactions together and run a hedonic regression of the asking prices, sale prices, and time on the market on the pooled sample with property type dummies, quarter fixed effects and state fixed effects. I then calculate the *Repeated Excess Asking Price*, *Repeated Excess Sale Price*, and *Repeated Excess Time-on-Market* as the differences between the hedonic regression residuals of the REO transactions and their previous transactions. Finally, I regress the

Repeated Excess Asking Price, *Repeated Excess Sale Price*, and *Repeated Excess Time-on-Market* on banking characteristics; the results are shown in Table 6. Similar to the findings in Table 4, *Liquidity* continues to have positive and statistically significant effects on asking prices and sale prices, and also positive and statistically significant effects on time on the market, and *Tier 1 Capital Ratio* continues to have negative and statistically significant effects on asking prices and time-on-market, and negative but statistically insignificant effects on sale prices. These results suggest that unobserved time invariant property characteristics are unlikely to drive the effects of bank liquidity and bank capital on REO sales.

4.5 Unobserved Bank Characteristics and Bank Fixed Effects

The other possibility that may prevent a causal interpretation of the above results is unobserved bank characteristics, which may be correlated with bank capital and bank liquidity. One such characteristic can be managerial ability, which is unobservable, yet can affect REO sales. I first use bank fixed effects to reduce the biases caused by unobserved time invariant bank characteristics. The regression results with bank fixed effects are presented in Columns (1)-(3) of Table 7. Whereas the levels of statistical significance have all dropped, the results are still consistent with the results in Table 4. The decline in statistical significance is not surprising due to the large number of banks (about 500 unique banks) relative to the small number of observations (less than 2,000). Nonetheless, the bank fixed effects regressions show that the results are unlikely to be driven by unobserved time invariant bank characteristics.

The fixed effects regressions are not able to control unobserved time variant bank characteristics, especially changing managerial abilities during the sample period. This can potentially lead to biases because many banks experienced management turnovers during the sample period. To mitigate such a concern, I exclude all transactions whose selling banks experienced changes of CEOs or CFOs during the sample period. The information on bank CEO or CFO changes comes from news search on FDIC reports, Factiva, LexisNexis, Google, Wall Street Journals, Yahoo Finance, and local newspapers. I find that about 25%, or about 143 banks in the sample changed their CEOs or CFOs during the sample period. I also exclude all banks that appear only once in

the sample. I then run the bank fixed effects regression on remaining observations, and the results are presented in Columns (4)-(6) of Table 7. The results are still consistent with the hypotheses. I therefore conclude that the results are unlikely to be driven by changing managerial abilities due to management turnovers.

4.6 Nonlinearity and Interactions of the Effects of Bank Liquidity and Capital

In this subsection, I test Hypotheses F4, C4, and FC1 by dividing the samples according to *Liquidity* and *Tier 1 Capital Ratio*. I first divide the sample into low liquidity and high liquidity sub-samples; banks in the low liquidity sub-sample have *Liquidity* below the sample median, and banks in the high liquidity sub-sample have *Liquidity* above the sample median. To examine the nonlinear effects of capital, I similarly divide the sample into low capital and high capital sub-samples. By examining the effects of capital on low liquidity and high liquidity sub-samples and the effects of liquidity on low capital and high capital sub-samples, I can test the interactive effect of bank liquidity and bank capital on REO sales. The regression results on these sub-samples are presented in Table 8.

Panel A reports the second step regression results on *Excess Asking Prices*. Comparing the results from the high liquidity and low liquidity sub-samples, *Liquidity* has a greater effect on the low liquidity sample than on the high liquidity sample, which supports Hypothesis F4 that the effect of bank liquidity is nonlinear in *Liquidity*. Conversely, the effect of *Tier 1 Capital Ratio* is greater on the high liquidity sub-sample, which supports Hypothesis FC1 that high liquidity increases a bank's ability to delay REO sales. Comparing the results on the high capital and low capital sub-samples, *Tier 1 Capital Ratio* has a greater effect on asking prices in the low capital sub-sample than in the high capital sub-sample, which is consistent with Hypothesis C5 that the effect of bank capital on REO sales is nonlinear. Conversely, the effect of *Liquidity* is stronger on the high capital sub-sample than on the low capital sub-sample, which is consistent with Hypothesis FC with respect to the interactive effect that high capital levels increase a bank's willingness to sell REOs at fire sale prices.

Panel B of Table 8 shows the results on *Excess Sale Prices*, which are similar to the results on asking prices in Panel A. Consistent with Hypothesis F4, the effect of *Liquidity* on sale price is greater on the low liquidity sub-sample than on the high liquidity sub-sample. Consistent with Hypothesis C4, the effect of *Tier 1 Capital Ratio* on sale price is greater on the low capital sub-sample than on the high capital sub-sample, but the result is weaker than the result on asking price. Consistent with Hypothesis FC 1, the effect of *Liquidity* on sale price is greater on the high capital sub-sample than on the low capital sub-sample.

Panel C of Table 8 reports the results on *Excess Time-on-Market*. The results support Hypotheses F4 and C4 that the effect of liquidity on time on the market is nonlinear in *Liquidity* and the effect of capital is nonlinear in *Tier 1 Capital Ratio*. Moreover, the results also support Hypothesis FC 1 that a high level of liquidity increases a bank's ability to postpone the sale of REO properties and that a high level of capital increases a bank's ability and urgency to quickly sell REO properties.

Overall, these results show that the effects of both liquidity and capital on REO sales are nonlinear, and that the effects of liquidity interact with the effects of capital.

4.7 Bank Deposits and Fire Sale

In this subsection, I test Hypothesis F5 to examine whether a bank's access to *Core Deposits* affects the bank's need to engage in fire sales. I construct an interaction term between *Liquidity* and *Core Deposits* and include the interaction term in the regressions. The results are presented in Table 9. For *Excess Asking Price* and *Excess Sale Price*, the coefficient estimates on the interaction term are both negative and statistically significant, which is consistent with Hypothesis F5 and suggests that banks with easy access to deposits do not rush to sell REO properties at fire sale prices. However, for *Time on the Market*, similar to the previous results with respect to the effect of *Liquidity*, the coefficient estimate on the interaction term is of the wrong sign and is statistically insignificant. In general, the results suggest that having access to other liquidity sources reduces the need asset fire sales.

4.8 Robustness Checks

In addition to the above mentioned tests, I also do the following robustness checks, all of which exhibit similar qualitative results.

- I run hedonic regressions on all transactions from the CoStar database.
- I run hedonic regressions with squared and interaction terms of property characteristics.
- I use directly the residuals from the first step hedonic regressions as dependent variables in the second step regressions.
- I run regressions using alternative liquidity and capital measures.
- I run regressions on a smaller sample where all the relevant variables are available.
- I run regressions separately for each property type.
- I change the number of matched properties for each REO transactions.
- I run duration models for *Time on the Market*.
- I include additional bank controls including commercial real estate exposure, land and construction loan exposure, and non-performing real estate loans.

5 Conclusions

This paper examines how bank characteristics, especially bank liquidity and capital, affect REO sales. I find the following: (1) Banks with lower capital levels post higher asking prices and postpone the sale of REO properties, but they do not necessarily obtain higher sale prices; (2) Banks with lower liquidity levels post lower asking prices while attempting to quickly sell REO properties. Whereas this strategy leads to lower sale prices, it does not lead to shorter time on the market; (3) Both the effects of bank capital and liquidity on REO sales are nonlinear; and (4) There is an interactive effect between bank liquidity and bank capital on REO sales, in which high

liquidity increases banks' abilities to delay REO sales and high capital increases banks' willingness to engage in fire sales.

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Table 1: Number of REO Properties by States and by Year

State	2008	2009	2010	Total
AK	0	1	0	1
AL	0	1	9	10
AR	1	1	12	14
AZ	3	38	141	182
CA	30	196	377	603
CO	11	35	67	113
CT	0	0	5	5
FL	6	66	187	259
GA	11	115	216	342
HI	0	0	1	1
IA	1	8	20	29
ID	0	5	19	24
IL	3	30	97	130
IN	6	7	30	43
KS	1	5	11	17
KY	2	5	3	10
LA	0	0	6	6
MA	0	5	8	13
MD	0	4	6	10
ME	1	0	1	2
MI	24	101	165	290
MN	4	17	29	50
MO	3	18	41	62
MS	0	0	1	1
MT	0	0	2	2
NC	0	10	67	77
NE	3	2	5	10
NH	0	1	3	4
NJ	0	0	11	11
NM	0	1	3	4
NV	3	18	73	94
NY	2	1	5	8
OH	7	19	27	53
OK	2	6	15	23
OR	0	8	22	30
PA	1	12	30	43
RI	1	7	2	10
SC	2	5	27	34
SD	0	0	1	1
TN	4	14	52	70
TX	5	25	31	61
UT	0	2	11	13
VA	1	12	25	38
VT	0	1	0	1
WA	0	15	52	67
WI	8	91	162	261
WV	0	0	3	3
WY	1	0	1	2
Total	147	908	2,082	3137

Table 2: Summary Statistics

This table presents summary statistics of property characteristics and bank characteristics. Panel A is for property characteristics. Property characteristics include: *Asking Price*-The asking price listed for the REO property, *Sale Price*-the selling price of the REO property, *Time on the Market*-the Time-on-market of the last listing of the REO property, *Size*-log of the square footage of the property, Age-age of the property, *Vacancy*-percentage of space vacant within the property, *Recently Renovated*-whether the property was renovated within the last 15 years, *Land size*-log of square footage of the land, *Excess Asking Price*-the difference between the residual of the REO property and the average residuals of the matching properties from the asking price hedonic regression, *Excess Sale Price* and *Excess Time on the Market* are similarly defined.
Panel B is for bank characteristics. Bank characteristics include: *Liquidity*- bank cash plus available for sale securities divided by total assets, *Tier 1 Capital Ratio*-Tier 1 capital divided by risk-weighted assets, *Cash and Investment Securities*-the sum of cash, investment securities, federal funds sold, and trading assets, minus pledged securities divided by total assets, *On-Balance-Sheet Net Liquidity*-all liquid assets (cash + investment securities + federal funds sold + trading assets) minus all on-balance-sheet liquid liabilities (transaction deposits + savings deposits + federal funds purchased + trading liabilities) divided by total assets, *Off-Balance-Sheet Net Liquidity* - the sum of all liquid assets minus all on-balance-sheet liquid liabilities minus all off-balance-sheet liabilities (unused commitments, net standby letter of credit, commercial and similar letters of credit, and all other off-balance sheet liabilities), *Tier 1 Leverage Ratio*-tier 1 capital divided by average consolidated total assets, *Total Capital Ratio*-Total capital divided by risk-weighted assets, *Bank Size*-log of the total bank assets, *ROA*-bank net income divided by total assets, *Deposits*-transactions deposits plus time deposits less than $100,000 divided by total assets, *Real Estate Exposure*-real estate loan divided by total assets, *Loan Loss Allowance*-allowance for loan loss divided by total loan, *Risk Weighted Assets*-Net risk weighted assets divided by total assets.

Panel A: Property Characteristics

Variable	Mean	Std. Dev.	Min	25%	Median	75%	Max	Obs
Sale Price	1,058,604	1,772,407	0.000	190,000	450,000	1,075,000	1.15E+07	3,120
Asking Price	985,762	1,465,825	29,000	225,000	489,900	1,045,440	8,900,000	1,838
Time on the Market	253.35	255.37	1.000	78	166.5	340.5	1,272	1,986
Square Footage	18,655	33,913	900	3,712	7,150	17,050	220,090	2,633
Age	34.98	31.04	0.000	8.000	28.00	50.00	128.0	2,542
Vacancy	5.36	18.18	0.000	0.000	0.000	0.000	100	2,563
Recently Renovated	0.049	0.216	0.000	0.000	0.000	0.000	1.000	3,102
Land Square Footage	327,790	1,039,236	2,178	16,195	46,609	154,638	7,676,578	3,005
Excess Sale Price	-0.204	0.957	-6.675	-0.724	-0.144	0.394	5.107	2,006
Excess Asking Price	-0.006	0.796	-4.207	-0.437	0.039	0.482	6.452	1,262
Excess Time-on-Market	0.002	1.207	-5.391	-0.644	0.108	0.840	2.597	1,383

Panel B: Bank Characteristics

Variable	Mean	Std. Dev.	Min	25%	Median	75%	Max	Obs
Liquidity	0.166	0.110	0.002	0.085	0.154	0.222	0.780	3,120
Cash and Investment Securities	0.153	0.103	0.005	0.078	0.125	0.180	0.777	2,541
On-Balance-Sheet Net Liquidity	-0.183	0.172	-0.637	-0.327	-0.204	0.015	0.780	2,541
Off-Balance-Sheet Net Liquidity	-0.332	0.204	-1.158	-0.648	-0.418	-0.159	0.587	2,541
Tier 1 Capital Ratio	0.118	0.046	0.001	0.086	0.116	0.128	0.276	2,541
Tier 1 Leverage Ratio	0.085	0.030	0.001	0.057	0.087	0.123	0.183	2,541
Total Capital Ratio	0.131	0.047	0.001	0.102	0.128	0.152	0.288	2,541
Bank Size	14.448	2.409	10.821	12.481	13.839	16.338	20.227	3,108
ROA	-0.003	0.015	-0.068	-0.006	0.001	0.005	0.022	3,120
Core Deposits	0.228	0.183	0.000	0.084	0.198	0.376	0.836	3,120
REO	0.016	0.018	0.000	0.003	0.005	0.015	0.236	3120
Real Estate Exposure	0.529	0.137	0.150	0.441	0.532	0.611	0.840	3,120
Loan Loss Allowance	0.025	0.012	0.008	0.017	0.024	0.030	0.073	3,120
Risk-Weighted Assets	0.750	0.116	0.419	0.680	0.752	0.819	1.061	3,120

Table 3: Hedonic Regressions

This table presents the hedonic regression of the logarithms of asking price, sale price, and time on the market on property characteristics. The property characteristics include: *REO Property*-an indicator equals one if REO sale, and zero otherwise, *Size*-log of the square footage of the property, *Size Squared*-square of *Size*, *Age*-age of the property, *Age Squared*-square of *Age*, *Vacancy*-percentage of space vacant within the property, *Recently Renovated*-whether the property was renovated within the last 15 years, *Land size*-log of square footage of the land. All regressions include property type dummies, quarter fixed effects, city fixed effects, and their interactions. Significance levels of 10%, 5%, and 1% are marked with *, **, and *** respectively.

Variables	(1) Asking Price	(2) Sale Price	(3) Time-on-Market
REO Property	-0.242***	-0.341***	0.125***
	(0.017)	(0.014)	(0.012)
Size	0.153***	0.076**	0.693**
	(0.052)	(0.032)	(0.324)
Size Squared	0.033***	0.035***	-0.041**
	(0.003)	(0.002)	(0.017)
Age	-0.008***	-0.003***	-0.003
	(0.000)	(0.000)	(0.002)
Age Squared	0.000***	-0.000***	0.000
	(0.000)	(0.000)	(0.000)
Vacancy	-0.001**	-0.002***	0.004**
	(0.000)	(0.000)	(0.002)
Recently Renovated	0.134***	-0.003	0.197
	(0.028)	(0.018)	(0.121)
Land Size	0.043***	0.112***	0.123***
	(0.008)	(0.005)	(0.032)
Constant	8.746***	7.917***	0.862
	(0.272)	(0.394)	(1.561)
Property type dummies	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes
Observations	6,874	10,670	6,954
R-squared	0.916	0.888	0.405

Table 4: The Effects of Bank Liquidity and Bank Capital on REO Sales

This table presents the second step regression results of *Excess Asking Price*, *Excess Sale Price*, and *Excess Time-on-Market* on bank characteristics. Bank characteristics include: *Liquidity*-bank cash plus available for sale securities divided by total assets, *Tier 1 Capital Ratio*-Tier 1 capital divided by risk weighted assets, *Bank Size*-log of the total bank assets, *ROA*-bank net income divided by total assets, *Deposits*-transactions deposits plus time deposits less than $100,000 divided by total assets, *Real Estate Exposure*-real estate loan divided by total assets, *Loan Loss Allowance*-allowance for loan loss divided by total loan, *Risk Weighted Assets*-Net risk weighted assets divided by total assets. All regressions also include quarter fixed effects, property dummies, and state fixed effects. Standard errors clustered by bank and year are presented below the estimates in parentheses. Significance levels of 10%, 5%, and 1% are marked with *, **, and *** respectively.

Panel A: Separate Effects of Liquidity and Capital

Variables	(1) Excess Asking Price	(2) Excess Sale Price	(3) Excess Time-on-Market	(4) Excess Asking Price	(5) Excess Sale Price	(6) Excess Time-on-Market
Liquidity	0.524**	0.526**	0.685			
	(0.263)	(0.224)	(0.421)			
Tier 1 Capital				-1.142**	0.098	-3.677**
				(0.534)	(0.700)	(1.460)
Bank Size	0.006	-0.024***	-0.008	0.005	-0.024**	-0.013
	(0.011)	(0.009)	(0.017)	(0.011)	(0.009)	(0.017)
ROA	-1.046	1.179	1.576	-0.672	1.023	3.051
	(1.438)	(1.230)	(2.309)	(1.481)	(1.280)	(2.391)
Core Deposits	-0.126	-0.199	-0.600**	0.043	-0.056	-0.377*
	(0.155)	(0.129)	(0.251)	(0.131)	(0.114)	(0.216)
REO	1.338	0.543	3.444	0.794	0.462	2.060
	(1.484)	(1.240)	(2.389)	(1.506)	(1.261)	(2.421)
Real Estate	-0.022	0.238	-0.030	-0.174	0.108	-0.239
	(0.182)	(0.155)	(0.297)	(0.167)	(0.145)	(0.273)
Loan Loss Allowance	0.576	4.477**	0.471	1.255	5.075***	1.510
	(2.291)	(1.801)	(3.552)	(2.267)	(1.786)	(3.503)
Risk-Weighted Assets	0.470**	0.280	-0.959***	0.397**	0.134	-0.965***
	(0.197)	(0.176)	(0.321)	(0.191)	(0.168)	(0.311)
Constant	-0.618	-0.065	1.068	-0.321	0.152	1.601*
	(0.547)	(0.582)	(0.921)	(0.540)	(0.577)	(0.907)
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Property Type Dummies	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,276	2,032	1,398	1,276	2,032	1,398
R-squared	0.288	0.310	0.114	0.287	0.308	0.116

Panel B: Combined Effects of Liquidity and Capital

Variables	(1) Excess Asking Price	(2) Excess Sale Price	(3) Excess Time-on-Market
Liquidity	0.556**	0.526**	0.779*
	(0.263)	(0.224)	(0.422)
Tier 1 Capital	-1.300**	-0.023	-3.905***
	(0.489)	(0.701)	(1.464)
Bank Size	0.005	-0.024***	-0.013
	(0.011)	(0.009)	(0.017)
ROA	-0.524	1.190	3.299
	(1.481)	(1.280)	(2.392)
Core Deposits	-0.131	-0.199	-0.614**
	(0.155)	(0.129)	(0.251)
REO	0.961	0.536	2.304
	(1.506)	(1.260)	(2.422)
Real Estate	-0.023	0.238	-0.023
	(0.182)	(0.155)	(0.297)
Loan Loss Allowance	0.526	4.479**	0.487
	(2.290)	(1.802)	(3.544)
Risk-Weighted Assets	0.530***	0.281	-0.768**
	(0.201)	(0.179)	(0.328)
Constant	-0.542	-0.064	1.283
	(0.549)	(0.584)	(0.922)
Quarter Fixed Effects	Yes	Yes	Yes
Property Type Dummies	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes
Observations	1,276	2,032	1,398
R-squared	0.290	0.310	0.119

Table 5: The Local Correlation Effect

This table presents the second step regression results on sub-samples. Panel A presents results on OCC-regulated banks and non-OCC regulated banks, and Panel B presents results where the banks are in the same MSA as the property, and the banks are not in the same MSA as the property separately. Panel C presents the falsification tests on matched properties. The dependent variables are *Excess Asking Price*, *Excess Sale Price*, and *Excess Time-on-Market*. Bank characteristics include: *Liquidity*-bank cash plus available for sale securities divided by total assets, *Tier 1 Capital Ratio*-Tier 1 capital divided by risk weighted assets, *Bank Size*-log of the total bank assets, *ROA*-bank net income divided by total assets, *Deposits*-transactions deposits plus time deposits less than $100,000 divided by total assets, *Real Estate Exposure*-real estate loan divided by total assets, *Loan Loss Allowance*-allowance for loan loss divided by total loan, *Risk Weighted Assets*-Net risk weighted assets divided by total assets. All regressions also include quarter fixed effects, property dummies, and state fixed effects. Standard errors clustered by bank and year are presented below the estimates in parentheses. Significance levels of 10%, 5%, and 1% are marked with *, **, and *** respectively.

Panel A: OCC-Regulated and Non OCC-Regulated Banks

	OCC Regulated			Non-OCC Regulated		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Excess Asking Price	Excess Sale Price	Excess Time-on-Market	Excess Asking Price	Excess Sale Price	Excess Time-on-Market
Liquidity	1.247**	1.166**	1.897	0.555*	0.640**	0.670
	(0.605)	(0.580)	(1.285)	(0.290)	(0.250)	(0.453)
Tier 1 Capital	-7.137**	-5.745***	0.006	-0.101	0.640	-4.821***
	(2.827)	(2.199)	(4.666)	(1.013)	(0.775)	(1.611)
Bank Size	-0.044	-0.069**	-0.008	0.013	-0.019*	-0.002
	(0.036)	(0.027)	(0.059)	(0.012)	(0.010)	(0.019)
ROA	-1.659	-2.358	9.308	-0.620	1.346	2.461
	(4.688)	(4.009)	(7.984)	(1.603)	(1.386)	(2.512)
Core Deposits	-1.240*	-0.495	-1.554	-0.078	-0.217	-0.440*
	(0.651)	(0.447)	(1.034)	(0.165)	(0.139)	(0.260)
REO	8.552	5.666	21.613	1.040	0.610	-0.074
	(8.877)	(6.787)	(15.141)	(1.563)	(1.324)	(2.447)
Real Estate	-0.718	-0.610	-0.352	0.198	0.380**	-0.045
	(0.756)	(0.516)	(1.261)	(0.199)	(0.173)	(0.317)
Loan Loss Allowance	4.097	3.604	4.787	0.154	4.509**	-0.938
	(5.624)	(4.347)	(8.966)	(2.562)	(2.007)	(3.875)
Risk-Weighted Assets	0.555	0.393	-1.959*	0.563**	0.280	-0.273
	(0.718)	(0.496)	(1.167)	(0.227)	(0.205)	(0.363)
Constant	0.948	1.622***	1.079	-0.921	-0.262	0.750
	(0.782)	(0.598)	(1.347)	(0.570)	(0.609)	(0.929)
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Property Type Dummies	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	265	385	292	1,011	1,647	1,106
R-squared	0.454	0.449	0.280	0.286	0.308	0.131

Panel B: The Bank and the Property in the Same State and in Different MSAs

	Same MSA			Different MSAs		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Excess	Excess	Excess	Excess	Excess	Excess
	Asking Price	Sale Price	Time-on-Market	Asking Price	Sale Price	Time-on-Market
Liquidity	0.887**	1.067***	0.907	1.240***	1.150***	0.621
	(0.406)	(0.323)	(0.660)	(0.371)	(0.327)	(0.594)
Tier 1 Capital	-1.574**	0.171	-5.514**	-1.446**	-0.139	-3.219**
	(0.796)	(0.883)	(2.206)	(0.672)	(1.221)	(1.175)
Bank Size	-0.014	-0.042**	-0.043	0.027*	0.000	0.006
	(0.022)	(0.016)	(0.034)	(0.015)	(0.014)	(0.024)
ROA	-1.541	0.575	7.694**	2.209	2.058	-3.927
	(1.970)	(1.495)	(3.115)	(2.797)	(2.567)	(4.448)
Core Deposits	-0.194	-0.263	-0.312	0.015	0.002	-0.931**
	(0.229)	(0.173)	(0.368)	(0.233)	(0.207)	(0.376)
REO	0.426	0.552	-2.721	-2.869	-2.400	7.857*
	(1.932)	(1.517)	(3.152)	(3.275)	(2.520)	(4.683)
Real Estate	0.170	0.284	-0.350	-0.189	-0.097	0.069
	(0.316)	(0.253)	(0.511)	(0.266)	(0.234)	(0.439)
Loan Loss Allowance	-0.037	4.821**	7.079	-0.160	1.092	-4.516
	(3.187)	(2.237)	(4.941)	(4.072)	(3.480)	(6.291)
Risk-Weighted Assets	0.869**	0.740***	-0.318	0.123	-0.204	-1.626***
	(0.365)	(0.284)	(0.578)	(0.289)	(0.269)	(0.487)
Constant	-0.606	0.130	1.884	-0.480	-0.231	1.470
	(0.870)	(0.833)	(1.445)	(0.754)	(0.841)	(1.283)
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Property Type Dummies	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	640	1,052	693	636	980	705
R-squared	0.360	0.367	0.166	0.287	0.314	0.153

Panel C: A Falsification Test on Matched Properties

Variables	(1) Excess Asking Price	(2) Excess Sale Price	(3) Excess Time-on-Market
Liquidity	-0.201	-0.469*	-0.021
	(0.311)	(0.251)	(0.422)
Tier 1 Capital	1.195	1.019	-0.205
	(0.915)	(0.712)	(1.464)
Bank Size	0.010	0.007	-0.013
	(0.013)	(0.010)	(0.017)
ROA	-1.062	-0.832	3.299
	(1.571)	(1.372)	(2.392)
Core Deposits	0.362**	0.177	-0.614**
	(0.169)	(0.140)	(0.251)
REO	-2.637*	0.086	2.304
	(1.562)	(1.477)	(2.422)
Real Estate	0.153	0.197	-0.023
	(0.190)	(0.162)	(0.297)
Loan Loss Allowance	3.509	1.627	0.487
	(2.547)	(1.778)	(3.544)
Risk-Weighted Assets	-0.105	-0.235	-0.768**
	(0.241)	(0.197)	(0.328)
Constant	-0.429	-1.762*	1.283
	(0.332)	(0.976)	(0.922)
Quarter Fixed Effects	Yes	Yes	Yes
Property Type Dummies	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes
Observations	3,154	5,021	2,998
R-squared	0.101	0.070	0.112

Table 6: Unobserved Property Characteristics and Repeated Sales Regressions
This table presents the second-stage of the repeated sales sample results. The dependent variables are the differences between the regression residuals of the REO properties and its previous sales. Bank characteristics include: *Liquidity*-bank cash plus available for sale securities divided by total assets, *Tier 1 Capital Ratio*-Tier 1 capital divided by risk weighted assets, *Bank Size*-log of the total bank assets, *ROA*-bank net income divided by total assets, *Deposits*-transactions deposits plus time deposits less than $100,000 divided by total assets, *Real Estate Exposure*-real estate loan divided by total assets, *Loan Loss Allowance*-allowance for loan loss divided by total loan, *Risk Weighted Assets*-Net risk weighted assets divided by total assets. All regressions also include year fixed effects, state fixed effects, and property type dummies. Standard errors clustered by bank and year are presented below the estimates in parentheses. Significance levels of 10%, 5%, and 1% are marked with *, **, and *** respectively.

Variables	(1) Repeated Excess Asking Price	(2) Repeated Excess Sale Price	(3) Repeated Excess Time-on-Market
Liquidity	0.636**	0.585***	0.739*
	(0.268)	(0.226)	(0.423)
Tier 1 Capital	-1.079***	0.052	-3.827***
	(0.304)	(0.707)	(1.469)
Bank Size	0.003	-0.025***	-0.010
	(0.011)	(0.009)	(0.017)
ROA	-0.752	0.776	3.365
	(1.506)	(1.291)	(2.400)
Core Deposits	-0.151	-0.223*	-0.621**
	(0.158)	(0.130)	(0.252)
REO	0.831	0.517	2.656
	(1.531)	(1.270)	(2.429)
Real Estate	-0.059	0.224	-0.024
	(0.185)	(0.157)	(0.298)
Loan Loss Allowance	0.712	4.075**	0.781
	(2.328)	(1.817)	(3.555)
Risk-Weighted Assets	0.542***	0.254	-0.758**
	(0.204)	(0.181)	(0.329)
Constant	-0.059	0.156	1.739*
	(0.559)	(0.588)	(0.925)
Quarter Fixed Effects	Yes	Yes	Yes
Property Type Dummies	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes
Observations	573	1,256	1,018
R-squared	0.314	0.333	0.150

Table 7: Unobserved Bank Characteristics and Bank Fixed Effects

This table presents the second step regression results of *Excess Asking Price*, *Excess Sale Price*, and *Excess Time-on-Market* on bank characteristics with bank fixed effects. Columns (1)-(3) report results for all observations, and Columns (4)-(6) report results excluding all banks with management turnovers. Bank characteristics include: *Liquidity*-bank cash plus available for sale securities divided by total assets, *Tier 1 Capital Ratio*-Tier 1 capital divided by risk weighted assets, *Bank Size*-log of the total bank assets, *ROA*-bank net income divided by total assets, *Deposits*-transactions deposits plus time deposits less than $100,000 divided by total assets, *Real Estate Exposure*-real estate loan divided by total assets, *Loan Loss Allowance*-allowance for loan loss divided by total loan, *Risk Weighted Assets*-Net risk weighted assets divided by total assets. All regressions also include quarter fixed effects, property dummies, and state fixed effects. Standard errors clustered by bank and year are presented below the estimates in parentheses. Significance levels of 10%, 5%, and 1% are marked with *, **, and *** respectively.

Variables	(1) Excess Asking Price	(2) Excess Sale Price	(3) Excess Time-on-Market	(4) Excess Asking Price	(5) Excess Sale Price	(6) Excess Time-on-Market
Liquidity	0.958*	0.871**	0.944	0.989*	0.858**	1.083
	(0.504)	(0.419)	(0.800)	(0.514)	(0.425)	(0.808)
Tier 1 Capital	-1.291*	-3.943	-5.842**	-1.652**	-3.817	-5.759**
	(0.712)	(2.398)	(2.811)	(0.814)	(2.431)	(2.866)
Bank Size	0.145	-0.255	-0.001	0.135	-0.240	0.000
	(0.363)	(0.227)	(0.387)	(0.368)	(0.228)	(0.388)
ROA	8.286**	4.220*	-2.813	5.881	3.254	-0.094
	(3.545)	(2.438)	(5.385)	(3.868)	(2.532)	(5.752)
Core Deposits	-0.230	-0.112	-0.673	-0.282	-0.183	-0.703
	(0.324)	(0.258)	(0.502)	(0.331)	(0.262)	(0.506)
REO	1.191	-0.234	7.593	2.547	1.428	7.272
	(4.268)	(3.268)	(6.401)	(4.658)	(3.406)	(6.805)
Real Estate	0.126	-1.293	-1.229	0.412	-1.994*	-1.962
	(1.315)	(1.018)	(2.059)	(1.542)	(1.116)	(2.352)
Loan Loss Allowance	-6.583	0.116	1.796	-8.792	0.301	6.854
	(7.567)	(5.351)	(10.554)	(7.957)	(5.539)	(10.884)
Risk-Weighted Assets	0.374	1.288*	-1.154	0.036	1.464**	-0.700
	(0.891)	(0.668)	(1.281)	(0.934)	(0.685)	(1.319)
Constant	-2.648	3.573	1.628	-2.378	3.603	1.694
	(5.812)	(3.633)	(6.316)	(5.930)	(3.666)	(6.352)
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Property Type Dummies	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,276	2,032	1,398	1,015	1,638	1,130
R-squared	0.542	0.530	0.454	0.544	0.531	0.451

Table 8: Nonlinearity and Interaction of Liquidity and Capital on REO Sales
This table presents the second step regression results of *Excess Asking Price* (Panel A), *Excess Sale Price* (Panel B), and *Excess Time-on-Market* (Panel C) on bank characteristics on sub-samples. Each panel presents results for low liquidity, high liquidity, low capital, and high capital samples. Bank characteristics include: *Liquidity*-bank cash plus available for sale securities divided by total assets, *Tier 1 Capital Ratio*-Tier 1 capital divided by risk weighted assets, *Bank Size*-log of the total bank assets, *ROA*-bank net income divided by total assets, *Deposits*-transactions deposits plus time deposits less than $100,000 divided by total assets, *Real Estate Exposure*-real estate loan divided by total assets, *Loan Loss Allowance*-allowance for loan loss divided by total loan, *Risk Weighted Assets*-Net risk weighted assets divided by total assets. All regressions also include year fixed effects, state fixed effects, and property type dummies. Standard errors clustered by bank and year are presented below the estimates in parentheses. Significance levels of 10%, 5%, and 1% are marked with *, **, and *** respectively.

Panel A: Excess Asking Price

	(1) Low Liquidity	(2) High Liquidity	(3) Low Capital	(4) High Capital
Liquidity	1.847***	0.963*	0.604*	1.546***
	(0.716)	(0.545)	(0.346)	(0.445)
Tier 1 Capital	-1.559	-3.589***	-5.629**	-2.376**
	(1.580)	(1.178)	(2.386)	(1.108)
Bank Size	0.010	0.002	0.003	0.001
	(0.016)	(0.019)	(0.015)	(0.018)
ROA	-1.481	0.838	3.479	-2.422
	(2.693)	(1.870)	(2.360)	(2.093)
Core Deposits	-0.108	-0.304	-0.230	-0.004
	(0.217)	(0.269)	(0.195)	(0.276)
REO	-0.496	3.247	1.423	1.024
	(2.180)	(2.267)	(1.732)	(3.518)
Real Estate	-0.053	0.170	0.141	-0.356
	(0.236)	(0.329)	(0.292)	(0.276)
Loan Loss Allowance	3.319	-0.796	-3.959	3.890
	(3.588)	(3.158)	(3.630)	(3.380)
Risk-Weighted Assets	0.276	0.810**	0.996**	0.452*
	(0.267)	(0.352)	(0.405)	(0.257)
Constant	-0.522	-0.770	-0.956	0.219
	(0.750)	(0.887)	(0.641)	(0.439)
Quarter Fixed Effects	Yes	Yes	Yes	Yes
Property Type Dummies	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
Observations	671	605	624	652
R-squared	0.339	0.339	0.311	0.346

Panel B: Excess Sale Price

	(1) Low Liquidity	(2) High Liquidity	(3) Low Capital	(4) High Capital
Liquidity	0.873**	0.568	0.336	0.791**
	(0.436)	(0.440)	(0.313)	(0.346)
Tier 1 Capital	1.148	-0.909	-3.773*	-0.088
	(1.067)	(0.971)	(1.955)	(1.102)
Bank Size	-0.016	-0.028*	-0.036***	-0.011
	(0.014)	(0.015)	(0.013)	(0.015)
ROA	0.330	2.572	3.414*	-0.068
	(2.133)	(1.622)	(2.046)	(1.757)
Core Deposits	-0.214	-0.284	-0.287*	-0.109
	(0.189)	(0.208)	(0.171)	(0.211)
REO	-0.698	2.140	0.813	-2.181
	(1.922)	(1.731)	(1.460)	(2.971)
Real Estate	0.243	0.325	0.380	0.088
	(0.208)	(0.270)	(0.241)	(0.229)
Loan Loss Allowance	6.114**	5.119**	-0.481	7.150***
	(3.001)	(2.345)	(2.901)	(2.567)
Risk-Weighted Assets	0.033	0.507*	0.656*	0.187
	(0.251)	(0.292)	(0.338)	(0.228)
Constant	0.279	-0.590	0.008	0.001
	(0.834)	(0.863)	(0.653)	(0.364)
Quarter Fixed Effects	Yes	Yes	Yes	Yes
Property Type Dummies	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,038	994	1,009	1,023
R-squared	0.316	0.363	0.330	0.335

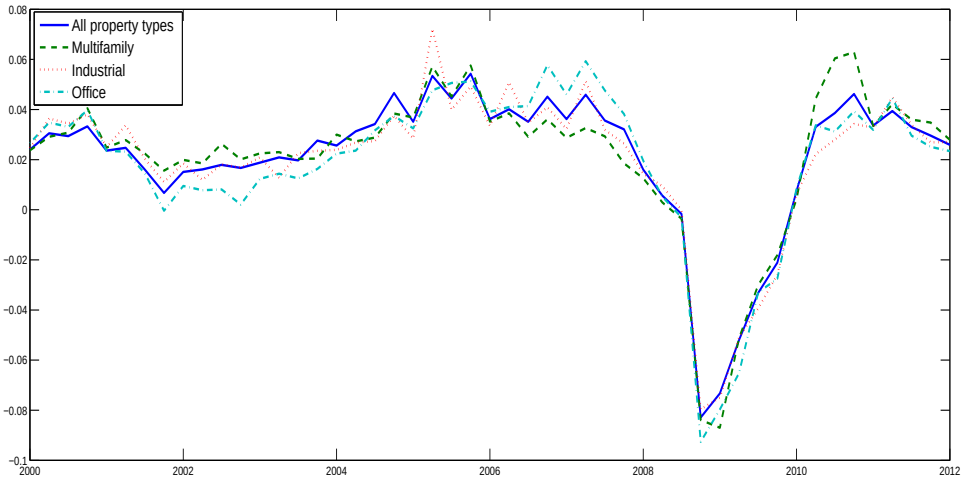
Panel C: Excess Time-on-Market

	(1) Low Liquidity	(2) High Liquidity	(3) Low Capital	(4) High Capital
Liquidity	0.149	0.667	0.716	0.717
	(1.157)	(0.862)	(0.545)	(0.733)
Tier 1 Capital	-2.652	-4.968***	-5.555**	-2.420
	(2.623)	(1.892)	(2.797)	(2.806)
Bank Size	0.002	-0.024	-0.013	0.001
	(0.026)	(0.028)	(0.024)	(0.029)
ROA	5.443	1.636	3.136	4.504
	(4.204)	(3.106)	(3.804)	(3.413)
Core Deposits	-0.619*	-0.457	-0.544*	-0.758*
	(0.356)	(0.432)	(0.316)	(0.450)
REO	0.973	4.081	0.113	8.558
	(3.600)	(3.576)	(2.752)	(5.818)
Real Estate	0.478	-0.639	0.438	-0.162
	(0.398)	(0.529)	(0.458)	(0.472)
Loan Loss Allowance	-4.974	4.002	3.452	-2.419
	(5.837)	(4.737)	(5.521)	(5.440)
Risk-Weighted Assets	-1.044**	0.101	-1.081*	-0.949**
	(0.460)	(0.558)	(0.649)	(0.425)
Constant	1.346	0.389	1.761*	1.010
	(1.300)	(1.446)	(1.053)	(0.748)
Quarter Fixed Effects	Yes	Yes	Yes	Yes
Property Type Dummies	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
Observations	739	659	690	708
R-squared	0.178	0.124	0.114	0.164

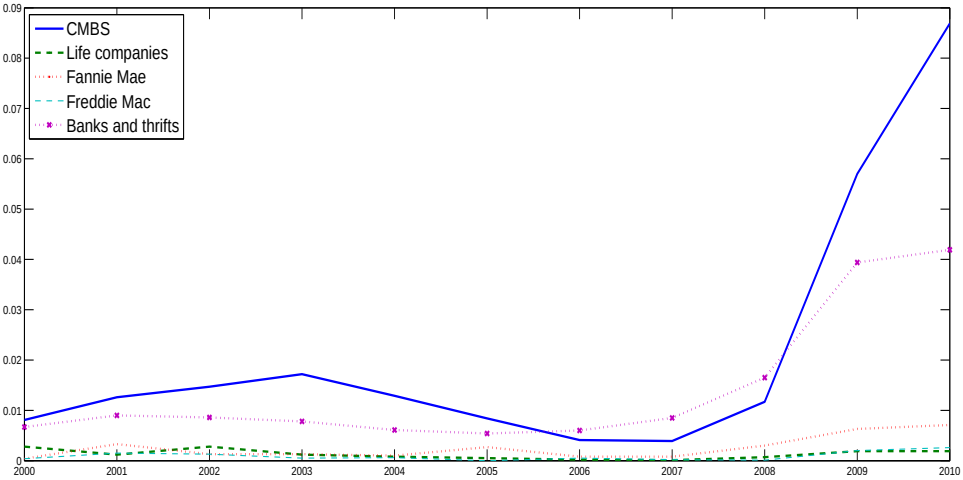
Table 9: Regression Results with the Interaction Between *Liquidity* and *Core Deposits*
This table presents the second step regression results of *Excess Asking Prices*, *Excess Sale Prices*, and *Excess Time-on-Market* on the interaction term between *Liquidity* and *Deposits*. Bank characteristics include: *Liquidity*-bank cash plus available for sale securities divided by total assets, *Tier 1 Capital Ratio*-Tier 1 capital divided by risk weighted assets, *Bank Size*-log of the total bank assets, *ROA*-bank net income divided by total assets, *Deposits*-transactions deposits plus time deposits less than $100,000 divided by total assets, *Real Estate Exposure*-real estate loan divided by total assets, *Loan Loss Allowance*-allowance for loan loss divided by total loan, *Risk Weighted Assets*-Net risk weighted assets divided by total assets. All regression also include year fixed effects, state fixed effects, and property type dummies. Standard errors clustered by bank and year are presented below the estimates in parentheses. Significance levels of 10%, 5%, and 1% are marked with *, **, and *** respectively.

Variables	(1) Excess Asking Price	(2) Excess Sale Price	(3) Excess Time-on-Market
Liquidity	0.996***	0.874***	0.579
	(0.361)	(0.313)	(0.577)
Tier 1 Capital	-1.319***	-0.074	-3.905***
	(0.589)	(0.702)	(1.464)
*Core Deposits*Liquidity*	-1.929**	-1.525**	0.892
	(0.086)	(0.758)	(1.751)
Bank Size	-0.002	-0.028***	-0.010
	(0.011)	(0.010)	(0.018)
ROA	-0.649	1.071	3.389
	(1.481)	(1.282)	(2.400)
Core Deposits	0.142	0.015	-0.738**
	(0.218)	(0.186)	(0.349)
REO	0.654	0.308	2.432
	(1.514)	(1.267)	(2.436)
Real Estate	-0.098	0.187	0.012
	(0.186)	(0.159)	(0.304)
Loan Loss Allowance	0.751	4.581**	0.414
	(2.291)	(1.802)	(3.548)
Risk-Weighted Assets	0.494**	0.253	-0.752**
	(0.202)	(0.180)	(0.330)
Constant	-0.368	0.061	1.206
	(0.558)	(0.589)	(0.935)
Quarter Fixed Effects	Yes	Yes	Yes
Property Type Dummies	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes
Observations	1,276	2,032	1,398
R-squared	0.291	0.311	0.119

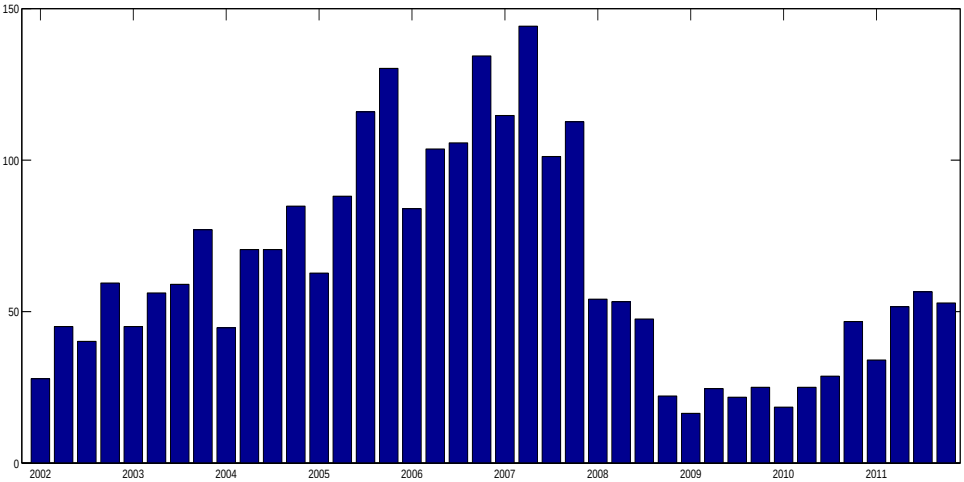
Figure 1: Commercial real estate and commercial mortgage markets



Panel A: Commercial real estate quarterly return index, 2000-2012



Panel B: Commercial mortgage delinquency rates, 2000-2010



Panel C: Commercial mortgage origination volume, 2002-2011