

Did Local Lenders Forecast the Bust? Evidence from the Real Estate Market*

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Abstract

This paper shows that mortgage lenders with a physical presence near the property being financed have better information about home-price fundamentals than non-local lenders. Within lender, loan origination and retention decrease when the lender has a branch and the area experiences high home price appreciation. Across markets, local loans decrease from 2002-06 as home prices rise. Where local loans were made, home prices fell less from 2006-09. A standard deviation increase in local loans is associated with 5 fewer foreclosures per one thousand homes. The results for housing prices and foreclosures are even stronger when lenders retain the loans.

Keywords: Local lending, House price growth, Foreclosures

JEL Classification: G21

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1 Introduction

The recent mortgage default crisis follows an unprecedented period of home price appreciation. In this paper, I study the relationship between home price growth from 2002-06 and lending growth by lenders with a physical presence in the local market during the same time period. I test whether local lenders are more likely than non-local lenders to exit markets when prices diverge from fundamentals. By examining lenders' behavior during the crisis, I am able to test if local lenders forecast the bust in housing prices from 2006-09 and what role they play in the subsequent foreclosure crisis. My hypothesis is that local lenders understand when prices are out of line with fundamentals because they are privy to *information* about the local economy. I find that during the run-up, local lending decreases most in areas that experience the greatest price run-up (2002-06) and greatest subsequent declines (2006-09).

The importance of information in financial contracting cannot be overstated. For lenders to make loans they must first decide if the conditions of the loans are favorable. Studying lending behavior across institutions is useful because the supply of credit and financial intermediation is heavily attributed to helping an economy grow.¹ I use the branch network of a lender to proxy for the lender's ability to gather information about the local economy. The lending decisions are affected by the quality of information the lender receives and the borrowers are affected by the lender's decision about whether or not to extend credit.

Historically, the market share of local lenders has been steadily decreasing over time. However, I find evidence that local lending is making a comeback. I define a loan to be *Local* if the lender that makes the loan has a branch in the county where the property is located. Figure 1 shows that from 1998-2006, the market share of local lenders decreases. Yet, during the crisis from 2008-09, the average *Local Share* increases to levels even higher than in 1998. Since there is a return to localized lending, it is useful to understand what role local lenders play in the economy.

To understand this relationship better, I first study local vs. non-local loan originations *within* lender over the run-up to the real estate crisis. Loan originations by lenders decrease

¹Please see: Demirguc-Kunt and Maksimovic (1998); Jayaratne and Strahan (1996); King and Levine (1993a,b); Levine, Loayza and Beck (2000); Paravisini (2008); Rajan and Zingales (1998); Rice and Strahan (2009) among others.

over 2002-06 when they had a branch in the county where the property was located. When a lender has a branch, it lends less in the local economy in areas that incur home price appreciation over the run-up. The lender also retains fewer loans on their portfolio in these areas, suggesting that by having a physical presence in the market, lenders are operating differently than when no branch is present. By looking within lenders I can identify that having a branch, and thus local loan officers processing the loan application, affects the lending decisions for the lender in that area. Once I have identified differences within lenders themselves, I am able to use branches to signal greater understanding of the local economy and try to understand the implications on lending overall.²

Thus far, the literature has focused on soft information as it pertains to the borrowers. I test whether local lenders are also informed about markets, specifically, the housing market. The mortgage default crisis provides a particularly dramatic setting to study the knowledge of local lenders. I find that during the run-up from 2002-06, lenders with branches lend significantly less in the areas experiencing home price appreciation. Instead of increasing lending by roughly 8 percent, they only increase lending by 2% for every percentage increase in house prices. While the growth rate is still positive, the rate of the growth is much less dramatic when a branch is present. A within lending analysis highlights how useful the branch network can be for gathering better information about the local economy as well as their borrowers.³

When I run the analysis *across markets* (instead of within lender) I find that during the run-up from 2002-06, home price growth across ZIP codes negatively correlates with local lending. Across markets, when house prices increase by 1 percent, local loan growth decreases by 2%. And, local lending growth from 2002-06 is positively correlated with the growth in home prices during the mortgage default crisis (2006-09). This means that local lending declines most in areas with the worst housing price bust.⁴

²I also test the scenario in which I define loans made by non-depository originators that are associated with banks, such as CitiMortgage and Citibank, as local, and the results are robust to the original definition of local.

³I confirm these results within one specific bank, Bank of America, and the result holds that in areas where there is a bank branch lending is negatively correlated with home price growth. The results are reported in Table 1 of the online appendix. Table 3-21 of the online appendix report results from changes in local lending instead of growth rates for robustness.

⁴Table 3-21 of the online appendix report results from changes in local lending instead of growth rates for robustness.

I then separate the local loans into loans that are sold by the lenders and loans the lender retains on its balance sheet to determine if local lenders are actively leaving the market. Purnanandam (2011) and Mian and Sufi (2009) describe how securitization during this period played a large part in the role of credit supply and the increase in housing prices. If local lenders understand that the housing market is overheating, then fewer local loans should be held after origination since the lender would incur the losses if the borrower were to default. It is in fact the case that the relationship between housing prices and the growth rate of held loans is strongly negative; a 1 percent increase in housing prices explains roughly 8% decrease in local loans that are originated and subsequently held. This suggests that local lenders understand when prices exceed the value of the home, and exit the market to safeguard their portfolios against future mortgage defaults.⁵

Local lending grows during the boom in areas where home prices *increase* during the bust, such as areas in Northern California and the Mid-Atlantic. Where local lending increased by 1 percent, home prices grew by 3 percent during the crisis, even controlling for the price run-up during the boom. On average, housing prices fall 15% from 2006-09, so a 3 percent increase is economically very large. In areas where the local loans were held also experienced positive house price growth during the bust, a 1 percent increase in held loans results in a 2 percent increase in house prices. I argue that local lenders are actively exiting overheated markets but making loans in areas where the increase in house prices is justified.

I further examine the behavior of local lenders in different markets using the Saiz measurement of housing supply elasticity. Glaeser, Gyourko and Saiz (2008) shows that prices in areas with an extremely elastic housing supply (i.e. unlimited ability to build and expand the housing stock such as Wichita, KS.) will not deviate from fundamentals. In fact, home price growth in high elasticity markets during the pre-crisis years remains relatively flat, growing at the rate of inflation. Whereas inelastic areas experience an increase in home prices, even with the ability to say, grow vertically, demonstrating the ability hous-

⁵I look at securitization rates within the sub-market of local loans. I do not differentiate between prime and subprime loans and though I recognize the potential for different behavior across loan pools, previous studies have shown that concentrated lenders do tend to lend to riskier borrowers. Agarwal, Chang and Yavas (2012) have an excellent discussion of adverse selection in mortgage securitization in regards to pre-payment verse default risk for further information on subprime lending.

ing demand has on driving up prices in areas with lower ability to increase housing supply. Perhaps causing prices to rise beyond the intrinsic value of the home with no justification from the economic health of the local market.

The within lender analysis shows that in low elasticity areas where the lender has a branch lending growth is negative. Across markets, home price growth is more strongly negatively correlated with local loans growth in areas with low housing elasticity, such as Miami, FL. In areas with high elasticity, home price growth and local lending growth are no longer correlated but the relationship is not statistically significantly different from the low elasticity market. The most striking result is that where local lenders decrease their growth rate, non-local lenders *increase* their lending and the difference across the lender types in the low elasticity markets is statistically significant. During the run-up to the housing crisis (2002-06), local lenders markedly exit the markets that would eventually face the worst price declines.

I use California foreclosure data available at the ZIP code level to quantify the relationship between local lending and foreclosures during the mortgage default crisis. I use the California subsample because the complete coverage for the state is available from 2002. Foreclosure rates are higher in markets where local loans fell most during the boom. A 1 standard deviation increase in local loan growth from 2002-06 is associated with 5 fewer foreclosures for every one thousand houses from 2006-09. The results are even stronger for the local loans that are held; a 1 standard deviation increase in the growth rate of local loans held is associated with 7 fewer foreclosures per one thousand households. To the extent that foreclosures are costly for the local economy, fewer foreclosures are beneficial.⁶

This study contributes to the literature by testing across all banks, large and small, their ability to take advantage of soft information when they have a physical presence in the local area. The theoretical literature about financial institutions suggests that banks should be large, diversified and financed mainly with debt in order to minimize risk and address asymmetric information issues.⁷ Previous literature documents how local lenders invest more in personal relationships and are able to take advantage of soft information.

⁶Campbell, Giglio, and Pathak (2009) find that foreclosure at a distance of 0.05 miles lowers the price of a house by about 1%.

⁷Leland and Pyle (1977), Townsend (1979) and Diamond (1984).

Both the size of the institution and the distance from borrowers have been suggested in prior literature as important factors in the institutions' willingness to loan to riskier borrowers and the bank's ability to retain borrowers' business.⁸

The size of the bank plays a large role because of the difficulty of transmitting soft information across multiple layers of a decision making process. Stein (2002) argues that small, decentralized banks have a comparative advantage in the case of small business lending because small banks can utilize soft information, i.e. information that cannot be directly verified by anyone other than the agent who produces it. Loan officers at small banks have the incentive to invest in information gathering because they have the power to allocate capital, unlike loan officers who operate within large banks. Working for smaller banks not only gives the loan officers access to soft information, but it also enables them to put the information to good use.

I argue that the presence of a branch allows even large decentralized banks to capitalize on soft information because loan officers at the bank's branch can affect lending directly. Loan officers work at a specific branch, or a few branches within a very concentrated area so they know when home prices are supported by fundamentals, such as increased economic opportunities in the area or new school districts etc. Loan officers can also see when home prices are rising for other reasons, such as the appraisal process. The same lender may make poor decisions about lending where no branch is available because they have to rely solely on hard information like FICO scores which is shown by Rajan, Seru and Vig (2014) to be worse at predicting default behavior than originally expected.

The importance of soft information is changing as lenders adapt to new technologies. Petersen and Rajan (2002) argue that distance no longer deters financing because advances such as computers and communication equipment improve bank employees' productivity. Instead of loan officers using soft information, there is more hard information available about the borrower from a variety of sources. Plus, the response time is quicker, so even if the borrower defaults on a payment, the lender can intervene quickly. However, Degryse and Ongena (2005) find that loan rates decrease with the distance between the lender and the borrower to offset transportation costs. So, while distance may no longer be a factor

⁸Agarwal and Hauswald (2010); Coval and Moskowitz (2011); DeYoung, Goldberg and White (1998); Ergungor (2010); Kroszner and Rajan (1994); Morse (2012); Lerner (1995).

in getting a loan, it still can affect the price of the loan. My findings suggest that lenders with soft information about housing prices exited areas with the worst price declines, so in the case of housing prices, soft information led to a better understanding of the market than hard information.

Berger et al. (2005) find that large banks are less willing to lend to informationally difficult borrowers and lend at a greater distance. The authors also show that between borrowers and small banks relationships last longer and are more exclusive. They suggest this result makes sense because soft information produced over time is non-transferable. My measure allows both small and large banks to be classified as local as long as they have a branch in the county where they are making loans. I think this is an important distinction because I am quantifying *local lending*, not just local lenders. Borrowers can form bonds with branch employees regardless of the size of the bank.

Recent studies show the supply of credit plays a major role in the housing crisis.⁹ Over time, mortgage lending practices loosen, and the average borrower's leverage increases, which subsequently leads to more borrowers defaulting on their loans.¹⁰ Some regions experience an increase in mortgage originations, even while relative income growth decreases. If the supply of credit contributed to the housing crisis, it is important to determine how different lenders behaved during the run-up to the crisis. Lenders differ in their ability and willingness to invest in information gathering about the default risk of their borrowers.¹¹ Those difference in lending strategies lead to a divergence among lenders in how informed they are about their loan portfolios.

My results suggest that lenders with branches in the counties where they made their loans take the time to understand more completely the borrower's probability of default as well as the true value of the home. Investing in information is beneficial for lenders because it enables them to lend to qualified borrowers. It is useful for the borrowers because they gain access to credit. The relationship between local lending, house price behavior and foreclosure rates suggests that local lenders could play an important role in

⁹Calhoun, LaCour-Little, Yu (2009); Favara and Imbs (2009); Gerardi, Shapiro and Willen (2007); Keys, Mukhejee, Seru, Vig (2010); Loutskina and Strahan (2009); Mayer and Pence (2009); Mian and Sufi (2009)

¹⁰Agarwal and Wang (2009); Loutskina (2010); Loutskina and Strahan (2010); Mian, Sufi and Trebbi (2011); Rajan, Seru and Vig (2010)

¹¹Stiglitz and Weiss (1981)

avoiding another housing crisis.

2 Data and Summary Statistics

I test the relationship between mortgage loans, housing prices and foreclosure rates. In order to test these relationships I need data on loan originations, the location of the lender, loan retention rates, housing prices and foreclosure rates. I use branch locations to define if a loan is local. I construct my sample using the Zillow Home Value Index and the Home Mortgage Disclosure Act (HMDA) data to calculate home price growth and mortgage characteristics at the ZIP code level.

2.1 HMDA Data

My sample includes mortgage loan origination data, made available annually pursuant to the Home Mortgage Disclosure Act of 1975 (HMDA) and includes whether a lender later sells the loan, and borrower characteristics. I focus my study on home purchases and exclude refinances and home improvement loans. I chose home purchase originations because during the Boom period interest rates changes could affect refinances through channels that are outside the scope of this study and home improvement loans are small compared to purchases. My sample starts in 1998 and runs through the housing crisis to 2009.¹²

HMDA data use the 1990 census tract definitions before 2003 and the 2000 census tract definitions starting in 2003. Both 1990 and 2000 geocoding databases are available from the Missouri Census Data Center. Census tracts do not map perfectly into ZIP codes, so I calculate weighted averages for the corresponding ZIP code weighted by the number of housing units in each census tract that lie within a given ZIP code.

Each year I match the HMDA data with the Summary of Deposits data by lender. The Summary of Deposits (SOD) contains deposit data for branches and offices of all FDIC-

¹²HMDA data include details of each application for mortgage credit; the type, purpose, lien status, and characteristics of the home mortgages that lenders originate or purchase during the calendar year; the census-tract designation of the properties related to these loans; personal demographic and other information about the borrowers; and information about loan sales. http://www.federalreserve.gov/pubs/bulletin/2010/pdf/2009_HMDA_final.pdf

insured institutions as of June 30 of each year. Along with the institution's certification number, branch addresses are included to provide an accurate mapping of the geographical presence of each institution.

Again, I consider a loan *Local* if the lender that makes the loan has a branch in the county where the property is located. I sum the number of local loans and scale that by the total number of loans originated to create an *Local Share* for each ZIP code to show how local lending behaves over time. I cannot match each individual loan to a specific branch but if I am wrongly categorizing a loan because it is in fact made by a branch outside the local market then I would be biasing my study against finding a relationship. Figure 1 shows the average *Local Share* over time measured across ZIP codes. From 1998-2002 the average levels stay around 30%; during the run-up to the housing crisis the levels dip to as low as 21%. Eventually the average *Local Share* increases to 34%, which is higher than even the 1998 levels. Overall loan origination levels fall from 2006-09, yet the share made by local lenders increases.

Table 1 details the annualized change in HMDA variables. I calculate the median of the log of income of the borrower, median income-to-loan ratios, and securitization rates. HMDA data specifies if the lender sells the loan after origination. For both local and non-local loans, I sum the number of loans originated and held, and scale by the total number of loans originated, respectively. I do this to test if housing prices appreciation decreases the number of local loans that the lender holds.

2.2 Zillow Data

Median home price data are available from the Zillow Home Value Index. Zillow.com provides monthly housing price data at the ZIP code level back to 1996.¹³ By downloading the Zillow database from Zillow.com, my sample includes pricing data for: all homes, studios, condominiums, one-bed, two-bed, three-bed, four-bed and many-bed homes. Over time, the sample increases to include more ZIP codes. In 1999, there are roughly ten thousand ZIP codes covered by Zillow; by 2009, the amount covered increases to over

¹³Mian and Sufi (2009) find that in their sample, the Zillow index has a .91 correlation coefficient with the Fiserv's Case Shiller Weiss index.

twenty-five thousand. My sample includes all ZIP codes that can be identified and mapped into their corresponding counties using the Missouri Census Data Center geocodes.

Table 2 details the annualized growth rates over time for each housing type. On average, home prices increased 12% a year from 2002-06, and decreased 5% a year from 2006-09. The correlation between different housing types is high, averaging around .8. Studios are the least correlated housing type and single family homes correlate the most with the other housing types. I run my analysis using the median price index for all homes.

2.3 Foreclosure Data

Foreclosure data are available for the state of California through the RAND California Business and Economic statistics. The data consist of the number of foreclosures in a ZIP code during the calendar year. My sample includes data from 2002 through 2009.¹⁴ There are 1,155 ZIP codes in my sample for California during the housing boom which also have housing price data from Zillow. Table 3 shows foreclosure rates over time. Throughout the housing boom, the foreclosure rate stays steady around 1 foreclosure for every one thousand housing units. During the housing crisis, mean rates reach as high as 22 foreclosures for every one thousand households.

2.4 Housing Supply Elasticity and Microeconomic Data

I use the Saiz housing supply elasticity measure based on satellite imagery of steep terrain and bodies of water to identify the amount of developable land in metropolitan areas (Saiz, 2010). An example of an area with a large amount of developable land, and thus a high elasticity value, is Wichita, KS. On the other end of the elasticity spectrum is Miami, FL. The housing supply elasticity measure is only available for the largest MSA's, so my sample size decreases in 2002 from 8,643 ZIP codes to 3,928 ZIP codes when I include the elasticity measurement. I calculated the median elasticity and break my sample into "High" and "Low" elasticity, depending on whether the value is above or below the median. I run my analysis on these two sub-samples to illustrate the differences in areas where housing

¹⁴Data are available from 1992-2002, however RAND California statistics recommend users exercise caution when comparing data across these two databases because they originate from different data sources and methods.

prices should not react to demand because the land is available to increase the housing supply.

Housing prices are strongly tied to economic factors. To proxy for health and prospects of the local economy, I use median income, unemployment and poverty growth rates measured at the county level in the year t . Growth rates are measured over the same time horizon as the housing price growth rates. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rates are from the Bureau of Labor local area unemployment statistics.

3 Empirical Methods

I first run a within lender analysis by including lender fixed effects to test the effect of having a branch in the county where the property is located. I calculate growth rates for each lender at the ZIP code level for loan originations and loan originations that are subsequently held on their portfolio. I regress those two variables on the home price growth, a flag for if the lender has a branch in the county and the interaction term of those two variables to study the relationship between lending and having a physical presence in the market. I control for economic factors in the local economy and borrower characteristics for the loans each lender makes. The growth rates are measured from 2002-06 within lender for each ZIP code, the OLS regression is as follows:

$$\begin{aligned} Y_{i,j,Boom} = & \beta_1 \text{ Home price growth*Branch}_{i,j,Boom} + \beta_2 \text{ Home price growth}_{i,Boom} \\ & + \beta_3 \text{ Branch}_{i,j,2002} + \text{Borrower Controls}_{i,j,Boom} \\ & + \text{Economic Controls}_{i,Boom} + \gamma_j + \phi_k + \alpha + \varepsilon_i \quad (1) \end{aligned}$$

in which γ_j is lender fixed effects and ϕ_k is state fixed effects. The branch flag is one if a lender has a branch in a respective county in 2002. Lenders such as thrifts and mortgage brokers that make loans but do not have a physical presence in the market have a branch flag equal to zero. For non-FDIC institutions, such as financial institutions solely under the supervision of the Housing and Urban Development agency (HUD), the branch flag

is also zero. Credit Unions represent roughly 3% of mortgage applications and are not included in the sample.

Additionally, I use the Saiz elasticity measure and regress the loan origination growth on the triple interaction between home price growth, a branch flag and an elasticity flag. I define the elasticity flag to be equal to one if the ZIP code is in a MSA with an elasticity level below the median elasticity. The low elasticity flag is equal to one in areas such as Miami, FL and capture the fact that in those areas house prices may move even further from fundamentals because of the inability to expand housing quantity when demand for housing rises.

Once I establish the importance of a lender's branch network, I run cross-sectional regressions over two periods: Boom years from 2002-06 in which housing prices were generally rising, and Bust years from 2006-09 over which time housing prices, on average, fell. I regress the growth rate of local and non-local loans on the growth rate of housing prices. The level of analysis is at the ZIP code. In my first regression, I study the relationship between *Local Loans Growth* and housing price growth in a contemporaneous model:

$$\begin{aligned} \text{Local Loans Growth}_{i,Boom} = & \beta \text{ Home Price Growth}_{i,Boom} \\ & + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Boom} + \phi_k + \alpha + \varepsilon_i \end{aligned} \quad (2)$$

in which ϕ_k is a State-level fixed effect. The *Local Loans Growth* is the difference between the Local Loans in 2006 and 2002, scaled by Local Loans in 2002. *Home Price Growth (Boom)* is the difference between home prices in 2006 and 2002, scaled by the home price in 2002.¹⁵ Borrower controls include median borrower income and loan to income ratios for both local and non-local loans. Economic controls include median income for the county as well as the poverty and unemployment rates also measured at the county level.

Furthermore, many studies document the importance of securitization from 2002-06 and the emergence of the originate to distribute model in mortgage lending. The loans that are not sold and remain on the lender's balance sheet are thus of even greater importance.

¹⁵Zillow Home Value Index is available monthly, so I measure all home prices as of June of the respective year.

I test if lenders with a geographical presence behave differently with respect to the loans that are originated and held as well. This analysis helps to drill down further to test the soft information hypothesis. Since lenders with knowledge of the local economic conditions and value of local housing could still possibly originate as many mortgages as possible with the intention to sell those to GSE's or other private lenders, the loans the lenders do retain on their portfolios can capture differences between local and non-local loans even more.

The model is changed to regress the *Local Held Loans Growth* on housing prices changes in which Local Held Loans Growth is the difference between the Local Held Loans in 2006 and 2002, scaled by Local Held Loans in 2002. I then test Non-Local and Non-Local Held Loan growth as dependent variables to study the difference between the two loan types.

I rerun equation (2) using the subsample of ZIP codes that are included in the Saiz measure of housing supply elasticity. Throughout the last decade, house price growth remained low in highly elastic areas, such as Wichita, KS, and Fort Wayne, IN; whereas house price growth increased steadily during the Boom period and collapsed during the Bust period in the low elasticity markets. I test the relationship between the *Local Loans Growth* and house price growth again because the change in the local loans in the High elasticity areas should not be very strong since housing demand can be met with new housing instead of increased house prices. The change in the local loans in the Low elasticity areas may be even more pronounced, however, since the relative scarcity of developable land can cause housing prices to rise, perhaps even in excess of a general equilibrium.

Models (1) and (2) document the behavior of lenders during the run-up to the real estate crisis. To test if lenders correctly identified where housing was overvalued, I regress the housing price growth rate during the housing bust from 2006-09 on the growth rates of loan origination and retention of local and non-local loans during the Boom. The growth rates are lagged to understand the behavior of housing prices during the Bust according to the lender behavior during the Boom. The model now becomes:

$$\begin{aligned} \text{Home Price Growth}_{i,Bust} = & \beta X_{i,Boom} + \text{Home Price Growth}_{i,Boom} \\ & + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_k + \alpha + \varepsilon_i \end{aligned} \quad (3)$$

in which ϕ_k is a State-level fixed effect and X includes Local Loans Growth, Local Held Loans Growth, Non-Local Loans Growth and Non-Local Held Loans Growth. Notice that the Economic controls are measured concurrently with the housing price growth. Borrower controls are measured over the same period as the lending growth rates because they are controlling for the quality of the borrowers during the Boom.

3.1 California Foreclosure Rates

To test the long term effects of local mortgage lending, I study the relationship between foreclosure rates and local lending for the state of California. I scale the total number of foreclosures in a ZIP code by the total number of housing units according to the 2000 Census. I regress the change of the foreclosure rates during the Bust on growth rates of loan origination and retention of local and non-local loans during the Boom.. The model includes borrower and economic controls and is as follows:

$$\begin{aligned} \text{Foreclosure Rate Change}_{i,Bust} = & \beta X_{i,Boom} + \text{Home Price Growth}_{i,Boom} \\ & + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_j + \alpha + \varepsilon_i \end{aligned} \quad (4)$$

in which ϕ_k is a county-level fixed effect and X includes Local Loans Growth, Local Held Loans Growth, Non-Local Loans Growth and Non-Local Held Loans Growth. It is important to include the home price growth during the Boom as a control as well since borrowers typically do not default when home prices rise. This regression allows me to determine if an increase in the local loans led to fewer foreclosures during the housing crisis from 2006-09.

4 Results

4.1 Within Lender Analysis

The within lender analysis from equation (1) is reported in Table 4. Column (1) reports the model with total loan originations as the dependent variable. The coefficient on the interaction term is negative and strongly statistically significant. The direct effect of

house price growth is positive while the direct effect of having a branch is negative. The interaction term tells us that as home prices rise, having a branch in the area slows the growth rate of total loan origination by a lender. Overall the growth rate is still positive since the coefficient on the interaction term is less than the coefficient on the direct effect of home price growth, but the growth rate is slowed. Specifically, lenders that have a branch decrease the growth rate by roughly 50 percentage points.

From 2002-06, home prices increase on average 12%. The coefficient from the direct effect of home price growth is 0.076 which means lenders increased lending nearly 84% over the boom. The coefficient from the interaction term of home price growth and a branch in the area is -0.053. That translates to 64% less lending increase in areas where the lender had a branch that experience the rapid growth in home prices.

Column (2) of Table 4 reports the regression results from the within lender analysis on the originated and *held* loans. I test to see if the results are stronger now that the loans will directly impact the lender because they remain on the lender's balance sheet. A lender decreases the growth rate by 7 percentage points when a branch is present. The coefficient from the direct effect is .107 whereas the coefficient from the interaction term is -0.07. When a lender has a branch in an area where it is lending, in addition to originating fewer loans from 2002-06, it retains fewer of the loans it originates. This evidence demonstrates that lenders behave differently when they have a physical presence in the market where they are operating.

Table 5 details the results from equation (1) that adds the supply elasticity to create a triple interaction with house price growth and the geographical presence of a branch. Again a within lender analysis, these results show that the direct effect of the Low elasticity areas is positive, areas such as Miami, FL and San Francisco, CA. The coefficient from the triple interaction is negative and highly significant. In column (1) the results for loan originations show that loan growth is now negative in low elasticity areas where lenders have branches and home prices appreciate most. Column (2) show that the decrease in maintaining the loans on their portfolio is also negative and decreases dramatically with a branch present. Note that when the elasticity measure is used the sample will always be smaller since the measure is only available at the MSA level.

4.2 Local Lending Growth Rates

Table 6 shows the relationship between the growth rates of local and non-local loans across markets with respect to house price growth from equation (2). It is important to study growth rates because the market share of local lenders could mechanically decrease with more non-local loans being originated in an area. However, the growth rate of local loans could possibly remain steady or even increase regardless of mortgage brokers and other lenders without branches increasing their lending in the area. The results from column (1) show the growth rate of local loans is significantly *negatively* correlated with house price growth during the boom. Non-local lending in column (3) is positively correlated. For a 1% increase in housing prices, local lending decreases by a little over two percent and non-local lending increases by roughly 2.5%. These results show that locally made loans are decreasing during the Boom in areas with the highest home price appreciation and provide evidence that lenders with a local presence behave differently and in many cases as if they are better informed about the value of housing in the local area.

The originate and held results in column (2) and (4) of Table 6 continue to show that where lenders have a branch they held fewer loans on their balance sheets whereas the growth rate for the non-local lenders does not show any significant change in their originate and hold behavior.

If local lenders were exiting overheated housing markets these results will be even stronger in the low housing supply elasticity markets such as Miami, FL. Table 7 and Table 8 repeat the analysis from equation (2) for Local Loans Growth subsample of ZIP codes with High and Low Elasticity. Housing price growth and the *Local Loans Growth* are no longer correlated in High elasticity areas during 2002-06. Low elasticity markets are still negatively correlated and now a 1% increase in home prices results a 3% decrease in Local Loans Growth. A test between the coefficients from the local and non-local loans made in low elasticity areas yields a χ^2 estimate of 13.25 (p-value 0.0003). While I can reject the null that the coefficient for the local and non-local loans are the same in low elasticity areas, I cannot reject that for local or non-local lenders the coefficient is the same across low and high elasticity areas.

The results are stronger in Table 8 for the Low elasticity markets and *Local Held*

Loans Growth and support the possibility that local lenders are choosing not to retain exposure to these areas as prices increase. Local held loan growth decreases by 20% in Low elasticity markets, which would translate to nearly every local loan being sold during the run-up in the areas that hit worst by the crisis. A test between the coefficients from the local and non-local held loans made in low elasticity areas yields a χ^2 estimate of 8.05 (p-value 0.0045). As in the case of the loan originations, I can reject the null that the coefficient for the local and non-local held loans are the same in low elasticity areas, but I cannot reject that for local or non-local lenders the coefficient is the same across low and high elasticity areas.

4.3 Home Price Growth During Bust

I find that the growth in local lending during the Boom forecasts the bust. Table 9 presents the results for the lead-lag model that regresses home price growth on the growth in lending by local and non-local lenders from equation (3). Local lending growth is positively correlated with future home price growth whereas non-local lending growth is non-significant. This supports the information story that local lenders are acting on soft information that they have via operating in the local economy and Non-local lenders are not able to forecast the future housing price bust. Specifically, for a 1% increase in Local Loans Growth during the Boom, Home Prices Growth increases 3% during the Bust. Since on average home prices fell substantially during the Bust a 3% increase is economically significant.

In Table 9 column (2) the results hold that home prices rise by 3% even while including the Local Held Loans Growth variable, which shows that home prices are also positively correlated and would increase 2% for every 1% increase in locally originated and held loans. Importantly, home price growth during the Boom is included as a control in equation (3) to test that local lending is positively associated with home price growth during the bust beyond what would be expected from the trend in home prices in the local area.

4.4 California Foreclosure Rates

California is representative of a rich subsample and accounts for nearly 20% of my sample from 2002 to 2006. Over that time the average foreclosure rate does not change. In 2009, however, the foreclosure rate increases to be 17 more foreclosures per one thousand houses than in 2006. Table 10 details the results for equation (4). As with equation (3) I include house price growth along with the economic controls since foreclosures are generally negatively correlated with home price growth (borrowers tend not to default on their homes when the price is appreciating,) and prices fall substantially over the Bust period.

The change in the Foreclosure Rate during the Bust is negatively correlated with Local Loans Growth and with Local Held Loans Growth. A 1 standard deviation increase in the *Local Loans Growth* during the Boom translates to 5 fewer foreclosures for every thousand homes during the Bust in the state of California. The growth rate of Non-Local Loans is significantly positively correlated with foreclosures. The state of California represents a highly varied subsample that includes areas that experience both high and minimal home price growth during the Boom and differing foreclosure rate changes during the Bust. Due to California's variety and size it makes for a useful subsample to study.

As with the house price growth regressions, the results are stronger for the growth rate of loans held by the lender. A 1 standard deviation increase in the Local Held Loans Growth during the Boom relates to 7 fewer foreclosures per one thousand houses during the Bust. The *Non-Local Held Loans Growth* is uncorrelated with the change in foreclosures and further confirms that local lenders behaved differently over the last decade. Favara and Giannetti (2014) also show concentrated lenders foreclose less because of the subsequent costs and show their results are not based on selecting on borrowers ex-ante. I cannot speak to whether the lenders with a branch in the area restructured their loans or avoided certain borrowers to begin with, but since foreclosures can be costly to the local economy, more locally originated loans and thus fewer foreclosures is valuable to the health of the local area.

5 Conclusion

The findings in this paper show that lenders with a physical presence in a market are better informed about housing prices during the run-up to the real estate crisis and are able to forecast that prices will fall during the bust. House prices during the crisis fall more in areas where local loans decreased during the run-up. It is possible that local lenders are trying to minimize their exposure to future foreclosures since borrowers with a mortgage loan greater than the value of the home are more likely to default.

The within lender analysis shows that lenders made fewer loans in high home price appreciation areas when there was a branch in the area where the property was located. While lenders may have a general business model for the institution, with all of the time-invariant factors absorbed by the lender fixed effects, the ability of loan officers at the branches to influence the loan origination process and take advantage of their superior knowledge of the local area is reflected in the results that better loans are made.

Across markets, the local loan growth rate is consistently negatively correlated with home price growth. On average, house prices increased 12% from 2002-06 so local lending would have decreased roughly 25% in those areas. The growth rate captures the behavior of local loans specifically and could in theory have remained constant over the Boom because the demand for credit was high and home ownership rates were rising.¹⁶ Yet the robust results of the negative relationship show that lenders with access to local information started to lend more prudently.

The results are stronger in areas with Low housing supply elasticity (i.e. Miami, FL). The results are also stronger when the lender holds the local loans. The evidence in regards to elasticity and the held loans suggests that local lenders exited overheated housing markets prior to the crisis. I run a counterfactual design using the time period from 1999-2002 to further test the robustness of the results and do not find a relationship.¹⁷ The importance of the timing of the run-up to the real estate crisis shows that these lenders are reacting to the possibility of home prices rising above actual home-price fundamentals.

Local lenders try to avoid the foreclosure process. The number of foreclosures is less

¹⁶<http://www.census.gov/housing/hvs/files/currenthvspress.pdf>.

¹⁷Results reported in the online appendix in Table 2.

during 2006-09 in areas where local loans increase from 2002-06. Again, the relationship is stronger when the lender holds the local loans rather than securitizing. A 1 standard deviation increase in the growth rate of held local loans is associated with 7 fewer foreclosures per one thousand homes in California during the mortgage default crisis. Since foreclosures are costly for both the lender and the surrounding area it is socially beneficial if lenders can decrease the possibility of defaults.

The ability to forecast future housing prices, as well as avoid foreclosures, suggests that investment in information pays off for local lenders. Collecting information is costly, which is why lenders with a branch in the area have an advantage over non-local lenders. However, the incentives in lending practices should be such that investing in information is rewarded even for non-local lenders. Large and diversified banks may theoretically be able to minimize risk in their loan portfolio by understanding the nuances of their markets.

The rapid rise of housing prices and mortgage default crisis provides an excellent setting to study the role local lenders play in the economy. Previous literature suggests that local lenders are more informed about their borrowers and in this paper I show that local lenders are also informed about their local economy and specifically, housing prices. Future research can extend this information story further to test if local lenders can capitalize on their soft information about other aspects of the local economy.

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A Definition of Variables

Zillow Home Value Index, Zillow.com

- Home Price Growth $_{i, Boom} = (\text{All Homes Price}_{i, 2006} - \text{All Homes Price}_{i, 2002}) / \text{All Homes Price}_{i, 2002}$
- Home Price Growth $_{i, Bust} = (\text{All Homes Price}_{i, 2009} - \text{All Homes Price}_{i, 2006}) / \text{All Homes Price}_{i, 2006}$

Branch level data, FDIC Summary of Deposits

- Branch Flag = indicator equal to 1 if a lender has a branch in a county in 2002.
- Local Loan = indicator equal to 1 if the lender has a branch in the county where the loan is to be made.
- Total Deposits $_{i, Boom} = (\text{Total Deposits}_{i, 2006} - \text{Total Deposits}_{i, 2002}) / \text{Total Deposits}_{i, 2002}$
- Total Deposits $_{i, Bust} = (\text{Total Deposits}_{i, 2009} - \text{Total Deposits}_{i, 2006}) / \text{Total Deposits}_{i, 2006}$

Home Mortgage Disclosure Act (HMDA) variables

- Loan Origination Growth = $(\text{Total Loans Originated}_{i, j, 2006} - \text{Total Loans Originated}_{i, j, 2002}) / \text{Total Loans Originated}_{i, j, 2002}$
- Held Loan Origination Growth = $(\text{Total Loans Originated and Held}_{i, j, 2006} - \text{Total Loans Originated and Held}_{i, j, 2002}) / \text{Total Loans Originated and Held}_{i, j, 2002}$
- Borrower Average Income = Growth rate of average income for borrowers of originated loans from 2002-2006 at the lender, ZIP code level.
- Borrower Loan to Income Ratio = Growth rate of average loan to income ratio for borrowers of originated loans from 2002-2006 at the lender, ZIP code level.
- Local Loans Growth $_{i, Boom} = (\text{Local Loans}_{i, 2006} - \text{Local Loans}_{i, 2002}) / \text{Local Loans}_{i, 2002}$
- Local Held Loans Growth $_{i, Boom} = (\text{Local Held Loans}_{i, 2006} - \text{Local Held Loans}_{i, 2002}) / \text{Local Held Loans}_{i, 2002}$
- Local Median Income $_{i, t} = \text{Log of Borrower Income}_{i, t}$
- Local Median Income $_{i, Boom} = (\text{Local Median Income}_{i, 2006} - \text{Local Median Income}_{i, 2002}) / \text{Local Median Income}_{i, 2002}$
- Local Loan to Income Ratio $_{i, t} = \text{Local Loan Amount}_{i, t} / \text{Borrower Income}_{i, t}$
- Local Loan to Income Ratio $_{i, Boom} = (\text{Local Loan Income Ratio}_{i, 2006} - \text{Local Loan Income Ratio}_{i, 2002}) / \text{Local Loan Income Ratio}_{i, 2002}$
- Local Share $_{i, t} = \text{Total Local Loans}_{i, t} / \text{Total Loans Originated}_{i, t}$ (online appendix)

- Local Held Loans Share $_{i,t}$ = Total Local Loans Held $_{i,t}$ / Total Local Loans $_{i,t}$ (online appendix)
- Local Share Change $_{i,Boom}$ = (Local Share $_{i,2006}$ -Local Share $_{i,2002}$) (online appendix)
- Local Held Loans Change $_{i,Boom}$ = (Local Loans Held Share $_{i,2006}$ -Local Loans Held Share $_{i,2002}$) (online appendix)

All variables are also calculated for non-local loans.

All variables are also calculated over the Bust period (2006-09).

California Foreclosure Rates, RAND Business and Economics Statistics

- Foreclosure Rate $_{i,t}$ = Total Foreclosures $_{i,t}$ / Total Housing Units $_{i,2000}$
- Foreclosure Rate $_{i,Boom}$ = (Foreclosure Rate $_{i,2006}$ - Foreclosure Rate $_{i,2002}$) (online appendix)
- Foreclosure Rate Change $_{i,Bust}$ = (Foreclosure Rate $_{i,2009}$ - Foreclosure Rate $_{i,2006}$)

House Supply Elasticity, Saiz Housing Supply Elasticity Measure

- High elasticity = indicator equal to 1 is the value of the elasticity is above the median elasticity value, e.g., Wichita, KS.
- Low elasticity = indicator equal to 1 is the value of the elasticity is below the median elasticity value, e.g., Miami, FL.

Microeconomic Variables

- Median Income $_{i,Boom}$ = (Median Household Income $_{i,2006}$ - Median Household Income $_{i,2002}$) / Median Household Income $_{i,2002}$
- Median Income $_{i,Bust}$ = (Median Household Income $_{i,2009}$ - Median Household Income $_{i,2006}$) / Median Household Income $_{i,2006}$
- Unemployment Rate $_{i,Boom}$ = (Unemployment Rate $_{i,2006}$ - Unemployment Rate $_{i,2002}$) / Unemployment Rate $_{i,2002}$
- Unemployment Rate $_{i,Bust}$ = (Unemployment Rate $_{i,2009}$ - Unemployment Rate $_{i,2006}$) / Unemployment Rate $_{i,2006}$
- Poverty Rate $_{i,Boom}$ = (Poverty Rate $_{i,2006}$ -Poverty Rate $_{i,2002}$) / Poverty Rate $_{i,2002}$
- Poverty Rate $_{i,Bust}$ = (Poverty Rate $_{i,2009}$ -Poverty Rate $_{i,2006}$) / Poverty Rate $_{i,2006}$

Figure 1: Local Share Time Trend

This figure reports the average Local Share from 1998-2009. A loan is considered local if it is made by a lender that has a branch in the county where the property is located. The Local Share is the total number of local loans scaled by the total loans originated. Local Share-All reflects the average local share for the entire sample in a year. Local Share-Balanced reflects the average local share for a balanced panel which includes all of the ZIP codes for which house price data is available in 2002. Branch data comes from the FDIC Summary of Deposits. Loan origination data comes from HMDA data which is made available per the Home Mortgage Disclosure Act of 1975. The unit of observation is at the ZIP code level.

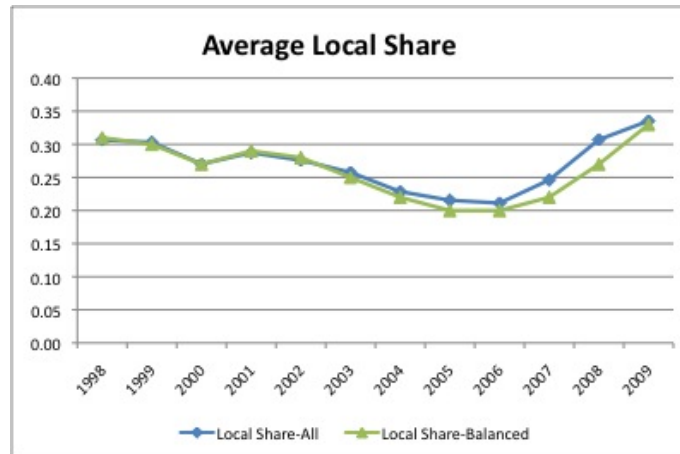


Table 1: HMDA Summary Statistics

This table reports summary statistics of the growth rates for HMDA variables over the Boom period (2002-06). The individual lender statistics are reported first and then the unit of observation is at the ZIP code level. A loan is considered local if made by a lender that has a branch in the county where the property is located. Branch data comes from the FDIC Summary of Deposits. Held loans are loans that the lender does not sell to a third party within the calendar year. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income.

Variable	HMDA Growth Rates 2002-06		
	Mean	St. Dev.	Obs.
Loan Originations	0.19	0.50	253,397
Held Loan Originations	0.28	0.59	170,464
Borrower Income	0.04	0.02	253,397
Borrower Loan to Income Ratio	0.02	0.02	253,397
Local Loans	-0.10	0.76	7,258
Local Held Loans	-0.04	0.19	7,258
Non-Local Loans	0.20	0.74	7,284
Non-Local Held Loans	0.07	0.90	7,284
Local Median Income (log)	0.02	0.04	7,258
Local Loan to Income Ratio	0.02	0.05	7,258
Non-Local Median Income (log)	-0.02	0.03	7,284
Non-Local Loan to Income Ratio	0.03	0.04	7,284

Table 2: Zillow Summary Statistics

This table reports summary statistics for the Zillow Home Value Index data over the Boom (2002-06) and Bust (2006-09). Zillow data are made available by Zillow.com. The unit of observation is at the ZIP code level. The Zillow Home Value Index reports median home prices based on a proprietary formula. The Top, Middle and Bottom tier report the top, middle and bottom third of the Index values, respectively. The number of observations changes per housing type because certain housing types may not be available to price in a ZIP code.

Home Type	Home Price Growth Annualized 2002-06			Home Price Growth Annualized 2006-09		
	Mean	St. Dev.	Obs.	Mean	St. Dev.	Obs.
All Homes	0.12	0.09	9,043	-0.05	0.06	10,706
Single Family	0.12	0.09	8,966	-0.05	0.06	10,628
Condo	0.13	0.15	4,313	-0.06	0.06	5,145
Top Tier	0.11	0.08	7,388	-0.05	0.05	9,046
Middle Tier	0.11	0.09	8,351	-0.05	0.05	9,969
Bottom Tier	0.12	0.18	7,470	-0.05	0.07	8,881
Studio	0.13	0.19	6,371	-0.04	0.08	7,621
One Bed	0.14	0.12	2,297	-0.06	0.07	2,619
Two Bed	0.12	0.09	6,699	-0.05	0.06	7,899
Three Bed	0.12	0.08	8,008	-0.05	0.06	9,512
Four Bed	0.12	0.08	7,000	-0.05	0.05	8,356
Many Bed	0.12	0.08	4,418	-0.05	0.06	5,316

Table 3: California Foreclosure Summary Statistics

This table reports summary statistics for foreclosures and foreclosure rates for the state of California from 2002-09. Panel A reports average total foreclosures and Panel B reports foreclosure rates defined as total foreclosures per one thousand houses. The number of observations in panel A is 1720 and 1640 in Panel B, it decreases because data on the number of housing units is unavailable. Foreclosure data are provided by California RAND Business and Economic statistics. Housing units data are provided by the Census Bureau via the Missouri Census Data Center. The unit of observation is at the ZIP code level.

Panel A: Total Foreclosures					
Year	Mean	St. Dev.	Minimum	Median	Max
2002	10	21	0	3	219
2003	6	11	0	2	1225
2004	3	5	0	1	61
2005	2	3	0	1	27
2006	8	12	0	3	122
2007	53	86	0	16	749
2008	147	243	0	44	1910
2009	117	173	0	43	1303

Panel B: Foreclosure Rates (per 1,000 houses)					
Year	Mean	St. Dev.	Minimum	Median	Max
2002	1	3	0	<1	18
2003	1	5	0	<1	9
2004	1	2	0	<1	15
2005	1	3	0	<1	10
2006	1	4	0	1	91
2007	7	31	0	3	213
2008	22	85	0	9	161
2009	18	66	0	9	150

Table 4: Within Lender Loan Growth during Boom

This table reports within-lender regressions of loan origination growth on home price growth in the ZIP code where the property is located and whether the lender has a branch in the County where the loan is made. Column (2) reports the within-lender OLS regression of originated loans that are held on the balance sheet of the lender. Loan originations growth and Held loan originations growth are calculated over the boom, 2002-06. Branch flag equals one if the lender has a branch in the county where the property is located. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics. County level clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) Loan Originations Growth	(2) Held Loan Originations Growth
Home Price Growth _{Boom} *Branch Flag	-0.0530*** (0.00997)	-0.0703*** (0.0161)
Home Price Growth _{Boom}	0.0763*** (0.0138)	0.107*** (0.0305)
Branch flag	-0.0983*** (0.00793)	-0.138*** (0.0124)
Total Deposits	0.00488 (0.00994)	0.00218 (0.0238)
Poverty Rate	-0.0298 (0.0297)	-0.119** (0.0533)
Median Income	-0.116 (0.0740)	-0.562*** (0.147)
Unemployment Rate	0.248*** (0.0380)	0.414*** (0.0779)
Borrower Income	0.001*** (0.0001)	0.003*** (0.0003)
Borrower Loan to Income Ratio	0.018*** (0.0012)	0.025*** (0.0026)
Observations	253,397	170,464
R-squared	0.232	0.095
State Fixed Effect	Yes	Yes
Lender Fixed Effect	Yes	Yes

Table 5: Within Lender Loan Growth during Boom by Elasticity

This table reports within-lender regressions of loan origination growth on home price growth in the ZIP code where the property is located and whether the lender has a branch in the County where the loan is made. Low Elasticity equals one if the loan is originated in a Low (e.g., Miami, FL) area based on Saiz housing supply elasticity. Column (2) reports the within-lender OLS regression of originated loans that are held on the balance sheet of the lender. Loan originations growth and Held loan originations growth are calculated over the boom, 2002-06. Branch flag equals one if the lender has a branch in the county where the property is located. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics. County level clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) Loan Originations Growth	(2) Held Loan Originations Growth
Home Price Growth _{Boom} *Branch Flag*Low Elasticity	-0.0787*** (0.0248)	-0.1204*** (0.0420)
Home Price Growth _{Boom} *Branch Flag	-0.0618*** (0.0172)	-0.0776** (0.0369)
Home Price Growth _{Boom} *Low Elasticity	0.0281 (0.0294)	0.00127 (0.0663)
Branch Flag*Low Elasticity	-0.0395** (0.0161)	-0.0426 (0.0306)
Home Price Growth _{Boom}	0.0626** (0.0284)	0.1057* (0.0588)
Branch flag	-0.0943*** (0.0157)	-0.1357*** (0.0264)
Low Elasticity	0.0521*** (0.0166)	0.0782** (0.0332)
Total Deposits	0.0289 (0.0206)	0.0555 (0.0397)
Poverty Rate	-0.1586*** (0.0345)	-0.231*** (0.0738)
Median Income	-0.231* (0.121)	-0.773*** (0.235)
Unemployment Rate	0.0673 (0.0551)	0.0684 (0.117)
Borrower Median Income	0.0002*** (0.00002)	0.0004*** (0.00004)
Borrower Loan Income Ratio	0.0219*** (0.0026)	0.0365*** (0.0726)
Observations	105,693	70,806
R-squared	0.234	0.119
State Fixed Effect	Yes	Yes
Lender Fixed Effect	Yes	Yes

Table 6: Loan Growth during Boom

This table reports regressions of growth rates of local and non-local lending on home price growth within each State from 2002-06. The unit of observation is at the ZIP code level. A loan is considered local if it is made by a lender that has a branch in the county where the property is located. Local Loans Growth is the difference in local loans made from 2002-2006, scaled by the total local loans made in 2002. Home Price Growth refers to median home prices from Zillow.com for all homes. Columns (2) and (4) report regressions of the growth rate of originated and held loans. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics. County level clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) Local Loans Growth	(2) Local Held Loans Growth	(3) Non-Local Loans Growth	(4) Non-Local Held Loans Growth
Home Price Growth _{Boom}	-0.0201*** (0.00702)	-0.0812** (0.0373)	0.0257*** (0.00757)	0.0333 (0.0222)
Total Deposits	0.00259 (0.0101)	0.00129 (0.0185)	-0.00332 (0.00411)	-0.00267 (0.00697)
Poverty Rate	0.00836 (0.0200)	-0.118 (0.0844)	0.0525*** (0.0167)	-0.00109 (0.0553)
Median Income	-0.0338 (0.0592)	0.146 (0.222)	0.0940** (0.0372)	0.184 (0.275)
Unemployment Rate	0.0332* (0.0173)	-0.0106 (0.142)	-0.0356 (0.0227)	0.211 (0.273)
Local Median Income (log)	0.0231*** (0.00438)	0.0209 (0.0172)		
Local Loan to Income Ratio	0.0102*** (0.00328)	-0.0335** (0.0149)		
Non-Local Median Income (log)			0.0500*** (0.00457)	-0.0698 (0.0664)
Non-Local Loan to Income Ratio			-0.00697 (0.00490)	0.0659 (0.0788)
Observations	7,258	7,258	7,284	7,284
R-squared	0.131	0.076	0.156	0.04
State Fixed Effects	Yes	Yes	Yes	Yes

Table 7: **Loan Growth during Boom by Elasticity**

This table reports regressions of growth rates of local and non-local lending on home price growth within each State from 2002-06 by Elasticity. High (e.g., Wichita, KS) and Low (e.g., Miami, FL) elasticity measure based on Saiz housing supply elasticity. The unit of observation is at the ZIP code level. A loan is considered local if it is made by a lender that has a branch in the county where the property is located. Local Loans Growth is the difference in local loans made from 2002-2006, scaled by the total local loans made in 2002. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics. County level clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1)		(2)		(3)		(4)		(5)		(6)	
	Local Loans	Growth	Local Loans	Growth	Local Loans	Growth	Non-Local Loans	Growth	Non-Local Loans	Growth	Non-Local Loans	Growth
Home Price Growth _{Boom}	-0.0323*** (0.0110)		-0.0324*** (0.0113)		-0.0292 (0.0202)		0.0394*** (0.0130)		0.0278** (0.0138)		0.0419*** (0.0125)	
Total Deposits	-0.00989 (0.00733)		0.0251** (0.0124)		-0.0161* (0.00875)		0.0131 (0.0129)		0.0425*** (0.0150)		0.0103 (0.0204)	
Poverty Rate	-0.0302 (0.0265)		0.00798 (0.0231)		-0.0833 (0.0562)		-0.00612 (0.0213)		-0.0466** (0.0188)		0.0726* (0.0409)	
Median Income	-0.194** (0.0952)		-0.131 (0.0845)		-0.219 (0.154)		0.0571 (0.0661)		0.208** (0.0892)		0.00957 (0.0908)	
Unemployment Rate	0.00400 (0.0225)		-0.0398 (0.0243)		0.0650* (0.0335)		-0.0701* (0.0399)		-0.0168 (0.0370)		-0.167*** (0.0614)	
Local Median Income (log)	0.0355*** (0.00576)		0.0393*** (0.00777)		0.0324*** (0.00741)							
Local Loan to Income Ratio	0.0179*** (0.00628)		0.0172** (0.00780)		0.0165** (0.00813)							
Non-Local Median Income (log)							0.0578*** (0.00536)		0.0507*** (0.00702)		0.0617*** (0.00813)	
Non-Local Loan to Income Ratio							-0.00804 (0.00773)		0.00886 (0.00999)		-0.0207** (0.0101)	
Observations	3,040		1,460		1,580		3,048		1,457		1,591	
R-squared	0.075		0.071		0.100		0.170		0.211		0.193	
Elasticity			Low		High				Low		High	
State Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	

Table 8: Held Loan Growth during Boom by Elasticity

This table reports regressions of growth rates of held local and non-local lending on home price growth within each State from 2002-06 by Elasticity. High (e.g., Wichita, KS) and Low (e.g., Miami, FL) elasticity measure based on Saiz housing supply elasticity. The unit of observation is at the ZIP code level. A loan is considered local if it is made by a lender that has a branch in the county where the property is located. A loan is considered held if it is not sold within the calendar year that it is originated. Local Held Loans Growth is the difference in local held loans made from 2002-2006, scaled by the total local held loans made in 2002. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics. County level clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) Local Held Loans Growth	(2) Local Held Loans Growth	(3) Local Held Loans Growth	(4) Non-Local Held Loans Growth	(5) Non-Local Held Loans Growth	(6) Non-Local Held Loans Growth
Home Price Growth _{Boom}	-0.0897** (0.0383)	-0.202*** (0.0721)	-0.0674 (0.0892)	0.0128** (0.00583)	0.0165*** (0.00517)	0.0230 (0.0191)
Total Deposits	-0.0198 (0.0185)	0.0209 (0.0498)	0.152* (0.0777)	0.00805 (0.00564)	0.0128** (0.00572)	0.00321 (0.0102)
Poverty Rate	-0.0903 (0.103)	-0.243** (0.113)	-0.285 (0.191)	0.000213 (0.0200)	-0.0321** (0.0158)	0.0205 (0.0377)
Median Income	0.182 (0.274)	0.404 (0.407)	-0.648 (0.476)	-0.0194 (0.0370)	-0.0719 (0.0446)	0.0510 (0.0655)
Unemployment Rate	0.00781 (0.183)	0.0248 (0.194)	-0.139 (0.278)	-0.0338 (0.0235)	-0.0326 (0.0322)	-0.0429 (0.0291)
Local Median Income (log)	0.0227 (0.0218)	-0.00114 (0.0274)	0.0226 (0.0397)			
Local Loan to Income Ratio	-0.0149 (0.0161)	-0.0740** (0.0368)	-0.0529 (0.0338)			
Non-Local Median Income (log)				0.00707 (0.00713)	-8.37e-05 (0.00472)	0.0156 (0.0150)
Non-Local Loan to Income Ratio				0.00360 (0.00515)	0.00382 (0.00499)	-0.00224 (0.00742)
Observations	3,040	1,460	1,580	3,039	1,588	1,451
R-squared	0.107	0.149	0.069	0.050	0.122	0.057
Elasticity		Low	High			
State Fixed Effects	Yes	Yes	Yes	Yes	Low Yes	High Yes

Table 9: Home Price Growth during Bust

This table reports regressions of home price growth from 2006-09 on local and non-loans growth rates from 2002-06 within each State. The unit of observation is at the ZIP code level. A loan is considered local if it is made by a lender that has a branch in the county where the property is located. Local Held Loans Growth is the difference in local held loans made from 2002-2006, scaled by the total local held loans made in 2002. Column (2) reports regressions that include local held and non-local held growth rates as well. A loan is considered held if it is not sold within the calendar year that it is originated. Local Held Loans Growth is the difference in local held loans made from 2002-2006, scaled by the total local held loans made in 2002. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics. County level clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) Home Price Growth _{Bust}	(2) Home Price Growth _{Bust}
Local Loans Growth	0.0344*** (0.00447)	0.0331*** (0.00444)
Local Held Loans Growth		0.0188*** (0.00453)
Non-Local Loans Growth	0.00540 (0.00415)	0.00569 (0.00407)
Non-Local Held Loans Growth		0.000045 (0.000126)
Home Price Growth _{Boom}	-0.168*** (0.0164)	-0.169*** (0.0161)
Total Deposits	0.00595 (0.00800)	0.00635 (0.00792)
Poverty Rate	-0.0742* (0.0418)	-0.0730* (0.0413)
Median Income	0.375*** (0.106)	0.366*** (0.105)
Unemployment Rate	-0.0663*** (0.0203)	-0.0663*** (0.0200)
Local Median Income (log)	-0.00184 (0.00654)	-0.00161 (0.00656)
Local Loan to Income Ratio	0.00683 (0.00443)	0.00678 (0.00441)
Non-Local Median Income (log)	-0.0195** (0.00968)	-0.0186* (0.00966)
Non-Local Loan to Income Ratio	0.0411*** (0.00884)	0.0399*** (0.00870)
Observations	7,215	7,195
R-squared	0.649	0.651
State Fixed Effects	Yes	Yes

Table 10: Foreclosure Rate Change during Bust

This table reports regressions of foreclosure rate changes from 2006-09 on local and non-loans growth rates from 2002-06 within Counties for the state of California. The unit of observation is at the ZIP code level. A loan is considered local if it is made by a lender that has a branch in the county where the property is located. Local Held Loans Growth is the difference in local held loans made from 2002-2006, scaled by the total local held loans made in 2002. Column (2) reports regressions that include local held and non-local held growth rates as well. A loan is considered held if it is not sold within the calendar year that it is originated. Local Held Loans Growth is the difference in local held loans made from 2002-2006, scaled by the total local held loans made in 2002. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics. ZIP code level clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) Foreclosure Rate Change _{Bust}	(2) Foreclosure Rate Change _{Bust}
Local Loans Growth	-0.0592*** (0.0228)	-0.0104* (0.00598)
Local Held Loans Growth		-0.0375* (0.0210)
Non-Local Loans Growth	0.0626** (0.0244)	0.0278 (0.0170)
Non-Local Held Loans Growth		0.00150 (0.00266)
Home Price Growth _{Boom}	-0.0852*** (0.0216)	-0.0869*** (0.0224)
Total Deposits	1.213* (0.694)	-0.00775 (0.135)
Poverty Rate	0.0831 (0.392)	0.0519 (0.0895)
Median Income	0.434 (0.963)	0.342 (0.306)
Unemployment Rate	0.197 (0.402)	-0.0227 (0.0656)
Local Median Income (log)	0.00769 (0.0216)	0.000435 (0.00413)
Local Loan to Income Ratio	0.0152 (0.00990)	0.00474 (0.00335)
Non-Local Median Income (log)	-0.141* (0.0789)	-0.0287 (0.0183)
Non-Local Loan to Income Ratio	0.0600 (0.0405)	0.0195 (0.0153)
Observations	1,034	1,030
R-squared	0.156	0.160
County Fixed Effects	Yes	Yes

Did Local Lenders Forecast the Bust? Evidence from the Real Estate Market

Kristle Romero Cortés

ONLINE APPENDIX

February, 2015

1 Bank of America

I do the analysis solely for the Bank of America to show the results for a particular lender that while national, has many branches that result in having a local presence in many markets. The results are strong that where Bank of America has a branch in 2002, the increase in their lending is negatively correlated with home price growth, similar to the local share results already presented.

2 Counterfactual Analysis

I test to see if there is a correlation between the *Local Share* change and housing price growth prior to the housing expansion of 2002. As a counterfactual, I regress the Home Price Growth during the Boom period on the *Local Share* change from 1999-2002:

$$\begin{aligned} \text{Home Price Growth}_{i, \text{Boom}} = & \beta \text{ Local Share Change}_{i, \text{Prior}} \\ & + \text{Borrower Controls}_{i, \text{Prior}} + \text{Economic Controls}_{i, \text{Boom}} + \phi_k + \alpha + \varepsilon_i \end{aligned} \quad (1c)$$

It is important to understand the behavior of the *Local Share* during periods of time when housing prices accurately reflect fundamentals in order to establish a baseline for comparison during the Boom and Bust periods. Table 11 shows the variables are not correlated when I test the relationship in my counterfactual. This result holds for both High and Low elasticity markets as well. The positive correlation between the housing Bust and the *Local Share* change during the Boom is particular to there first being the Boom in housing prices. This would support the reasoning that local lenders have more information and stopped making loans in areas with overzealous housing price growth. The housing prices increased during the crisis in areas where the *Local Share* change increased during the Boom. This result is special to the timing of the Bust following the Boom.

3 Changes in Local Share

The main tables based on the growth rates of the local share are repeated here using just the change in local share. The findings are consistent across the different measures including elasticity, the change in held share and with respect to foreclosures. The main reason to use growth rates is to show that the results are not caused by local loans being driven out of the market, but rather the conscience decision to lend less.

4 Changes in Local Share across Lender Size

4.1 Size: Fifty Percent of Market Share in 2002

In order to explore the relationship between location and size I define size three different ways. When I define small lenders as those that have less than the median asset size those lenders have roughly 30% of the market share of mortgages in 2002; if I define small lenders as those that have less than ten billion dollars in assets those lenders have roughly 70%. Instead of using the total assets to define small versus large, I back out the asset size of lenders by fixing the amount of market share to be 50%. Now the Small Lenders have assets totaling less than 700 million and by design 50% of the market share of mortgages in 2002.

4.2 Size: Average Median Assets from 2002-06

When I define Small Lenders using the average median asset size of lenders it means the Small Lenders are quite small, below 200 million dollars in assets. Yet, it seems that Small Lenders reacted more sharply than Large Lenders to increases in housing prices.

4.3 Size: Over Ten Billion in Assets in 2002

The way I define local is that a loan is considered local if the lender who makes the loan has a branch in the country where the property is located. This is novel because it allows all lenders to be local and non-local. Yet it also means that national lenders can be considered local in areas where they have branches and this may seem counter-intuitive since they are located nationwide. To address this concern, my third size definition tries to capture in the Large Lender bin only the largest lenders, those that have over 10 billion dollars in assets in 2002. This translates to the Large Lenders capturing roughly 30% of the market share in 2002. I think it fits nicely with the other two definitions because it allows me to cover the range of possibilities in regards to market share while directly studying the role of information as it relates to the largest mortgage lenders.

Table 1: **Bank of America Within Bank Analysis**

This table reports OLS regression coefficients for the following model: Bank of America Market Share Change $_{i, Boom} = \beta$ Home Price Growth $_{i, Boom}$ + Borrower Controls $_{i, Boom}$ + Economic Controls $_{i, Bust} + \phi_j + \alpha + \varepsilon_i$ in which ϕ_j is county fixed effects. Boom denotes 2002-06. The unit of observation is at the ZIP code level. Home Price Growth refers to median home prices from Zillow.com for all homes. The Local Share is the total number of local loans scaled by the total loans originated. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) BofA Market Share
Home Price Growth	-0.0489* (0.0295)
Branch Flag	0.269*** (0.0373)
Home Price Growth * Branch Flag	-0.278*** (0.0684)
Total Deposits	0.203*** (0.0526)
Poverty Rate	0.00910 (0.0685)
Median Income	-0.469** (0.204)
Unemployment Rate	-0.577*** (0.165)
BofA Median Income (log)	0.0329*** (0.00496)
BofA Income Loan Ratio	-0.00713 (0.00518)
Observations	8,643
R-squared	0.314

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Home Price Growth Counterfactual Regression

This table reports OLS regression coefficients for the following model: $\text{Home Price Growth}_{i, \text{Boom}} = \beta \text{Local Share Change}_{i, \text{Prior}} + \text{Borrower Controls}_{i, \text{Prior}} + \text{Economic Controls}_{i, \text{Boom}} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Bust denotes 2006-09, Prior denotes 1999-2002. The unit of observation is at the ZIP code level. Home Price Growth refers to median home prices from Zillow.com for all homes. The Local Share is the total number of local loans scaled by the total loans originated. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. High (e.g., Wichita, KS) and Low (e.g., Miami, FL) elasticity measure based on Saiz housing supply elasticity. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Home Price Growth	(2) Home Price Growth	(3) Home Price Growth
Local Share Change	0.0353 (0.0620)	0.0477 (0.0552)	-0.0494 (0.106)
Total Deposits	-0.0268** (0.0130)	-0.0236 (0.0377)	-0.00414 (0.0179)
Poverty Rate	-0.374*** (0.0843)	-0.102 (0.0621)	-0.262** (0.111)
Median Income	1.112*** (0.212)	-0.00289 (0.308)	0.755* (0.417)
Unemployment Rate	0.357*** (0.135)	-0.0286 (0.127)	0.107 (0.230)
Other Controls	Yes	Yes	Yes
Observations	8,545	1,919	1,972
R-squared	0.624	0.662	0.697
State Fixed Effects	Yes	Yes	Yes
Elasticity		High	Low

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Local Share Change Contemporaneous Regression

This table reports OLS regression coefficients for the following model: $\text{Local Share Change}_{i, Boom} = \beta \text{Home Price Growth}_{i, Boom} + \text{Borrower Controls}_{i, Boom} + \text{Economic Controls}_{i, Boom} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Boom denotes 2002-06. The unit of observation is at the ZIP code level. The Local Share is the total number of local loans scaled by the total loans originated. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. High (e.g., Wichita, KS) and Low (e.g., Miami, FL) elasticity measure based on Saiz housing supply elasticity. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Local Share Change	(2) Local Share Change	(3) Local Share Change
Home Price Growth	-0.0215* (0.0112)	-0.0271 (0.0188)	-0.0357** (0.0176)
Total Deposits	0.0190 (0.0124)	0.0229 (0.0197)	-0.000834 (0.0434)
Poverty Rate	-0.0251 (0.0319)	0.141** (0.0550)	-0.0609 (0.0860)
Median Income	-0.0867 (0.0764)	-0.0980 (0.167)	-0.136 (0.172)
Unemployment Rate	0.108** (0.0468)	-0.0420 (0.0645)	0.281** (0.138)
Local Median Income (log)	0.0391*** (0.00675)	0.0529*** (0.0143)	0.0486*** (0.0130)
Non-Local Median Income (log)	-0.00501 (0.00950)	-0.00282 (0.0155)	-0.0133 (0.0185)
Local Loan Income Ratio	0.0156** (0.00692)	0.0269** (0.0110)	0.0460** (0.0186)
Non-Local Loan Income Ratio	0.0227*** (0.00861)	0.0112 (0.0167)	0.0111 (0.0137)
Constant	-0.0359** (0.0166)	-0.0924*** (0.0292)	0.0361 (0.0445)
Observations	8,643	1,949	1,979
R-squared	0.304	0.339	0.369
State Fixed Effects	Yes	Yes	Yes
Elasticity		High	Low

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Home Price Growth Lagged Regression

This table reports OLS regression coefficients for the following model: $\text{Home Price Growth}_{i,Bust} = \beta \text{Local Share Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Bust denotes 2006-09, Boom denotes 2002-06. The unit of observation is at the ZIP code level. Home Price Growth refers to median home prices from Zillow.com for all homes. The Local Share is the total number of local loans scaled by the total loans originated. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. High (e.g., Wichita, KS) and Low (e.g., Miami, FL) elasticity measure based on Saiz housing supply elasticity. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Home Price Growth	(2) Home Price Growth	(3) Home Price Growth	(4) Home Price Growth
Local Share Change	0.104*** (0.0248)	0.0851*** (0.0245)	0.0140 (0.0457)	0.0725* (0.0418)
Home Price Growth (Boom)		-0.164*** (0.0155)	-0.0991*** (0.0298)	-0.189*** (0.0198)
Total Deposits	-0.00269 (0.0104)	0.00682 (0.00807)	0.0279 (0.0245)	0.0100 (0.0208)
Poverty Rate	-0.0888** (0.0445)	-0.0799* (0.0410)	-0.0344 (0.0574)	-0.153** (0.0654)
Median Income	0.367*** (0.1000)	0.378*** (0.0966)	0.231 (0.174)	0.256* (0.145)
Unemployment Rate	-0.0829*** (0.0227)	-0.0777*** (0.0199)	-0.102*** (0.0312)	-0.0552** (0.0269)
Local Median Income (log)	-0.00034 (0.00664)	0.00277 (0.00663)	-0.0257 (0.0179)	0.0105 (0.0143)
Non-Local Median Income (log)	-0.0364*** (0.00915)	-0.0216** (0.00861)	0.00606 (0.0207)	-0.0359* (0.0200)
Local Loan Income Ratio	0.00728 (0.00525)	0.00749* (0.00452)	0.000498 (0.0113)	0.0109 (0.00922)
Non-Local Loan Income Ratio	0.0294*** (0.00838)	0.0328*** (0.00869)	0.00358 (0.0150)	0.0283* (0.0145)
Constant	-0.0512** (0.0260)	0.0236 (0.0234)	0.0688* (0.0359)	0.0204 (0.0409)
Observations	8,645	8,628	1,945	1,973
R-squared	0.570	0.620	0.599	0.760
State Fixed Effects	Yes	Yes	Yes	Yes
Elasticity			High	Low

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Home Price Growth Contemporaneous Regression: Local Loans Held Share vs. Non-Local Loans Held Share

This table reports OLS regression coefficients for both local and non-local loans with the following model: Local, Non-Local Loans Held Change $_{i, Boom} = \beta$ Home Price Growth $_{i, Boom} + \text{Borrower Controls}_{i, Boom} + \text{Economic Controls}_{i, Boom} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Boom denotes 2002-06. The unit of observation is at the ZIP code level. The Local Held Share is the number of local loans held by the lender, scaled by the total local loans. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. High (e.g., Wichita, KS) and Low (e.g., Miami, FL) elasticity measure based on Saiz housing supply elasticity. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1)		(2)		(3)		(4)		(5)		(6)	
	Local Loans Held Change		Local Loans Held Change		Local Loans Held Change		Non-Local Loans Held Change		Non-Local Loans Held Change		Non-Local Loans Held Change	
Home Price Growth	-0.0200** (0.00883)		-0.00262 (0.0154)		-0.0295** (0.0125)		-0.000180 (0.00976)		-0.00213 (0.0202)		0.0342*** (0.0124)	
Total Deposits	0.00966 (0.00911)		-0.0118 (0.0140)		-0.00449 (0.0308)		0.0145*** (0.00535)		0.0246* (0.0141)		0.0280** (0.0141)	
Poverty Rate	-0.00921 (0.0233)		0.0971*** (0.0343)		-0.0243 (0.0617)		-0.0234 (0.0239)		0.00770 (0.0393)		-0.0709* (0.0400)	
Median Income	-0.0882* (0.0498)		-0.122 (0.122)		0.0306 (0.116)		0.0351 (0.0555)		-0.0169 (0.121)		-0.168 (0.107)	
Unemployment Rate	0.0232 (0.0322)		-0.0405 (0.0495)		0.0812 (0.0970)		-0.0806** (0.0322)		-0.0249 (0.0565)		-0.0516 (0.0756)	
Local Median Income (log)	0.0125** (0.00603)		0.00616 (0.00845)		0.0171* (0.0102)		-0.00646 (0.00877)		-0.0187 (0.0198)		-0.0294* (0.0162)	
Non-Local Median Income (log)	-0.00611 (0.00805)		0.0153* (0.00876)		-0.0162 (0.0143)		0.0106 (0.00976)		0.0391* (0.0206)		0.0236 (0.0190)	
Local Loan Income Ratio	0.0173*** (0.00543)		0.0300*** (0.00896)		0.0448*** (0.0144)		0.00620 (0.00425)		-0.00594 (0.0116)		0.0116* (0.00661)	
Non-Local Loan Income Ratio	0.0175*** (0.00569)		0.0118 (0.0121)		0.00580 (0.00949)		-0.0114 (0.00855)		-0.00847 (0.0156)		-0.0199 (0.0135)	
Constant	-0.0226** (0.0113)		-0.0567*** (0.0207)		-0.00578 (0.0320)		-0.0749*** (0.0129)		-0.0796*** (0.0188)		-0.0719** (0.0282)	
Observations	8,643		1,949		1,979		8,545		1,919		1,942	
R-squared	0.293		0.345		0.418		0.132		0.180		0.132	
State Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Elasticity			High		Low		High		High		Low	

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Home Price Growth Lagged Regression: Local Loans Held Share

This table reports OLS regression coefficients for the following model: $\text{Home Price Growth}_{i,Bust} = \beta \text{Local Share Change} + \text{Local Loans Held Change} + \text{Non-Local Loans Held Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Boom denotes 2002-06. The unit of observation is at the ZIP code level. The Local Held Share is the number of local loans held by the lender, scaled by the total local loans. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. High (e.g., Wichita, KS) and Low (e.g., Miami, FL) elasticity measure based on Saiz housing supply elasticity. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	Home Price Growth	Home Price Growth	Home Price Growth
Local Share Change	0.0204 (0.0324)	0.0422 (0.0562)	0.0253 (0.0542)
Local Loans Held Change	0.171*** (0.0504)	-0.0326 (0.0750)	0.159* (0.0813)
Non-Local Loans Held Change	0.0257 (0.0302)	0.0353 (0.0358)	-0.0566 (0.0439)
Total Deposits	-0.00262 (0.0101)	0.0177 (0.0230)	-0.0116 (0.0302)
Poverty Rate	-0.0808* (0.0447)	-0.0340 (0.0595)	-0.200*** (0.0708)
Median Income	0.363*** (0.101)	0.188 (0.169)	0.135 (0.187)
Unemployment Rate	-0.0849*** (0.0225)	-0.0934*** (0.0309)	-0.0567* (0.0315)
Local Median Income (log)	0.000559 (0.00689)	-0.0230 (0.0177)	0.0115 (0.0140)
Non-Local Median Income (log)	-0.0411*** (0.00962)	0.00234 (0.0204)	-0.0481** (0.0200)
Local Loan Income Ratio	0.00561 (0.00536)	0.00155 (0.0116)	0.00727 (0.00954)
Non-Local Loan Income Ratio	0.0278*** (0.00846)	0.000119 (0.0151)	0.00723 (0.0157)
Constant	-0.0457* (0.0255)	0.0331 (0.0333)	-0.0751* (0.0430)
Observations	8,547	1,921	1,939
R-squared	0.575	0.593	0.733
State Fixed Effect	Yes	Yes	Yes
Elasticity		High	Low

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Foreclosure Rate Contemporaneous Regression

This table reports OLS regression coefficients for the following model: $\text{Foreclosure Rate Change}_{i, Boom} = \beta \text{Local Share Change} + \text{Local Loans Held Change} + \text{Non-Local Loans Held Change}_{i, Boom} + \text{Borrower Controls}_{i, Boom} + \text{Economic Controls}_{i, Boom} + \phi_j + \alpha + \varepsilon_i$ in which ϕ_j is county fixed effects. Boom denotes 2002-06. The unit of observation is at the ZIP code level. Foreclosure data are from the Californian Rand Business and Economic Statistics. Home Price Growth refers to median home prices from Zillow.com for all homes. The Local Share is the total number of local loans scaled by the total loans originated. The Local Held Share is the number of local loans held by the lender, scaled by the total local loans. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Foreclosure Rate Change	(2) Foreclosure Rate Change	(3) Foreclosure Rate Change
Local Share Change	-0.000979 (0.00114)		
Local Loans Held Change		-0.00298 (0.00334)	
Non-Local Loans Held Change			-0.000673 (0.000700)
Home Price Growth	-0.00302*** (0.000618)	-0.00298*** (0.000585)	-0.00319*** (0.000665)
Unemployment Rate	-0.00101 (0.00319)	-0.000982 (0.00342)	-0.00199 (0.00249)
Poverty Rate	-0.00446 (0.00282)	-0.00467 (0.00289)	-0.00405 (0.00332)
Median Income	-0.00360 (0.00592)	-0.00280 (0.00596)	0.00338 (0.00610)
Local Loan Income Ratio	0.000309** (0.000154)	0.000312** (0.000155)	0.000194 (0.000139)
Non-Local Loan Income Ratio	0.000604 (0.000395)	0.000616 (0.000404)	0.000306 (0.000247)
Local Median Income (log)	0.000346 (0.000393)	0.000311 (0.000401)	-0.000235 (0.000221)
Non-Local Median Income (log)	-0.000444 (0.000684)	-0.000365 (0.000647)	-0.000567 (0.000378)
Total Deposits	0.000265 (0.00163)	0.000225 (0.00156)	0.000129 (0.00191)
Constant	0.00305* (0.00176)	0.00280 (0.00174)	0.00197 (0.00173)
Observations	1,155	1,155	1,146
R-squared	0.237	0.238	0.235
County Fixed Effects	Yes	Yes	Yes

ZIP code level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Foreclosure Rate Lagged Regression

This table reports OLS regression coefficients for the following model: $\text{Foreclosure Rate Change}_{i,Bust} = \beta \text{Local Share Change} + \text{Local Loans Held Change} + \text{Non-Local Loans Held Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_j + \alpha + \varepsilon_i$ in which ϕ_j is county fixed effects. Bust denotes 2006-09, Boom denotes 2002-06. The unit of observation is at the ZIP code level. Foreclosure data are from the Californian Rand Business and Economic Statistics. Home Price Growth refers to median home prices from Zillow.com for all homes. The Local Share is the total number of local loans scaled by the total loans originated. The Local Held Share is the number of local loans held by the lender, scaled by the total local loans. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Foreclosure Rate Change	(2) Foreclosure Rate Change
Local Share Change	-0.0376*** (0.0134)	-0.0432** (0.0182)
Local Loan Held Change	-0.0152* (0.00836)	-0.0259* (0.0152)
Non-Local Loan Held Change	-0.00688 (0.00556)	0.00353 (0.00832)
Home Price Growth		-0.0738*** (0.0158)
Unemployment Rate	-0.00701 (0.0100)	-0.00318 (0.0133)
Poverty Rate	0.00451 (0.0155)	-0.0371 (0.0279)
Median Income	0.0961*** (0.0313)	0.0193 (0.0673)
Local Loan Income Ratio	0.00376* (0.00208)	0.00545* (0.00323)
Non-Local Loan Income Ratio	0.00102 (0.00748)	0.0115 (0.0118)
Local Median Income (log)	0.00594** (0.00242)	0.00623 (0.00399)
Non-Local Median Income (log)	-0.00374 (0.00567)	-0.0153 (0.00985)
Total Deposits (Boom)	0.00868 (0.0174)	0.0190 (0.0243)
Constant	0.0124 (0.0138)	-0.00847 (0.0192)
Observations	1,405	1,140
R-squared	0.085	0.106
County Fixed Effects	Yes	Yes

ZIP code level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Market Share: Local Share Change Contemporaneous Regression

This table reports OLS regression coefficients for the following model: $\text{Local Share Change}_{i, Boom} = \beta \text{Home Price Growth}_{i, Boom} + \text{Borrower Controls}_{i, Boom} + \text{Economic Controls}_{i, Boom} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Boom denotes 2002-06. The unit of observation is at the ZIP code level. Small Lenders refers to lenders with less than half of the market share of mortgages in 2002. The Local Share is the total number of local loans scaled by the total loans originated. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1)	(2)
	Small Lenders' Local Share	Large Lenders' Local Share
Home Price Growth	-0.0837*** (0.0193)	-0.0125** (0.00505)
Total Deposits	0.00380 (0.0143)	-0.000142 (0.00355)
Poverty Rate	-0.0593 (0.0672)	0.00732 (0.0134)
Median Income	-0.0601 (0.134)	0.0291 (0.0323)
Unemployment Rate	0.0671 (0.0800)	0.106*** (0.0116)
Small Lenders' Local Median Income (log)	0.0716*** (0.00744)	
Small Lenders' Non-Local Median Income (log)	-0.00448 (0.00810)	
Small Lenders' Local Loan Income Ratio	0.00992 (0.00736)	
Small Lenders' Non-Local Loan Income Ratio	0.000268 (0.00905)	
Large Lenders' Local Median Income (log)		0.0613*** (0.00340)
Large Lenders' Non-Local Median Income (log)		-0.0314*** (0.00745)
Large Lenders' Local Loan Income Ratio		0.0137*** (0.00344)
Large Lenders' Non-Local Loan Income Ratio		-0.00706 (0.00558)
Constant	0.0997*** (0.0288)	-0.0620*** (0.00597)
Observations	8,643	8,643
R-squared	0.388	0.378
State Fixed Effects	Yes	Yes

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Market Share: Home Price Growth Lagged Regression

This table reports OLS regression coefficients for the following model: $\text{Home Price Growth}_{i,Bust} = \beta \text{Local Share Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Bust denotes 2006-09, Boom denotes 2002-06. Small Lenders refers to lenders with less than half of the market share of mortgages in 2002. The unit of observation is at the ZIP code level. Home Price Growth refers to median home prices from Zillow.com for all homes. The Local Share is the total number of local loans scaled by the total loans originated. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Home Price Growth	(2) Home Price Growth
Small Lenders' Local Share	0.0644*** (0.0161)	0.0491*** (0.0162)
Large Lenders' Local Share	0.0426** (0.0215)	0.0513*** (0.0193)
Home Price Growth (Boom)		-0.163*** (0.0155)
Total Deposits	-0.00164 (0.0104)	0.00722 (0.00795)
Poverty Rate	-0.0894** (0.0439)	-0.0811** (0.0404)
Median Income	0.363*** (0.0995)	0.371*** (0.0959)
Unemployment Rate	-0.0878*** (0.0220)	-0.0810*** (0.0192)
Local Median Income (log)	-0.000125 (0.00672)	0.00214 (0.00660)
Non-Local Median Income (log)	-0.0379*** (0.00918)	-0.0226*** (0.00852)
Local Loan Income Ratio	0.00753 (0.00525)	0.00778* (0.00455)
Non-Local Loan Income Ratio	0.0292*** (0.00834)	0.0320*** (0.00869)
Constant	-0.0501* (0.0255)	0.0250 (0.0230)
Observations	8,645	8,628
R-squared	0.572	0.621
State Fixed Effects	Yes	Yes

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11: **Market Share: Home Price Growth Lagged Model: Local Loans Held Share**

This table reports OLS regression coefficients for the following model: $\text{Home Price Growth}_{i,Bust} = \beta \text{Local Share Change} + \beta \text{Local Loans Held Change} + \beta \text{Non-Local Loans Held Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Boom denotes 2002-06. Small Lenders refers to lenders with less than half of the market share of mortgages in 2002. The unit of observation is at the ZIP code level. The Local Held Share is the number of local loans held by the lender, scaled by the total local loans. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Home Price Growth
Small Lenders' Local Share	0.0162 (0.00994)
Small Lenders' Local and Held Share	0.0643*** (0.0133)
Small Lenders' Non-Local and Share	0.0354 (0.0330)
Large Lenders' Local Share	0.0277 (0.0185)
Large Lenders' Local and Held Share	0.0557** (0.0277)
Large Lenders' Non-Local and Held Share	-0.0164 (0.0294)
Home Price Growth (Boom)	-0.161*** (0.00858)
Total Deposits	0.00730 (0.00493)
Poverty Rate	-0.0756*** (0.0150)
Median Income	0.362*** (0.0433)
Unemployment Rate	-0.0831*** (0.00799)
Local Median Income (log)	0.00258 (0.00630)
Non-Local Median Income (log)	-0.0232*** (0.00768)
Local Loan Income Ratio	0.00694* (0.00378)
Non-Local Loan Income Ratio	0.0310*** (0.00606)
Constant	0.0266*** (0.0101)
Observations	8,628
R-squared	0.623
State Fixed Effect	Yes

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Market Share: Foreclosure Rate Lagged Regression

This table reports OLS regression coefficients for the following model: $\text{Foreclosure Rate Change}_{i,Bust} = \beta \text{Local Share Change} + \text{Local Loans Held Change} + \text{Non-Local Loans Held Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_j + \alpha + \varepsilon_i$ in which ϕ_j is county fixed effects. Bust denotes 2006-09, Boom denotes 2002-06. Small Lenders refers to lenders with less than half of the market share of mortgages in 2002. The unit of observation is at the ZIP code level. Foreclosure data are from the Californian Rand Business and Economic Statistics. Home Price Growth refers to median home prices from Zillow.com for all homes. The Local Share is the total number of local loans scaled by the total loans originated. The Local Held Share is the number of local loans held by the lender, scaled by the total local loans. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Foreclosure Rate Change	(2) Foreclosure Rate Change
Small Lenders' Local Share	-0.0154*** (0.00513)	-0.0101** (0.00504)
Large Lenders' Local Share	-0.0507*** (0.0189)	-0.0433** (0.0168)
Home Price Growth		-0.0705*** (0.0148)
Unemployment Rate	-0.0110 (0.0127)	-0.00909 (0.0138)
Poverty Rate	0.0228 (0.0199)	-0.0248 (0.0248)
Median Income	0.0943** (0.0449)	0.0516 (0.0382)
Small Lenders' Local Loan Income Ratio	0.00107 (0.00140)	0.00212 (0.00187)
Small Lenders' Non-Local Loan Income Ratio	-0.00246 (0.00396)	0.00272 (0.00346)
Small Lenders' Local Median Income (log)	0.00377*** (0.00120)	0.00445** (0.00184)
Small Lenders' Non-Local Median Income (log)	-0.00589 (0.00575)	-0.00313 (0.00515)
Large Lenders' Local Loan Income Ratio	0.00609*** (0.00227)	0.00490** (0.00248)
Large Lenders' Non-Local Loan Income Ratio	0.00690 (0.00717)	0.0132 (0.00943)
Large Lenders' Local Median Income (log)	0.000617 (0.00255)	0.000667 (0.00349)
Large Lenders' Non-Local Median Income (log)	0.0122 (0.00817)	0.00546 (0.00582)
Total Deposits	-0.00574 (0.0193)	0.0394 (0.0263)
Constant	0.0177 (0.0165)	-0.0124 (0.0235)
Observations	1,448	1,155
R-squared	0.110	0.118
County Fixed Effects	Yes	Yes

ZIP code level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 13: Median Size Analysis: Local Share Change Contemporaneous Regression

This table reports OLS regression coefficients for the following model: $\text{Local Share Change}_{i, Boom} = \beta \text{Home Price Growth}_{i, Boom} + \text{Borrower Controls}_{i, Boom} + \text{Economic Controls}_{i, Boom} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Boom denotes 2002-06. The unit of observation is at the ZIP code level. Small Lenders denotes below median average asset size over 2002-06, Large denotes above median. The Local Share is the total number of local loans scaled by the total loans originated. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. High (e.g., Wichita, KS) and Low (e.g., Miami, FL) elasticity measure based on Saiz housing supply elasticity. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1)	(2)
	Small Lender Local Share	Large Lender Local Share
Home Price Growth	-0.0626*** (0.0160)	-0.0120** (0.00580)
Total Deposits	0.0230** (0.00995)	0.0152*** (0.00492)
Poverty Rate	0.118** (0.0549)	-0.0814*** (0.0128)
Median Income	-0.0393 (0.126)	-0.125*** (0.0318)
Unemployment Rate	0.0254 (0.0693)	0.0938*** (0.0189)
Small Lender Local Median Income (log)	0.0684*** (0.00381)	
Small Lender Non-Local Median Income (log)	-0.0160*** (0.00565)	
Small Lender Local Loan Income Ratio	0.00685** (0.00282)	
Small Lender Non-Local Loan Income Ratio	-0.00429 (0.00596)	
Large Lender Local Median Income (log)		0.0359*** (0.00406)
Large Lender Non-Local Median Income (log)		-0.00742 (0.00678)
Large Lender Local Loan Income Ratio		0.0147*** (0.00336)
Large Lender Non-Local Loan Income Ratio		0.0153*** (0.00576)
Constant	0.0450* (0.0257)	-0.0358*** (0.00731)
Observations	8,643	8,643
R-squared	0.312	0.323
State Fixed Effects	Yes	Yes

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14: Median Size Analysis: Home Price Growth Lagged Regression

This table reports OLS regression coefficients for the following model: $\text{Home Price Growth}_{i,Bust} = \beta \text{Local Share Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Bust denotes 2006-09, Boom denotes 2002-06. Small Lenders denotes below median average asset size over 2002-06, Large denotes above median. The unit of observation is at the ZIP code level. Home Price Growth refers to median home prices from Zillow.com for all homes. The Local Share is the total number of local loans scaled by the total loans originated. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. High (e.g., Wichita, KS) and Low (e.g., Miami, FL) elasticity measure based on Saiz housing supply elasticity. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Home Price Growth	(2) Home Price Growth
Small Lenders Local Share	0.0489*** (0.0130)	0.0263** (0.0113)
Large Lenders Local Share	0.0928*** (0.0222)	0.0873*** (0.0227)
Home Price Growth (Boom)		-0.162*** (0.0154)
Total Deposits	-0.00308 (0.0103)	0.00648 (0.00793)
Poverty Rate	-0.0917** (0.0445)	-0.0823** (0.0410)
Median Income	0.358*** (0.0997)	0.373*** (0.0963)
Unemployment Rate	-0.0839*** (0.0225)	-0.0784*** (0.0197)
Local Median Income (Log)	-0.00141 (0.00659)	0.00188 (0.00647)
Non-Local Median Income (Log)	-0.0373*** (0.00911)	-0.0221*** (0.00854)
Local Loan Income Ratio	0.00698 (0.00513)	0.00714 (0.00447)
Non-Local Loan Income Ratio	0.0291*** (0.00832)	0.0325*** (0.00868)
Constant	-0.0493* (0.0257)	0.0251 (0.0231)
Observations	8,645	8,628
R-squared	0.573	0.621
State Fixed Effects	Yes	Yes

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 15: Median Size Analysis: Home Price Growth Lagged Model: Local Loans Held Share

This table reports OLS regression coefficients for the following model: $\text{Home Price Growth}_{i,Bust} = \beta \text{Local Share Change} + \text{Local Loans Held Change} + \text{Non-Local Loans Held Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Boom denotes 2002-06. Small Lenders denotes below median average asset size over 2002-06, Large denotes above median. The unit of observation is at the ZIP code level. The Local Held Share is the number of local loans held by the lender, scaled by the total local loans. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. High (e.g., Wichita, KS) and Low (e.g., Miami, FL) elasticity measure based on Saiz housing supply elasticity. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Home Price Growth	(2) Home Price Growth	(3) Home Price Growth
Small Lenders Local Share	0.0190* (0.00994)		0.0235** (0.00996)
Small Lenders Local and Held Share	0.0194 (0.0124)		0.0168 (0.0125)
Small Lenders Non-Local and Held Share	0.0170 (0.0117)		0.0167 (0.0116)
Large Lenders Local Share		0.0246 (0.0195)	0.0248 (0.0195)
Large Lenders Local and Held Share		0.134*** (0.0274)	0.136*** (0.0274)
Large Lenders Non-Local and Held Share		0.0287 (0.0197)	0.0252 (0.0198)
Home Price Growth (Boom)	-0.163*** (0.00861)	-0.162*** (0.00853)	-0.159*** (0.00854)
Total Deposits	0.00776 (0.00494)	0.00669 (0.00496)	0.00592 (0.00497)
Poverty Rate	-0.0789*** (0.0150)	-0.0782*** (0.0151)	-0.0785*** (0.0150)
Median Income	0.377*** (0.0428)	0.371*** (0.0432)	0.366*** (0.0433)
Unemployment Rate	-0.0789*** (0.00805)	-0.0800*** (0.00798)	-0.0810*** (0.00796)
Local Median Income (Log)	0.00460 (0.00624)	0.00437 (0.00630)	0.00274 (0.00628)
Non-Local Median Income (Log)	-0.0232*** (0.00775)	-0.0223*** (0.00775)	-0.0233*** (0.00772)
Local Loan Income Ratio	0.00832** (0.00376)	0.00643* (0.00375)	0.00590 (0.00375)
Non-Local Loan Income Ratio	0.0342*** (0.00603)	0.0321*** (0.00605)	0.0313*** (0.00603)
Constant	0.0183* (0.0102)	0.0283*** (0.0101)	0.0291*** (0.0101)
Observations	8,628	8,628	8,628
R-squared	0.619	0.622	0.623
State Fixed Effect	Yes	Yes	Yes

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 16: Median Size Analysis: Foreclosure Rate Lagged Regression

This table reports OLS regression coefficients for the following model: $\text{Foreclosure Rate Change}_{i,Bust} = \beta \text{Local Share Change} + \text{Local Loans Held Change} + \text{Non-Local Loans Held Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_j + \alpha + \varepsilon_i$ in which ϕ_j is ZIP code fixed effects. Bust denotes 2006-09, Boom denotes 2002-06. Small Lenders denotes below median average asset size over 2002-06, Large denotes above median. The unit of observation is at the ZIP code level. Foreclosure data are from the Californian Rand Business and Economic Statistics. Home Price Growth refers to median home prices from Zillow.com for all homes. The Local Share is the total number of local loans scaled by the total loans originated. The Local Held Share is the number of local loans held by the lender, scaled by the total local loans. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Foreclosure Rate Change	(2) Foreclosure Rate Change
Small Lenders Local Share	-0.0173*** (0.00583)	-0.0155** (0.00640)
Large Lenders Local Share	-0.0471*** (0.0172)	-0.0443*** (0.0161)
Home Price Growth		-0.0816*** (0.0199)
Unemployment Rate	-0.00872 (0.0103)	-0.00788 (0.0115)
Poverty Rate	0.0295 (0.0224)	-0.0111 (0.0210)
Median Income	0.0875** (0.0398)	0.0674* (0.0354)
Small Lender Local Median Income (log)	0.00330*** (0.00125)	0.00406** (0.00162)
Small Lender Non-Local Median Income (log)	0.00113 (0.00159)	-0.00255 (0.00281)
Small Lender Local Loan Income Ratio	0.000244 (0.000204)	0.000305 (0.000251)
Small Lender Non-Local Loan Income Ratio	-0.000743 (0.00270)	0.00437 (0.00385)
Large Lender Local Median Income (log)	-0.00159 (0.00255)	0.00477 (0.00422)
Large Lender Non-Local Median Income (log)	0.00849 (0.00725)	0.000655 (0.00728)
Large Lender Local Loan Income Ratio	0.00354 (0.00230)	0.00622* (0.00331)
Large Lender Non-Local Loan Income Ratio	0.00641 (0.00679)	0.0141 (0.00881)
Total Deposits	-0.00652 (0.0200)	0.0383 (0.0236)
Constant	0.0148 (0.0143)	-0.0202 (0.0225)
Observations	1,448	1,155
R-squared	0.104	0.115
County Fixed Effects	Yes	Yes

ZIP code level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 17: Largest Lenders: Local Share Change Contemporaneous Regression

This table reports OLS regression coefficients for the following model: $\text{Local Share Change}_{i, \text{Boom}} = \beta \text{Home Price Growth}_{i, \text{Boom}} + \text{Borrower Controls}_{i, \text{Boom}} + \text{Economic Controls}_{i, \text{Boom}} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Boom denotes 2002-06. The unit of observation is at the ZIP code level. Small Lenders refers to lenders with less than ten billion in assets in 2002. The Local Share is the total number of local loans scaled by the total loans originated. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1)	(2)
	Small Lenders' Local Share	Large Lenders' Local Share
Home Price Growth	-0.0859*** (0.0177)	0.0335 (0.0233)
Total Deposits	0.00772 (0.0139)	0.0198 (0.0171)
Poverty Rate	-0.0645 (0.0619)	0.0371 (0.0372)
Median Income	-0.0537 (0.128)	-0.0716 (0.0860)
Unemployment Rate	0.0101 (0.0754)	0.210*** (0.0673)
Small Lenders' Local Median Income (log)	0.0709*** (0.00696)	
Small Lenders' Non-Local Median Income (log)	-0.00976 (0.00753)	
Small Lenders' Local Loan Income Ratio	0.00938 (0.00725)	
Small Lenders' Non-Local Loan Income Ratio	0.00518 (0.00914)	
Large Lenders' Local Median Income (log)		0.0408*** (0.00353)
Large Lenders' Non-Local Median Income (log)		-0.0180** (0.00827)
Large Lenders' Local Loan Income Ratio		0.0127*** (0.00459)
Large Lenders' Non-Local Loan Income Ratio		0.0211** (0.0103)
Constant	0.0740*** (0.0274)	-0.0207 (0.0185)
Observations	8,643	8,643
R-squared	0.342	0.457
State Fixed Effects	Yes	Yes

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 18: **Largest Lenders: Local and Held Share Change Contemporaneous Regression**

This table reports OLS regression coefficients for the following model: $\text{Local and Held Share Change}_{i, \text{Boom}} = \beta \text{ Home Price Growth}_{i, \text{Boom}} + \text{Borrower Controls}_{i, \text{Boom}} + \text{Economic Controls}_{i, \text{Boom}} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Boom denotes 2002-06. The unit of observation is at the ZIP code level. Small Lenders refers to lenders with less than ten billion in assets in 2002. The Local Share is the total number of local loans scaled by the total loans originated. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1)	(2)
	Large Lenders' Local and Held Share	Large Lenders' Local and Distributed Share
Home Price Growth	-0.0155*** (0.00537)	0.0308*** (0.0102)
Total Deposits	0.000519 (0.00325)	0.00555 (0.00792)
Poverty Rate	-0.00900 (0.0119)	0.0269 (0.0225)
Median Income	0.185*** (0.0292)	-0.0381 (0.0602)
Unemployment Rate	-0.0877*** (0.0165)	0.167*** (0.0362)
Large Lenders' Local Median Income (log)	-0.0134*** (0.00211)	0.0277*** (0.00235)
Large Lenders' Non-Local Median Income (log)	0.0508*** (0.00466)	-0.0146** (0.00624)
Large Lenders' Local Loan Income Ratio	-0.00170 (0.00222)	-0.00168 (0.00251)
Large Lenders' Non-Local Loan Income Ratio	-0.0117** (0.00501)	0.0146** (0.00640)
Constant	-0.0946*** (0.00651)	0.00268 (0.0126)
Observations	8,643	8,643
R-squared	0.207	0.355
State Fixed Effects	Yes	Yes

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 19: Largest Lenders: Home Price Growth Lagged Regression

This table reports OLS regression coefficients for the following model: $\text{Home Price Growth}_{i,Bust} = \beta \text{Local Share Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Bust denotes 2006-09, Boom denotes 2002-06. Small Lenders refers to lenders with less than ten billion in assets in 2002. The unit of observation is at the ZIP code level. Home Price Growth refers to median home prices from Zillow.com for all homes. The Local Share is the total number of local loans scaled by the total loans originated. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Home Price Growth	(2) Home Price Growth
Small Lenders' Local Share	0.0617*** (0.0165)	0.0453*** (0.0163)
Large Lenders' Local Share	0.0915*** (0.0211)	0.107*** (0.0187)
Home Price Growth (Boom)		-0.166*** (0.0158)
Total Deposits	-0.00273 (0.00998)	0.00620 (0.00762)
Poverty Rate	-0.0895** (0.0432)	-0.0803** (0.0393)
Median Income	0.348*** (0.0982)	0.357*** (0.0935)
Unemployment Rate	-0.0863*** (0.0219)	-0.0792*** (0.0189)
Local Median Income (log)	-0.000947 (0.00659)	0.00157 (0.00638)
Non-Local Median Income (log)	-0.0375*** (0.00915)	-0.0224*** (0.00847)
Local Loan Income Ratio	0.00802 (0.00529)	0.00840* (0.00450)
Non-Local Loan Income Ratio	0.0258*** (0.00831)	0.0280*** (0.00865)
Constant	-0.0511** (0.0253)	0.0243 (0.0226)
Observations	8,645	8,628
R-squared	0.575	0.626
State Fixed Effects	Yes	Yes

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 20: **Largest Lenders: Home Price Growth Lagged Model: Local Loans Held Share**

This table reports OLS regression coefficients for the following model: $\text{Home Price Growth}_{i,Bust} = \beta \text{Local Share Change} + \beta \text{Local Loans Held Change} + \beta \text{Non-Local Loans Held Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_k + \alpha + \varepsilon_i$ in which ϕ_k is state fixed effects. Boom denotes 2002-06. Small Lenders refers to lenders with less than ten billion in assets in 2002. The unit of observation is at the ZIP code level. The Local Held Share is the number of local loans held by the lender, scaled by the total local loans. Home Price Growth refers to median home prices from Zillow.com for all homes. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Home Price Growth
Small Lenders' Local Share	0.0192* (0.0105)
Small Lenders' Local Share	0.0600*** (0.0130)
Small Lenders' Local Share	0.0211 (0.0132)
Large Lenders' Local Share	0.103*** (0.0168)
Large Lenders' Local and Held Share	0.0412*** (0.0148)
Large Lenders' Non-Local and Held Share	0.0282 (0.0245)
Home Price Growth (Boom)	-0.164*** (0.00863)
Total Deposits	0.00585 (0.00492)
Poverty Rate	-0.0750*** (0.0149)
Median Income	0.348*** (0.0429)
Unemployment Rate	-0.0814*** (0.00791)
Local Median Income (log)	0.00198 (0.00603)
Non-Local Median Income (log)	-0.0250*** (0.00747)
Local Loan Income Ratio	0.00766** (0.00371)
Non-Local Loan Income Ratio	0.0267*** (0.00606)
Constant	0.0283*** (0.00999)
Observations	8,628
R-squared	0.628
State Fixed Effect	Yes

County level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 21: Largest Lenders: Foreclosure Rate Lagged Regression

This table reports OLS regression coefficients for the following model: $\text{Foreclosure Rate Change}_{i,Bust} = \beta \text{Local Share Change} + \text{Local Loans Held Change} + \text{Non-Local Loans Held Change}_{i,Boom} + \text{Borrower Controls}_{i,Boom} + \text{Economic Controls}_{i,Bust} + \phi_j + \alpha + \varepsilon_i$ in which ϕ_j is ZIP code fixed effects. Bust denotes 2006-09, Boom denotes 2002-06. Small Lenders refers to lenders with less than ten billion in assets in 2002. The unit of observation is at the ZIP code level. Foreclosure data are from the Californian Rand Business and Economic Statistics. Home Price Growth refers to median home prices from Zillow.com for all homes. The Local Share is the total number of local loans scaled by the total loans originated. The Local Held Share is the number of local loans held by the lender, scaled by the total local loans. Median income (log) is the log of the borrowers' median income. Loan to Income is the ratio of the amount of the loan to the borrower's income. Data on median income and poverty rates are from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data on the unemployment rate are from the Bureau of Labor local area unemployment statistics.

VARIABLES	(1) Foreclosure Rate Change	(2) Foreclosure Rate Change
Small Lenders' Local Share	-0.0453** (0.0184)	-0.0465* (0.0247)
Large Lenders' Local Share	-0.00796 (0.0107)	-0.000645 (0.0178)
Home Price Growth		-0.0713*** (0.0142)
Unemployment Rate	-0.00419 (0.0123)	0.00122 (0.0163)
Poverty Rate	0.0273 (0.0205)	-0.0177 (0.0245)
Median Income	0.102** (0.0448)	0.0713* (0.0387)
Small Lenders' Local Loan Income Ratio	0.00108 (0.00145)	0.00227 (0.00194)
Small Lenders' Non-Local Loan Income Ratio	-0.00221 (0.00442)	0.00335 (0.00342)
Small Lenders' Local Median Income (log)	0.00470*** (0.00158)	0.00536** (0.00229)
Small Lenders' Non-Local Median Income (log)	-0.00655 (0.00572)	-0.00384 (0.00539)
Large Lenders' Local Loan Income Ratio	0.00509*** (0.00173)	0.00510** (0.00207)
Large Lenders' Non-Local Loan Income Ratio	0.00640 (0.00675)	0.0119 (0.00904)
Large Lenders' Local Median Income (log)	-0.000996 (0.00186)	0.000106 (0.00283)
Large Lenders' Non-Local Median Income (log)	0.0136 (0.00848)	0.00596 (0.00532)
Total Deposits	-0.00360 (0.0208)	0.0399 (0.0283)
Constant	0.0109 (0.0173)	-0.0244 (0.0279)
Observations	1,448	1,155
R-squared	0.111	0.122
County Fixed Effects	Yes	Yes

ZIP code level clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1