Credit-Induced Boom and Bust*

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Abstract

Can a credit expansion induce a boom and bust in house prices and real economic activity? This paper exploits the federal preemption of national banks from local laws against predatory lending to gauge the effect of the supply of credit on the real economy. Specifically, we exploit the heterogeneity in the market share of national banks across counties in 2003 and that in state anti-predatory laws to instrument for an outward shift in the supply of credit. First, a comparison between counties in the top and bottom deciles of presence of national banks in states with anti-predatory laws suggests that the preemption regulation produced an 11% increase in annual lending. Our estimates show that to this lending increase is associated with a 12% rise in house prices and a 2% expansion of employment in the non-tradable sectors, followed by drops of similar magnitude in subsequent years. Finally, we show that the increase in the supply of credit reduced mortgage delinquency rates during the boom years but increased them in bust years. These effects are even stronger for subprime and inelastic regions.

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1 Introduction

The "Great Recession" was preceded by a very rapid expansion of credit and followed by a collapse in house prices and consumption, which did not regain its pre-recession level for three years. The resulting job decline was sharper than in any recession of recent decades, with unemployment peaking at 10% in October 2009. What role did the financial markets play in these severe fluctuations? Specifically, does an outward shift in the credit supply during the up-phase of the business cycle explain the observed disruptions in the real economy?

This paper inquires into the way in which an increase in credit supply to riskier borrowers was responsible for the boom and bust cycle in house prices and economic outcomes during the recession. This is important to an understanding how financial markets affect real economic activity and how fluctuations may be amplified by changes in the supply of credit. But it is hard to isolate credit as a causal variable because of omitted variables and reverse causality. The latter is especially important: counties with faster growth will have higher consumption and higher house prices, but they will also have greater demand for credit. As a result, house price and employment movements will be strongly correlated with credit supply, even if the latter has no direct effect on real estate prices or consumption.

In this paper we attempt to estimate the effect of an increase in credit supply on economic outcomes using significant changes to US banking regulation in the early 2000s. Starting in 1999 a number of states adopted anti-predatory-lending laws (APL) restricting the terms of mortgage loans to riskier borrowers by such means as requiring verification of ability to repay as well as limits on fees, rates and early repayment penalties. However, in 2004, in an effort to increase home ownership, the Office of the Comptroller of the Currency (OCC) enacted a preemption rule, barring the application of state anti-predatory-lending laws to national banks. In other words, national banks and their mortgage lending subsidiaries were exempted from state APLs and enforcement, while mortgage brokers and independent non-depository lenders, as well as state-chartered depository institutions and their subsidiaries,

were still required to comply.

This setting offers an excellent opportunity to exploit regulatory variations between states and types of lender to investigate the role of credit supply shocks. The key to our identification strategy is the possibility of comparing economic outcomes in states with and without APLs before and after the OCC preemption rule, but also taking advantage of the substantially uneven presence of national banks in different counties. In particular, APL-state counties in which a large proportion of loans were originated by national banks before 2004 had a positive credit supply shock in the wake of the OCC regulation, as national banks could now grant credit to riskier borrowers with fewer restrictions than other financial institutions. But states with APL might differ from those without, while counties with a stronger presence of national banks might be subject to different shocks than those dominated by local banks. To control for these differences, we compare counties within APL states, thus excluding differences between counties with more and fewer OCC lenders in non-APL states. That is, we use a triple difference-in-difference estimator to gauge the effect of the credit increase on the real economy, pinpointing the effect of the preemption on the availability of lending to riskier borrowers, and then using this as an instrument for the supply of credit during the period preceding the Recession.

There are four main findings. First, comparing counties in the top and bottom deciles of presence of national banks in states with anti-predatory-lending laws, we show that the OCC preemption resulted in an 11% increase in annual loan issuance. To control for county characteristics in all specifications, we include county and year fixed-effects. We also include such other controls as the county's median income and population, as well as the elasticity measure proposed by Saiz (2010) to control for the increase in credit demand and collateral values. This is needed in order to show that our instrument is not capturing inter-county differences in the propensity of house price to increase but the variation due to the expansion of credit. Further, narrowing the field to "subprime" counties – those above the median in proportion of subprime borrowers in 2000 – we show that the effect of the preemption on

loan origination is about 50% greater. This corroborates our hypothesis that the preemption significantly increased the availability of credit to riskier borrowers. To shed light on how this effect varied over time, we examine the boom period 2003-2005 and the bust period 2007-2009 separately, confirming that the counties with a greater presence of OCC lenders had a more pronounced boom-bust cycle in loan origination. These estimates constitute our first stage regression; now we can instrument the supply of credit with the interaction between the presence of national banks in APL states and the post indicator for the period after 2004.

Second, using this as an instrument for the supply of credit, we estimate its effect on house prices and find it to be substantial. A 10% increase in loan origination leads to a 3.5% increase in the rate at which house prices rise, which resulted in a total increase of 12% in house prices during the boom; what is more, our interaction significantly predicts the bust in housing prices. Our estimate is robust to extensive controls for demographics and income differences. And all the specifications explicitly control for the elasticity of house prices, which means had the preemption regulation not been passed, a substantial fraction of real estate bubble and the consequent collapse could have been avoided.

Third, we explore the effect of the increase in credit on employment in non-tradable sectors (as defined by Mian and Sufi (2012)), in order to focus on the sectors that are affected mainly by local demand. We find that employment expands significantly more in counties with a large presence of national banks in APL states, even controlling for county characteristics. Specifically, our IV estimates suggest that a 10% increase in loan origination leads to a 2% increase in employment in the non-tradable sectors. Consistent with our posited mechanism of credit-induced fluctuation, the effect is twice as great in counties with a larger fraction of subprime borrowers. And focusing solely on the boom and bust period, the predicted increase in lending is associated with a stronger boom and a sharper bust.

Finally, examine the quality of loans originated by national banks in the boom period. Interestingly, we find that in counties with more loans originated by OCC lenders in APL

states delinquency rates were significantly lower during the boom but surged in the bust period. Comparing counties in the top and bottom deciles of presence of national banks in APL states, the OCC preemption diminished delinquencies by 15% during the boom and increased them by 30% during the Recession. Presumably the increase in lending enabled households to avoid defaults during the upswing but aggravated their financial situation during the downturn, making them more fragile. Here again the results are even stronger when the sample is restricted to the subprime counties.

To check the robustness of our results and weigh potential alternative mechanisms we show several additional results. One concern about our results is the possibility that the presence of national banks could be correlated with the rise in securitization that occurred during the same period. To rule this out, for each county we compute the fraction of loans that was securitized and use this to proxy for the banks' incentive to increase lending due to securitization. All the results are completely unaffected, which suggests that our instrument is not correlated with securitization. Second, to control further for potential unobserved heterogeneity across counties, we can restrict attention to those at state borders. Since counties on the West coast are much larger than those on the East coast, and the sample of counties close to the borders is small, we construct our main variables at census tract level. Even restricting the investigation to census tracts within five miles of state borders, the results stand confirmed. Third, our analysis is robust even when only states that eventually passed an anti-predatory-lending law are considered. In other words, if the concern is that APL and non-APL states are fundamentally different, our results hold when only the timing of the adoption of APL, and not the difference between two "types" of state, is considered. Finally, we show that the main effects derive from the increase in loans to households, while lending to small businesses is not significantly affected by the preemption regulation.[1]

[1] The robustness of our results is further demonstrated by the fact that the predictive lending increases are not associated with an increase in employment in the tradable sectors. Furthermore, we can eliminate the states with the highest delinquency rates and largest housing bubbles, Arizona and Nevada, and show that our results are not driven by those states.

1.1 Related Literature

To the best of our knowledge, this is the first paper that is able to estimate the causal effect of an increase in credit supply on house prices and real economic activity. We show that an outward shift in credit supply generates a distinct boom and bust pattern.

An emerging literature related to this paper studies the effects of house price booms on real economic activity. The most closely related papers are Mian and Sufi (2009), and Kermani (2012). Mian and Sufi (2009) show that zip codes with a higher fraction of subprime borrowers experienced unprecedented relative growth in mortgage credit. Kermani (2012) instead offers theory and evidence linking the decline in consumption and housing wealth in many economic sub-regions to their increase in the area, and emphasizes that this cycle results naturally from the interplay between expanding credit, consumers' front-loading of consumption, and the endogenous relaxation of credit constraints. Our own paper makes three significant advances relative to these contributions: (1) exploiting an exogenous variation in the supply of credit, we estimate the effect of credit supply on house prices, controlling for local economic shocks; (2) our data enable us to track employment and delinquency rates as well; and (3) we find that the outward shift in the credit supply that followed the preemption regulation significantly predicts both the boom *and* the bust in real economic activity.

Other papers on the interplay between credit, house prices and consumption include Mian et al. (2011), Mian et al. (2011), Greenstone and Mas (2012), and Adelino et al. (2012). Mian et al. (2011) instrument foreclosure with the difference between judicial and non-judicial foreclosure states to show that foreclosures cause a significant decline in house prices and residential investment.[2] Mian et al. (2011) show that zip codes where households

[2]Other related papers are Favara and Imbs (2010) and Kleiner and Todd (2007). Favara and Imbs (2010) uses the passage of the Interstate Banking and Branching Efficiency Act (IBBEA) in 1994 to show that this deregulation triggered an increase in the demand for housing, that is, that house prices rose because the supply of credit in deregulating states expanded. The present paper, instead, observes an increase in credit supply due to the preemption rule of 2004, and shows how it helped to trigger the boom-bust cycle in both real estate and employment. Kleiner and Todd (2007) find that the requirement, in place in many states, that mortgage brokers maintain a minimum net worth is associated with smaller numbers of brokers, fewer subprime mortgages, higher foreclosure rates, and a higher percentage of high-interest-rate mortgages.

are more highly leveraged have a higher marginal propensity to consume out of housing wealth. The importance of the credit channel is highlighted by Greenstone and Mas (2012), who assesses the role of bank lending to small businesses in the employment decline during the recession. Our own paper, by contrast, instruments variations in lending with regulatory changes to show the effect of the increase in lending on the boom and bust in several sectors of the economy. Finally, Mian and Sufi (2012) show that job losses in the non-tradable sector between 2007 and 2009 are significantly more severe in high-leverage counties that experienced sharp demand declines, while Adelino et al. (2012) exploits changes in the conforming loan limit as an instrument to gauge the effect of the availability of cheaper financing on house prices. We employ the same differentiation as Mian and Sufi (2012) between tradable and non-tradable sectors to show that the increase in lending boosted local demand, which in turn increased employment in the non-tradable sectors.

This paper also contributes to the growing literature on the effects of the decline in lending during the Recession. Ivashina and Scharfstein (2010), for instance, document that new loans to large borrowers fell by 79% between the second quarter of 2007 and the fourth quarter of 2008. They argue that this drop was largely "supply-driven", because of the decline in banks' access to short-term funding following the Lehman Brothers failure. Using Community Reinvestment Act data, Huang and Stephens (2011) and Berrospide and Edge (2010) show that multi-market banks' exposure to markets in which there were housing busts affected the supply of small business loans within all MSAs. Goetz and Valdez (2010) find evidence that differences in the liability structure of small U.S. commercial banks, particularly the use of "non-core" funding, affected lending patterns during the 2008 crisis. Dagher and Fu (2011) shows a positive correlation between the presence of non-bank mortgage originators and the increase in foreclosure filing rates at the onset of the housing downturn.

Finally, Rajan and Ramcharan (2012) examine the boom (and bust) in farmland prices in the United States that preceded the Depression of the 1930s, and conclude that credit availability had a direct effect in inflating land prices. Moreover, areas with higher ex ante

credit availability suffered a greater fall in land prices and also higher bank failure rates. We show instead that the credit supplied by national banks during the economic upswing explains the surge and subsequent collapse in house prices, employment and consumption.

The remainder of the paper is organized as follows. Section 2 gives background on the US credit market and regulation. Section 3 provides details on the data sources. Section 4 explains the research design and how it is made operational. Section 5 describes and interprets the results. Section 7 discusses a number of robustness checks and Section 8 concludes.

2 Regulatory Framework

2.1 Dual banking system

In the United States, residential mortgage lenders are regulated by national and local agencies. Specifically, national banks, Federal thrift institutions and their subsidiaries are supervised by the OCC or the Office of Thrift Supervision (OTS). State banks and state-chartered thrift institutions are supervised by either the Federal Reserve System, the Federal Deposit Insurance Corporation (FDIC) or by their chartering state. Credit unions are supervised by the National Credit Union Administration (NCUA), while non-depository independent mortgage companies are regulated by the Department of Housing and Urban Development (HUD) and the Federal Trade Commission.

The inconsistencies generated by this system are studied in Agarwal et al. (2012). The authors show that federal regulators are significantly less lenient, downgrading supervisory ratings about twice as frequently as state supervisors, while banks under federal regulators report higher nonperforming loan ratios, more delinquent loans, higher regulatory capital ratios, and lower ROA.

Banks accordingly have an incentive to switch from Federal to state supervision, if they

are allowed to do so. Rosen (2005) explores switching in regulatory agencies between 1970 and 2003, finding that in the early part of the period most of the switches were due to new banking policies, such as the easing of the ban on interstate banking, whereas after the initial period the main reason for switching was merger with a bank chartered at a different level. Further, the banks that switched tended to be small banks with assets of less than $1 billion. These findings corroborate our own identification strategy; moreover, the granularity of our dataset allows us to track the banks that changed regulatory agencies, so that we can address any further concerns related to this issue.

2.2 Anti-predatory laws

This dual banking system generated conflicting regulations when several states passed anti-predatory-lending laws and the OCC issued a preemption rule for national banks. In 1994, Congress had passed the Home Ownership and Equity Protection Act (HOEPA) which imposed substantive restrictions on terms and practices for high-priced mortgages, based either on APR or on total points and fees. This regulation aimed to redress abusive high charges for refinancing and home equity loans.[3] However, the thresholds for classifying mortgages as predatory or "high cost" were very high, which significantly reduced the applicability of the restrictions; these "high cost mortgages," in fact, accounted for just 1 percent of subprime residential mortgages; they represented the most abusive sector of the subprime mortgage market (Bostic et al. (2008)).

Many states later adopted stronger anti-predatory regulations than federal law requires. Anti-predatory laws seek to prevent various unfair and deceptive practices, such as steering borrowers into loans with a higher interest rate than they could qualify for, making a loan without considering repayment ability, charging exorbitant fees, or adding abusive subprime

[3] Agarwal and Evanoff (2013) provide evidence of unscrupulous behavior by lenders – such as predatory lending – during the housing boom of the 2000s. They show that lenders steered higher-quality borrowers to affiliates that provided subprime-like loans, with APR between 40 and 60 basis points higher.

early repayment penalties, all of which can increase the risk of foreclosure significantly. The first comprehensive state APL law was that of North Carolina in 199, which was targeted at the subprime mortgage market. As of January 2007, 29 states and the District of Columbia had APL laws in effect.

Potentially, APLs may have different kinds of effects on mortgage market outcomes. On the one hand, the laws might ration credit and raise the price of subprime loans. On the other, they might serve to allay consumer fears about dishonest lenders and ensure that creditors internalize the cost of any negative externalities from predatory loans, which could increase the demand for credit.

There is strong recent evidence that anti-predatory laws had an important role in the subprime market. Ding et al. (2012), for instance, find that they are associated with a 43% reduction in early repayment penalties and a 40% decrease in adjustable-rate mortgages; they are also correlated with a significant reduction in the riskier borrowers' probability of default. In subprime regions (those with a higher fraction of borrowers with FICO scores below 620) these effects are even stronger.

Keys et al. (2010) study the effect of securitization on lenders' screening decisions and exploit the passage and subsequent repeal of anti-predatory laws in New Jersey (2002) and Georgia (2003) that varied the ease of securitization. They find strong evidence that the incentives to screen the borrowers significantly increased during a period of strict enforcement of anti-predatory lending laws.[4]

Using 2004 HMDA data, Ho and Pennington-Cross (2006) find that subprime loans originated in states with laws against predatory lending had lower APRs than in unregulated states. Ho and Pennington-Cross (2008) provide additional evidence, focusing on border counties of adjacent states with and without APL to control for labor and housing market

[4]In a similar vein, Purnanandam (2011) analyzes the screening behavior of lenders that are directly responsible for originating loans at the front end of the lending-securitization channel. Moreover, after finding the evidence of diluted underwriting standards by banks, they also show that a bank's capital position and reliance on non-demandable debt have significant effects on its screening incentives.

characteristics, and using a legal index, they examine the effect of APLs on the probability of subprime applications, originations, and rejections. They find that stronger regulatory restrictions reduced the likelihood of origination and application. Similarly, Elliehausen et al. (2006), using a proprietary database of subprime loans originated by eight large lenders from 1999 to 2004, find that the presence of a law was associated with fewer subprime originations. More recently, Agarwal et al. (2013) estimate the effect on mortgage default rates of a pilot anti-predatory policy in Chicago that required "low-credit-quality" applicants and applicants for "risky" mortgages to submit their loan offers from state-licensed lenders for third-party review by HUD-certified financial counselors. This policy significantly affected both the origination rates and the characteristics of risky mortgages.[5]

Finally, the anti-predatory laws are likely to have had significant impact on the banks' incentives for securitization. In fact, credit rating agencies stated explicitly that after the APLs were enacted they began to require credit enhancement from lenders who might have been in violation of state APLs: "To the extent that potential violations of APLs reduce the funds available to repay RMBS investors, the likelihood of such violations and the probable severity of the penalties must be included in Moody's overall assessment".[6]

We follow this literature by considering only the states that passed anti-predatory laws that pertained to home purchase loans and were not just small-scale home ownership and equity protection acts implemented to prevent local regulation. Appendix A shows the states that passed an anti-predatory law and their implementation dates.

2.3 Preemption Rule

On January 7, 2004 the OCC adopted sweeping regulations preempting, with regard to national banks, a broad range of state laws that sought to regulate the "terms of credit." The measure preempted laws that regulate loan terms and lending and deposit relationships

[5] For a theoretical model of predatory lending see Bond et al. (2009).
[6] Available at https://www.moodys.com.

or require a state license to lend. The final rule also provided for preemption when the law would "obstruct, impair, or condition a national bank's exercise of its lending, deposit-taking, or other powers granted to it under federal law", either directly or through subsidiaries. The new regulations effectively barred the application of all state laws to national banks, except where (i) Congress has expressly incorporated state-law standards in federal statutes or (ii) particular state laws have only an "incidental" effect on national banks. The OCC has said that state laws will be deemed to have a permissible "incidental" effect only if they are part of "the legal infrastructure that makes it practicable" for national banks to conduct their federally-authorized activities and "do not regulate the manner or content of the business of banking authorized for national banks," such as contracts, torts, criminal law, the right to collect debts, property acquisition and transfer, taxation, and zoning.

Specifically, the OCC preempted all regulations pertaining the following:

- Loan-to-value ratios;
- The terms of credit, including repayment schedules, amortization, balance, payments due, minimum payments, or term to maturity, including the circumstances under which a loan may be called due and payable after a certain time or upon a specified external event;
- The aggregate amount that may be lent with real property as security;
- Security property, including leaseholds;
- Access to, and use of, credit reports;
- Disclosure and advertising, including laws requiring specific statements, information, or other content as compulsory part of credit application forms, credit solicitations, billing statements, credit contracts, or other credit-related documents;

- Processing, origination, servicing, sale or purchase of, or investment or participation in, mortgages;
- Rates of interest on mortgage loans;

This means that starting in 2004 the subprime mortgage market in states with anti-predatory laws was no longer a level playing field: national banks were the only institutions that could provide mortgage credit to riskier borrowers without restrictions on the terms.

3 Data and Summary Statistics

We collect data on the new mortgage loans originated every year from 1999 to 2011 through the Home Mortgage Disclosure Act (HMDA) dataset for loan applications, which records the final status (denied/approved/originated), reason for borrowing (home purchase/refinancing/home improvement), loan amount, race, sex, income, and home ownership status. We aggregate HMDA data up to the county level and compute the fraction of loans originated by lenders regulated by the OCC. We augment this dataset with information on the fraction of securitized loans by county from Blackbox Logic, a private company that provides a comprehensive, dynamic dataset with information on 21 million privately securitized Subprime, Alt-A, and Prime loans originated after 1999. These loans account for about 90% of all privately securitized mortgages from that period.

Our county-level house price data from 1999 to 2011 come from Zillow.com, which combines the underlying transactions data with a hedonic adjustment model that assigns values to homes based on their characteristics: specifically, size, number of bedrooms and number of bathrooms. To control for heterogeneity in counties' propensity for housing bubbles, we use the elasticity measure proposed by Saiz (2010) and adopted commonly in the literature. To further complement our data concerning the financial conditions of the different counties, we employ the New York Fed Consumer Credit Panel, which provides county-level informa-

tion on loan amounts, mortgage delinquency rates and the fraction of households with FICO scores under 620.

To determine how the credit expansion affected employment, we extracted the employment data from the County Business Pattern, which allows us to differentiate between tradable and non-tradable sectors (following the classification of Mian and Sufi (2012). Finally, to control for local credit demand, we also add Census-based county-level data on demographics, income, and business statistics.

4 Research Design

This paper starts with the observation that the preemption regulations significantly affected the availability of credit to subprime borrowers, especially in American counties where national banks were already predominant. Our identification strategy is designed to exploit the inter-county heterogeneity in exposure to national banks, under the testable hypothesis that riskier households cannot fully compensate for the reduction in credit when their state-chartered banks' lending is curbed by the APL. That is, a lending supply shock to a subset of banks in a region is likely to affect aggregate lending in that region, insofar as households cannot easily find a substitute bank in a different state. This hypothesis is tested directly in the first stage of estimation. Figure 1, displaying the distribution of the fraction of mortgage loans originated by OCC lenders among counties, shows that the importance of national banks does in fact vary significantly. This source of heterogeneity is critical to the study of the way in which regulatory change affects the availability of credit.

The estimation methodology employed here is a triple difference estimator (DDD). The reason for this empirical methodology is twofold. First, the potential problem with difference-in-differences alone (DD) between counties with larger and smaller fractions of OCC lenders is that the estimation might be contaminated by changes in local mortgage market conditions, a possible causal factor in the relative local presence of national banks. A different approach

to DD analysis could be to take the counties with higher fractions of OCC lenders in a non-APL state as the control group. But this approach too is problematic, insofar as changes in the availability of credit in counties with a large proportion of national banks might differ systematically between states due to, say, income and wealth differences, rather than the preemption policy. Furthermore, the states that decided to enact an APL might have done so precisely in response to local credit market conditions.

A more robust analysis than either of these DD approaches can be obtained by using as control groups both a different state and a different group within the same APL state. Specifically, we run the following regression

$$\begin{aligned} Log(\text{Loan Amount})_{i,t} &= \lambda_i + \eta_t + \beta_1 APL_{g,t} * Post_{2004} + \beta_2 OCC_{2003} * Post_{2004} \\ &\quad + \beta_3 OCC_{2003} * APL_{g,t} + \beta_4 APL_{g,t} * Post_{2004} * OCC_{2003} + X_{i,t} + \varepsilon_{i,t}, \end{aligned} \tag{1}$$

where i denotes the county, g the state, and t the year of the loan. We measure the county's exposure to the preemption regulation as the fraction of loans originated by OCC lenders in 2003. $Post_{2004}$ is a dummy equal to 1 after 2004, the year of the preemption rule, and $APL_{g,t}$ is equal to 1 if state g has an anti-predatory-lending law in place at time t. $X_{i,t}$ is a vector of controls at county level, such as population, income, and the elasticity of house prices. What we are interested in is β_4, namely the coefficient of the triple interaction.

The DDD estimate begins with the change over time in averages for the counties with higher fractions of national banks in the APL state; we then net out the change in means for counties with high fractions of OCC lenders in the non-APL state and the change in means for the counties with low fractions of OCC lenders in the APL state. This is designed to control for two potentially confusing factors: ex ante differential incentives of lenders in different states to supply credit in counties with high fractions of OCC lenders (regardless of preemption) and changes in the mortgage market in all the counties of the APL state

(possibly due to other state-wide policies affecting the propensity to lend or changes in the state economy affecting the soundness of lenders).

We start by observing that the fraction of national banks is very persistent over time. Figure 2 shows the relation between the fraction of OCC lenders at time t and at $t-2$ for APL and non-APL states. In both cases the correlation over time is greater than .9. This reassures us that using the presence of national banks in 2003 is a good predictor of their presence in subsequent years; moreover, the Figure demonstrates that the passage of the preemption rule in 2004 did not significantly affect the composition of lenders; that is, national banks did not then suddenly increase their presence in the APL states.

Table 1 provides the summary statistics for our main variables and for the four different regions: counties below and above the median in national bank presence, states with and without APL. The first point to notice is that there are no significant differences in the four quadrants either in the level or in the change in the elasticity of housing supply, population and median income. We then investigate the changes in our main dependent variables – loan amounts, house prices and employment – between 2003 and 2005 and between 2008 and 2010. There is a significant difference between the treatment and control groups, confirming our hypothesis that the effect of the preemption regulation was different in counties with strong as opposed to weak presence of OCC lenders and in APL as opposed to non-APL states. We then checked for these differences in the pre-sample period, 2001- 2003: no such pattern emerges, demonstrating that there are no pre-trends. Our empirical strategy, therefore, is valid.

Now we can present our estimation results. Table 2 shows the regression of home purchase mortgages originated in different counties on the interaction between $APL_{g,t}$, the $Post$ indicator and an OCC indicator equal to one if the originator is regulated by the OCC and so exempt from APL and zero otherwise. Column 1 displays the level, showing a significant increase in loans originated by national banks in APL states after 2004. Column 2 shows the effects on lending growth controlling for county fixed effects, and column 3 controls

for county times agency fixed effects. In both specifications, national banks in APL states increased their lending significantly. These results are consistent with the hypothesis that lenders regulated by the OCC lent more in APL states after the enactment of the preemption regulation.

Table 3.A shows the results of (1) estimated on different subsamples. In Columns (1)-(3) we run a panel regression with the log of loan amounts as dependent variable controlling for year and county fixed-effects, and in turn for log of median income and population for the years 2000-2006. The results show that a more substantial presence of national banks in APL states is associated with larger increases in lending. The counties in the top decile of presence of national banks in APL states showed on average 13% higher annual loan issuance after the preemption than those in the bottom decile. Column (4) and (5) restricts to the sample of counties for which we have the elasticity of housing prices and estimate the same regression with and without controlling for that and its interaction with the Post indicator.

In Table 3.B we present our cross-sectional results. Columns (1)-(4) restrict attention to the boom period 2003-2005 and run a cross-sectional regression with the change in loan origination as dependent variable, controlling for the change in median income and population and the elasticity of house prices. We find that our coefficient is positive and both statistically and economically significant. That is, credit expanded more in the APL-state counties with a higher fraction of national banks than in other counties.

Columns (5)-(8) examine the bust period, 2007-2009, with the change in loan origination as dependent variable, and find that the counties that increased lending most sharply during the boom are the same ones where lending was cut most during the bust. The counties in the top decile of presence of national banks in APL states showed 14% lower annual loan issuance after the preemption than those in the bottom decile.

In short, the preemption rule had a significant effect on the credit supply of national banks in APL states. To further check that the differential impact on credit expansion and real economic activities across counties is not driven by differential trends among the

counties, Figure 3-6 graph the time-series coefficients of the following regressions:

$$\begin{aligned} Log(\mathrm{Y})_{i,t} &= \lambda_i + \eta_t + \sum_{\tau \neq t_0} \beta_{1\tau} APL_{2004} \mathbf{1}_{(\tau=t)} + \sum_{\tau \neq t_0} \beta_{2\tau} OCC_{2003} \mathbf{1}_{(\tau=t)} + \\ & \sum_{\tau \neq t_0} \beta_{3\tau} APL_{2004} * OCC_{2003} \mathbf{1}_{(\tau=t)} + \Gamma X_{i,t} + \varepsilon_{i,t}, \end{aligned} \tag{2}$$

where Y is a vector including our dependent variables: the log of loan amount, the house price growth, the log of the total number of employees in the non-tradable sector and the fraction of delinquent loans. $\mathbf{1}_{(\tau=t)}$ is a dummy variable equal to 1 for year t, and $X_{i,t}$ contains all the other main controls such as the change in the population, change in median income and the elasticity of the supply of houses. We have normalized the coefficient β_{2004}– the year of the preemption rule – to zero. APL_{2004} equals one for the states that passed an APL by 2004 and zero otherwise and, to keep the sample constant over time, we have excluded the states that implemented an APL after 2004 (i.e. Wisconsin, Rhode Island and Indiana).

These event studies highlight two main points. First, that in the pre-period there was no difference in credit supply, house prices, employment and delinquency rates among counties with different fractions of OCC lenders. In other words, the treatment group (counties with a higher fraction of OCC lenders) and the control group (lower fraction) were on parallel trends in the pre-period. Second, Figure 3-6 show the dynamics of the effects we are going to explore in the next section as captured by the coefficient $\beta_{3\tau}$ in 2. All the coefficients becomes significantly positive right after the implementation of the preemption rule and describe the boom and bust pattern we shall test further in the next sections. For loan amounts, house prices and employment the coefficient picks between 2005 and 2006 and then declines significantly up to the point in which it becomes negative. These results show that the counties with a higher fraction of OCC lenders experienced a larger boom and a more severe bust than counties with a lower fraction. Figure 6 shows, instead, the dynamics of our main interaction variable on the delinquency rate, which first decreases until 2007, and

then the effect becomes significantly positive starting in 2008. This shows that delinquency rates were first lower for our treatment group up to 2007 and then they became significantly higher. We are going to analyze these effects and the boom and bust pattern in more details exploiting both the longitudinal and cross section variation in our data.

5 Main Results

In this section we examine the effect of the predicted change in the supply of credit on house prices, employment, and delinquency rates. Kiyotaki and Moore (1997) provides a model in which the dynamic interaction between credit supply and asset prices turns out to be a powerful mechanism by which the effects of shocks persist and get amplified. Their results suggests that a shock to the credit supply can generate large and persistent fluctuations in real economic activity and in the next section we provide evidence supporting this hypothesis.

5.1 The Effect of Credit Expansion on House Prices

To estimate the real estate price impact of the credit expansion precisely, controlling for county characteristics, Table 4.A gives the results for the following reduced form equation:

$$\begin{aligned} House\ Prices\ Growth_{i,t} &= \lambda_i + \eta_t + \beta_1 APL_{g,t} * Post_{2004} + \beta_2 OCC_{2003} * Post_{2004} \\ &\quad + \beta_3 OCC_{2003} * APL_{g,t} + \beta_4 APL_{g,t} * Post_{2004} * OCC_{2003} + X_{i,t} + \varepsilon_{i,t}, \end{aligned} \tag{3}$$

β_4 is the coefficient of interest. Columns (1)-(3) control for year and county fixed-effects and then add the change in median income and population, while Columns (4)-(5) restrict to the counties for which we have data on the elasticity measure and control for elasticity times Post as an additional control. In all three specifications the coefficient is positive and significant. This shows that the predicted increase in credit supply is in fact associated with a rise in house prices. As in the literature, moreover, prices rise less in the counties where

the supply of houses is more elastic. The rise in house prices is also correlated negatively with the introduction of anti-predatory-lending laws (which should curb lending to subprime borrowers) and positively with changes in income and population.

Since we are ultimately interested in how changes in credit supply affect house prices, we can explicitly instrument the credit supply with our main interaction. And we have already shown that this instrument is not correlated with other county characteristics. In column (6) we estimate the effect of an increase in lending by two-stage least squares as follows:

$$\text{House Growth}_{i,t} = \widehat{Loan\ Amount}_{i,t} + \lambda_i + \gamma_t + X_{i,t} + \varepsilon_{i,t}$$

where the predicted increase in $\widehat{Loan\ Amount}$ is estimated using the first stage regression 1. We find that the effect is significantly larger, the coefficient being about 40 percent higher. This IV estimation implies that a 10 percent increase in the credit supply results in 3.6 percent increase in house price growth between 2003 and 2006, or an overall increase of 12% in prices.

As an additional check we considered the possible weakness of our instrumental variable. We generally find F-statistics above Stock (2008) the critical weak identification value of 10, rejecting the hypothesis that the IV is weak. We also confirmed that all our results are robust to weak instruments by employing the approach described by Moreira (2009), which produces tests and confidence sets with correct size when instruments are arbitrarily weak for the case of a single endogenous variable.

In Table 4.B we present our cross-sectional results. Columns (1)-(4) restrict attention to the boom period 2003-2005 and run a cross-sectional regression with the change in house prices as dependent variable, controlling for the change in median income and population and the elasticity of house prices. We find that our coefficient is positive and both statistically and economically significant. That is, house prices increased significantly more in the APL-state counties with a higher fraction of national banks than in other counties.

Columns (5)-(8) examine the bust period, 2007-2009, and find that the counties where house prices increased the most during the boom are the same ones where they fell the most during the bust. These cross-sectional results mirror and confirm the pattern highlighted in Figure 4: counties with a stronger presence of national banks experience a more severe boom and bust cycle in house prices.

5.2 The Effect of Credit on Employment

We have estimated the effect of the outward shift in credit supply on aggregate employment. We should expect job losses to be more closely correlated with local demand and with household indebtedness in the non-tradable in the tradable sector. We hypothesize that an expansion of credit availability boosts local demand and consumption, hence employment.

Table 5.A shows the main results for the non-tradable sector. Columns (1)-(3), tracing the employment during the years 2000-2006, shows that counties with a higher fraction of national banks enjoyed stronger job creation. After controlling for year and county fixed effects the coefficient remains positive and significant. We check robustness by controlling for various county characteristics in columns (2)-(5), and again the coefficient is still positive, statistically significant and economically substantial.

In column (6) we instrument the increase in credit supply and find that the coefficient is greater than the OLS estimates. This estimate implies that a 10% increase in loan issuance is associated with a 2% increase in employment in the non-tradable sector. Taken together, these results indicate that the credit boom of the early 2000s accounts for a good part of the pre-crisis employment increase and also for its subsequent collapse.

In Table 5.B we analyze the boom and bust pattern in employment Columns (1)-(4) restrict attention to the boom period 2003-2005 and run a cross-sectional regression with the change in empoyment in the non-tradable sector as dependent variable, controlling for the change in median income and population and the elasticity of house prices. We find

that our coefficient is positive and both statistically and economically significant. That is, employment increased significantly more in the APL-state counties with a higher fraction of national banks than in other counties.

Columns (5)-(8) examine the bust period, 2008-2010, and show that the counties where job creation was stronger during the boom are the same ones where employment fell the most during the bust. The boom and bust cycle highlighted by Figure 5 gets confirmed in these estimates and provide further evidence that the outward shift in the credit supply had significant effects on the real economic activity.

5.3 The Effect of Credit on Delinquency Rates

We have shown that the counties that were presumably affected more significantly by the preemption regulation, because they have a higher fraction of national banks, experienced a more pronounced boom and bust in both house prices and employment. Now we provide evidence that a contributory factor aggravating the fluctuations in these counties was the increased fragility of the borrowers who increased their leverage during the boom, and their related higher propensity to default during the downturn.

Table 6.A reports a formal test of this hypothesis. Columns (1)-(5) reports the results from estimating a reduced form similar to 3 with deliquency rate as dependent variable and controlling for various characteristics of the county such as population, income and elasticity. As expected, we find that income is negatively correlated with delinquency rates, and that the more elastic counties have lower default rates. The coefficient of interest on the effect of the interaction between the APL dummy, the presence of national banks and the Post 2004 indicator is positive and significant in all the specifications. The effect is also economically substantial: a 10% increase in annual loan issuance brings a 10% reduction in defaults. For counties for which we have the elasticity measure, the effect is significantly greater as the same increase in annual loan issuance result in a 19% decrease in defaults.

Table 6.B analyze the dynamics of this effect in the boom and the bust periods. Column (1)-(4) give the results for the cross-section of counties during the 2003-2005 period: delinquency rates were significantly lower in the counties with a higher fraction of national banks in APL states, even controlling for changes in population and income.

Finally, column (5)-(8), for the 2008-2010 period, show that the predicted increases in lending are associated with significantly higher delinquency rates. This suggests that the build-up of debt during the boom made the households more vulnerable in the recession. The effect is even more significant than for the boom period: if we compare counties in the top and bottom deciles of national bank presence in APL states, the OCC preemption resulted in a 66% increase in delinquencies. Presumably, risky borrowers managed to stay afloat without defaulting thanks to easy credit during the booms but were severely affected during the bust and defaulted with higher frequency.

A possible alternative explanation for the increase in loan issuance shown in Table 3 is that national banks were better at identifying high-quality borrowers than independent mortgage lenders or local banks. If this were the case, however, the households that borrowed from national banks should have been less and not more likely to default during the crisis, and Table 6.B rules out this possibility.

6 Heterogeneous Effects

In the previous section, we have shown that an increase in lending by national banks resulted in a more pronounced boom and bust in house prices, employment and delinquency rates for the average county. However, if the effects we uncover in the data are due to the relaxation of the borrowers' credit constraint, we should then expect them to be stronger for regions where borrowers face tighter financial constraints.

Our first proxy for borrowers' creditworthiness is their FICO score. Specifically, we should expect that counties with a higher fraction of subprime borrowers, those with a FICO score

below 620, are more affected than prime counties, as the preemption rule affected in particular the availability of credit to riskier borrowers. Table 7 investigates this hypothesis. Odd columns show the results for the boom period when we modify our main interaction variable by including an indicator variable equal to one for counties whose fraction of subprime borrowers is in the top tercile. For the loan amount, the employment in the non-tradable sector, and the delinquency rates the results are significantly stronger in subprime counties. This confirms our hypothesis and suggests that the preemption regulation benefited significantly more the riskier borrowers. Even columns depict, instead, the effect on the bust period. In this case, the effects for the loan amount, the house prices and the delinquency rates are stronger when we compare subprime counties to the prime ones. In other words, subprime counties are also those that experience more severe downturns.

To further explore the heterogeneous effects of the introduction of the preemption regulation and the resulting increase in loan issuance, we exploit another measure of borrowers' financial constraints: house affordability. That is, we modify our interaction by including a dummy variable that is equal to one for the counties with a ratio of median house price to median income in the highest tercile. Table 8 shows that counties with least affordable housing experienced a larger boom in loan amounts, employment in the non-tradable sector and delinquency rates. Moreover, even columns also show that there is a significant larger impact of the outward shift in the credit supply in regions where borrowers face tighter credit constraints due to higher house prices and/or lower income.

Finally, we should expect that the response of house prices is greater for inelastic regions, as these are the regions where prices can be more sensitive to an increase in the demand for housing resulting from an increase in the availability of credit. Table 9 confirms this hypothesis by showing that house prices increase and then subsequently decrease significantly more in inelastic regions.

In conclusion, these additional results provide evidence confirming our proposed mechanism that the relaxation of APL for national banks induced them to lend significantly more

to borrowers facing tighter credit constraints.

7 Robustness

In this section, we further test the validity of our identification strategy and examine several alternative explanatory hypotheses.

7.1 Securitization

One possible concern about our results is that the presence of national banks could be correlated with the increase in securitization during our period. Or else, given the credit rating concerns about possible violations of the state laws against predatory lending, the national banks' exemption from the laws might have increased their capacity for loan securitization (although it is generally recognized that the key securitization players were independent mortgage lenders, not national banks. In other words, we need to address the objection that our result might be explained by the rise in the securitization rather than by the outward shift in credit supply.

To respond to this concern, we have drawn data from BlackBox Logic, the largest provider of data on securitized loans. The database covers 90 percent of all securitized loans, and we have aggregated it at the county level to obtain a reliable, county-by-county measure of securitized loans. Table 10 repeats the main estimation of the paper (1), but including as an additional control this measure of securitization all the results are robust. Neither magnitude nor statistical significance changes, suggesting that our instrument does not reflect differences in mortgage originators' incentives for securitization but captures a source of variation that operates by means of the national banks' lending incentives, which contributed to the credit boom.

7.2 Evidence from Border Counties

We have controlled for a number of county characteristics, but in order to control for potential unobserved heterogeneity across counties, another approach is to focus on the counties that border on another state. Since counties in the West are much larger than in the East, and the sample of counties at state borders is small, we construct our main variables at the level of census tracts, which produces a highly homogeneous and much larger sample.

We consider only census tract pairs in different states with a maximum distance between them of 10 miles. We have a sample of 4600 census tracts close to state borders for loan amounts but only 540 for house prices, because many of these tracts are rural areas for which house price indexes are not available. In order to run our triple-difference estimator we compute the fraction of loans originated by national banks in 2003 in each census tract.

Table 11 shows the results of the same regression as in 1 but including border times year fixed effects and census tract fixed effects. This controls for any trend specific to the border areas and for unobserved and time-invariant heterogeneity across tracts. Our main interaction coefficient is still highly significant and only slightly lower than in Table 3. This further validates the triple-difference estimator, because in principle if the underlying assumptions are valid, the magnitude should not depend on the sample.

7.3 Focusing on States with APL

Since anti-predatory-lending laws are not randomly distributed, it is essential to control for heterogeneity between APL and non-APL states. Our triple-difference methodology is motivated in part by this necessity, and our results show that even for state-border counties alone the effects are similar. But an additional robustness check may be useful, restricting the analysis to the states that did *eventually* pass an anti-predatory law. That is, our treatment group is the states that passed an anti-predatory law between 2000 and 2004 and the control group, those that did so in later years.

If the main concern is that APL states are fundamentally different from non-APL states, this test should show that even without using this difference but considering only the timing of the laws, our results hold. Obviously, this does not imply that the timing is exogenous, but this additional test might still help to prove that the relevant variation does not derive from heterogeneity across states but from the preemption rule and its effects on lending by national banks.

Table 12 shows the results for the four dependent variables. In all specifications, we control for time and county fixed effects. Column 1 shows that the effect on loan amounts is both economically and statistically significant. Column 2 analyzes the impact of our main interaction variable on house prices, showing that in the states that passed anti-predatory laws at some point, house prices rise more steeply in the counties with a larger fraction of national banks. Column 3 reports a similar specification for employment in the non-tradable sector. The sign and the magnitude are quite similar to the main specifications, but the coefficient is not significant. Finally, column 4 analyzes delinquency rates, with results very similar to those of the main specification.

7.4 Other Banking Activities

The preemption regulation radically altered the framework of competition in the mortgage market, giving national banks an advantage in the subprime segment that they could have exploited to earn extra profits and invest them locally. This could have significantly affected the local economy through channels other than credit supply to households. For instance, the national banks may have used the proceeds of the loans to riskier borrowers during the boom to increase their lending to small businesses, and the relaxation of credit constraints for local businesses could explain the expansion of employment and possibly the rise in house prices as well.

To evaluate this possibility, we have collected data on national banks' lending to small

businesses, using the Community Reinvestment Act (CRA) disclosure data from the Federal Financial Institutions Examination Council (FFIEC). The CRA requires banks with assets above $1 billion to report small business lending each year. Greenstone and Mas (2012) estimate that in 2007 CRA-covered banks accounted for 86% of all loans under $1 million. FFIEC provides data by bank, county, and year. We aggregated them by type of lender to compute the total amount lent by national banks to small businesses.

Table 13 shows our main regression (1). Column (1) traces the effect of CRA lending on loan issuance, Columns (2)-(4) examine the rise in house prices, employment in the non-tradable sector, and the delinquency rate. CRA lending does not affect either the significance or the magnitude of the coefficient of the interaction between APL, the Post indicator and the fraction of loans to households by OCC lenders in 2003. This evidence helps to distinguish the direct credit supply effect from the indirect spillover effect that might have contributed to a county's economic growth. These results are in line with Figure 2, suggesting again that preemption did not significantly affect the mortgage market in any dimension save lending to riskier households.

7.5 Loan-Level Evidence

In order to provide further evidence supporting the mechanism identified in the previous section, we are going to show that the amount of high-cost loans increased significantly in states with anti-predatory laws and in regions with a higher presence of national banks.

To this end, we collected data on high-cost loans from HDMA, these are defined as loans with an annual percentage rate 3 percentage points or more above the Treasury rate for first-lien mortgages with comparable maturities (or 5 points over in the case of junior liens). Data on high-cost loans were first provided in the 2004 HDMA dataset.[7] This allows us to investigate if the introduction of the OCC preemption rule resulted in an increase in the

[7]The indicator of subprime lending used before then was based n loans originated by lenders designated as "sub-prime" lenders by the U.S. Department of Housing and Urban Development.

issuance of riskier loans.

Table 14 reports coefficient estimates of weighted least square regressions relating the amount of newly originated high cost loans under OCC lenders and non-OCC lenders to the passage of Anti-Predatory laws and the regulatory agency of loan originator. Since HMDA has reported data on high-cost loans only from 2004 onward, we cannot rely on the DDD identification strategy employed in the preceding sections. Our identification in column (1) comes from states that adopted APL between 2004 and 2007, that is, we can exploit the staggered introduction of the anti-predatory laws to identify the effect of an outward shift in the credit supply on the issuance of riskier mortgages. In column (1) we control for year and county-agency fixed-effects and we find a positive and significant effect of the anti-predatory laws in regions with a higher fraction of national banks. In column (2) we analyze the effect on the loan growth and we saturate the model with year, county and agency fixed-effects in order to control for unobserved heterogeneity that might bias our results. We still find a positively significant result. However, although we control for fixed characteristics at the county level, different counties might react differentially to the introduction of the anti-predatory laws. To alleviate this concern, in column (3) we control for county times year fixed-effects when we estimate the effect on the loan amount growth. Both the significance and the magnitude of the effect remains unaffected.

Finally, let us clarify that the measure of high-cost mortgages provided by HDMA is only an imperfect proxy for the "bad loans" originated in the years preceding the crisis. For instance, this measure does not include loans without any documentation or loans that featured teaser rates due to the definition of high-cost loans based on the interest rate spread. Moreover, the issuance of a high-cost loan does not imply that it is in violation of state APL. Even with these limitations, the results of Table 14 provide evidence that corroborates the interpretation of our previous results: after 2004 national banks had the opportunity to significantly increase their lending to riskier borrowers.

7.6 Bank Holding Companies

Up to now, we have considered the agency of each different lender in the computation of our measure for the presence of national banks. However, the reported agency for a loan in HMDA is not the agency of the parent company. For example Wells Fargo in 2005 had 153 subsidiaries with entries in HMDA, 136 of these are assigned to OCC and 17 are assigned to HUD as reporting agency. We can then investigate how our results would change in the case in which we assign the agency of the bank holding company to all the subsidiaries. This additional robustness check also allows us to take care of an additional concern: the possibility for lenders to exploit a form of regulatory arbitrage by switching, for instance, between a HUD lender and an OCC lender. By considering only the bank holding company regulatory agency

We have reproduced all the previous tables with this new measure, however, we report only Table 15, which analyze the cross-sectional results for all the main dependent variables, controlling for the expansion of securitization.[8] Odd columns report our results during the boom period, while the even columns analyze the bust period. Interestingly, both the statical and the economic magnitudes of the effects are equivalent to the one found in the previous section. This reassures us that our source of variation is not confounded by any attempt made by mortgage lenders to exploit laxer regulatory constraints imposed by the different regulatory agencies.

8 Conclusion

This paper exploits major changes in banking regulation that had differential effects on the states with and without anti-predatory-lending laws, and on counties with differing degrees of presence of national banks. This enables us to develop a novel identification strategy for inquiring into the role of credit supply in helping to generate the boom and bust in house

[8] The other tables are available upon request from the authors.

prices and real economic activity in the first decade of the century.

We make four main findings. First, the counties that were more strongly affected by the regulation – i.e. those with a larger presence of national banks in APL states – display significantly greater loan origination, an increase of 13% per year. Second, house prices rise markedly more in these counties during the boom but they also fall more steeply during the bust. Third, there is evidence that the increase in credit supply affected real economic activity; that is, increases in employment in the non-tradable sector are associated with the predicted increases in lending to riskier borrowers. Fourth, there is also evidence that the credit boom was preliminary to a rise in delinquency rates when the housing market turned down.

In conclusion, we believe that this study sheds new light on the impact of credit boom on the real economy and on the way the effect spread across the U.S. between 2002 and 2006. Finally, we observe that an outward shift in the supply of credit to riskier households may amplify economic fluctuations.

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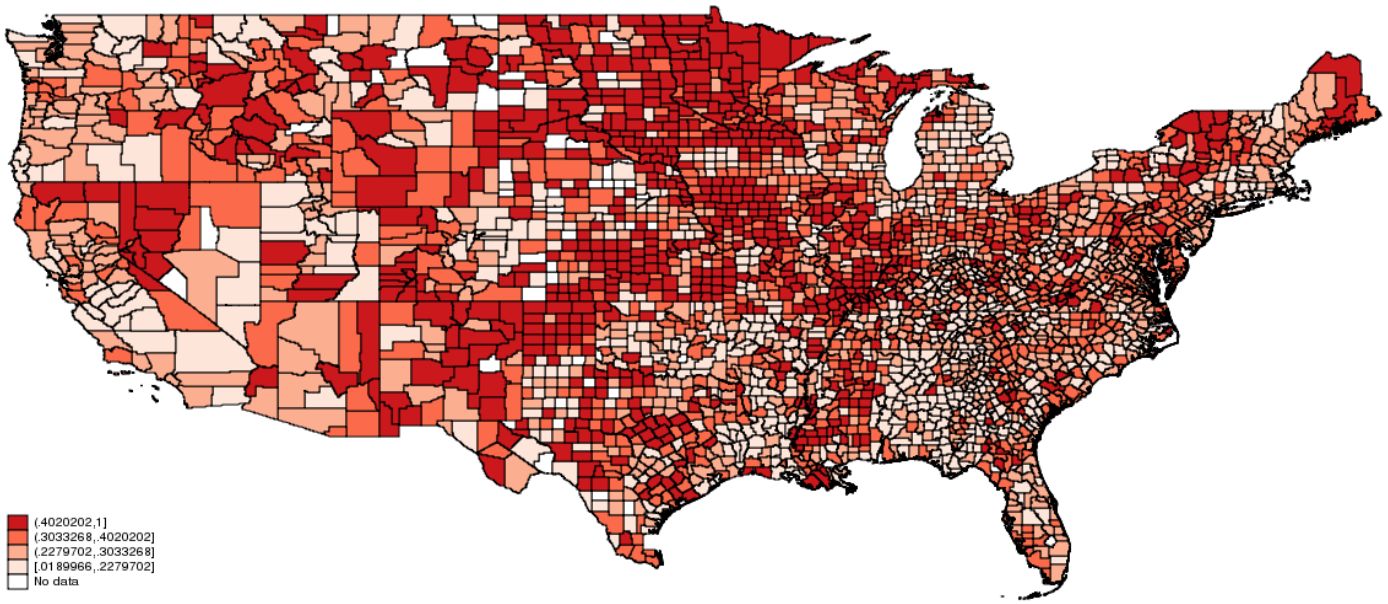


Figure 1- Fraction of Lending Done by National Banks in 2003 for Each County

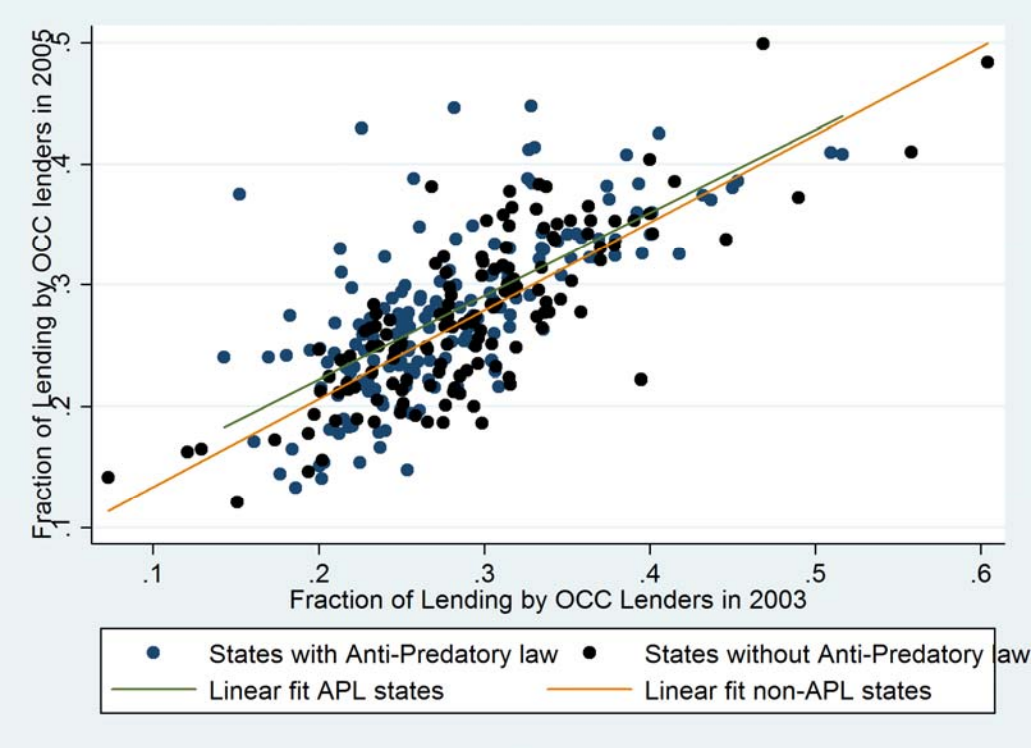


Figure 2 – The Relation between the Fraction of Lending Done by National Banks in 2003 and in 2005 for Each County

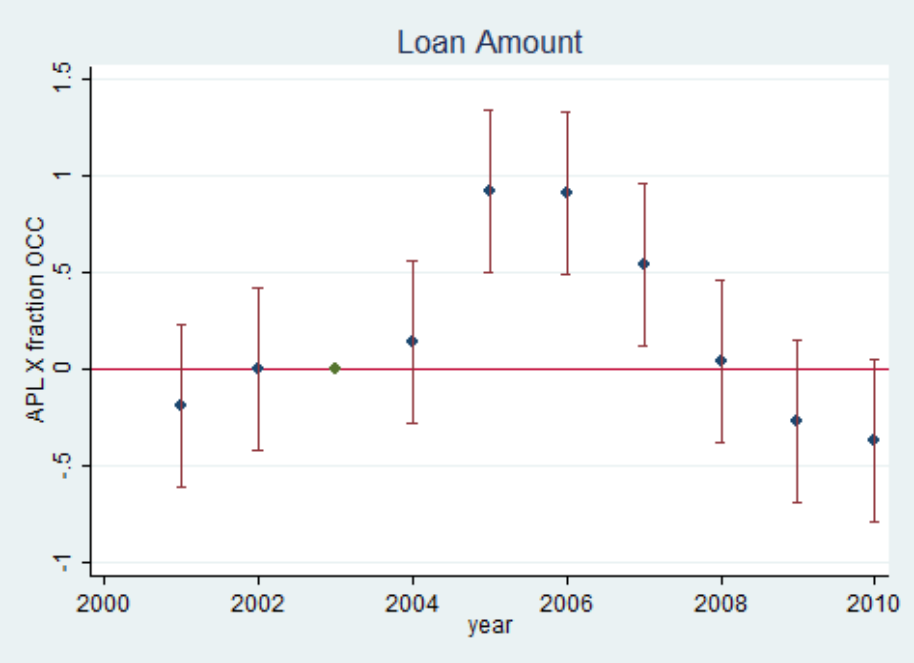


Figure 3- Preemption of national banks from states Anti-Predatory law (APL) and changes in loan amounts.



Figure 4- Preemption of national banks from states Anti-Predatory law (APL) and changes in house prices growth.



Figure 5- Preemption of national banks from states Anti-Predatory law (APL) and changes in employment in non-tradable sector.

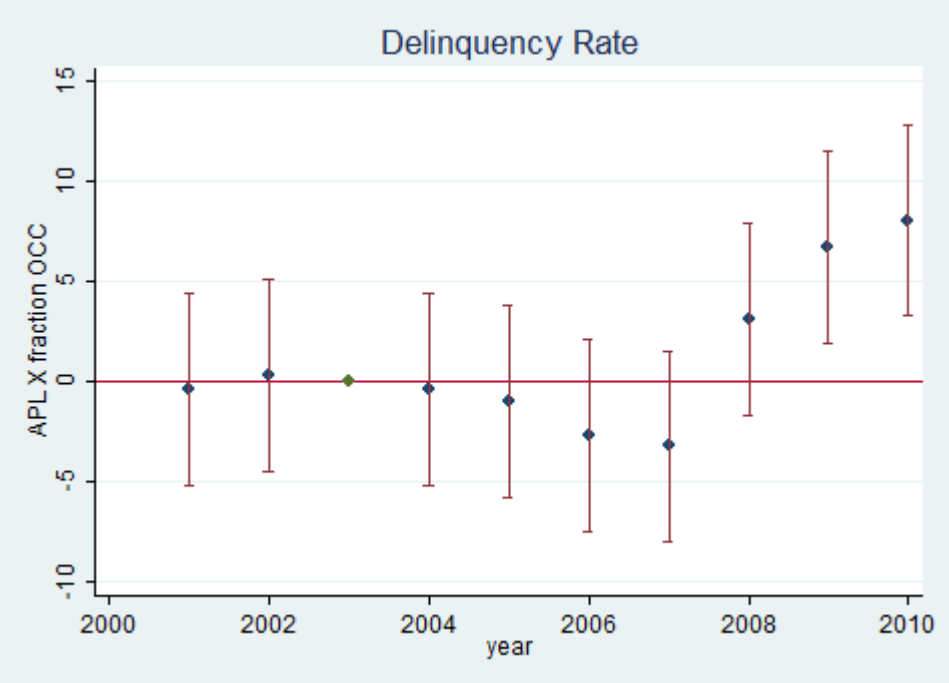


Figure 6- Preemption of national banks from states Anti-Predatory law (APL) and changes in delinquency rates.

Summary Statistics

The table reports descriptive statistics for the main variables employed in our analysis. Loan Amount is computed using HDMA data, and denotes the value of mortgages to purchase a home by mortgage lenders in the period 2000-2011. Data on Population and Income are from the Census. House prices are from Zillow.com and are aggregated at the county level. The Fraction of OCC lenders in 2003 is the share of loans originated by all the mortgage lenders regulated by The Office of the Comptroller of the Currency (OCC) as of 2003, and is computed using data from HDMA. We compute the averages for these variables for counties with above and below the median fraction of loans originated by OCC lenders, and for both states with and without anti-predatory laws. the Column Diff-in-Diff is our baseline estimator and tests for significant differences between the treatment and the control group. Asterisks denote significance levels (***=1%, **=5%, *=10%).

		N	Mean	Standard Deviation	Min	Max	States without Anti-Predatory Law		States with Anti-Predatory Law		Diff-in-Diff
							Below Median	Above Median	Below Median	Above Median	
	Fraction of OCC lenders in 2003	2,219	0.31	0.13	0.05	0.88	0.219	0.349	0.230	0.345	-0.015
	Elasticity of housing supply	770	2.36	1.25	0.60	12.15	-1.568	-2.083	-1.575	-1.775	0.315
	Log Population in 2003	2,219	10.54	0.23	9.82	11.44	10.58	10.66	10.70	10.73	-0.050
	Log Median Income in 2003	2,219	10.66	1.12	9.04	15.84	12.51	12.09	13.26	12.60	-0.240
Change from 2003-2005	Median Income	2,220	0.06	0.04	-0.15	0.28	0.0727	0.0549	0.103	0.0835	-0.002
	Population	2,219	0.03	0.04	-0.32	0.20	0.0306	0.0220	0.0212	0.0171	0.005
	Fraction of Loans Securitized	2,211	0.14	0.08	-0.68	0.76	0.204	0.162	0.238	0.194	-0.002
	Loan amounts	2,219	0.36	0.23	-0.77	1.82	0.710	0.443	0.455	0.428	0.240 ***
	House prices	679	0.22	0.15	-0.28	1.09	0.450	0.250	0.359	0.289	0.130 *
	Employment in non-tradables	760	0.04	0.11	-0.40	0.94	0.0725	0.0471	0.0508	0.0441	0.019 *
Change from 2008-2010	Median Income	2,220	-0.01	0.05	-0.28	0.21	-0.00495	-0.0108	-0.00595	-0.00928	0.003
	Population	2,220	0.01	0.02	-0.07	0.13	0.00583	0.00728	0.00583	0.00724	0.000
	Loan amounts	2,220	-0.27	0.22	-1.27	1.07	-0.265	-0.202	-0.179	-0.210	-0.094 ***
	House prices	714	-0.08	0.10	-0.49	0.16	-0.170	-0.0744	-0.112	-0.0929	-0.077 **
	Employment in non-tradables	765	-0.06	0.07	-0.33	0.32	-0.0567	-0.0409	-0.0403	-0.0481	-0.024 **
Change from 2001-2003 (Pre-trends)	Median Income	2,219	0.03	0.03	-0.10	0.11	0.0302	0.0257	0.0146	0.00803	-0.002
	Population	2,219	0.02	0.03	-0.21	0.15	0.00803	0.0102	0.0178	0.0150	-0.005
	Loan amounts	2,219	0.23	0.20	-1.37	1.37	0.379	0.280	0.372	0.286	0.013
	House prices	665	0.15	0.10	-0.83	0.44	0.207	0.154	0.275	0.150	-0.072
	Employment in non-tradables	747	0.01	0.12	-0.67	0.88	0.0450	0.0196	0.0454	0.0138	-0.006

Table 2

Preemption of National Banks and the Amount of Loans Issued Under Each Regulatory Agency

The table reports coefficient estimates of weighted least square regressions relating the amount of newly originated loans under each regulatory agency to the preemption of national banks were weights equal to population of county. Loan amounts is based on HMDA and is the amount of loans originated for purchainsg a house aggregated for each regulatory agency at county level for each year. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "OCC" is equal to one if the regulating agency is OCC. The sample includes years from 2000 to 2006. Robust standard errors, clustered at county level, are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	1	2	3
	Log of loan amount	*Log (Loan Amounts / Loan Amounts in 2000)*	
APL x Post x OCC	0.09***	0.11***	0.11***
	(0.03)	(0.03)	(0.03)
OCC x Post	-0.07***	-0.09***	-0.09***
	(0.02)	(0.02)	(0.02)
APL x OCC	-0.01	-0.00	-0.00
	(0.02)	(0.02)	(0.02)
APL x Post	-0.09***	-0.10***	
	(0.02)	(0.02)	
OCC		0.05***	0.05***
		(0.01)	(0.01)
APL	-0.01	-0.01	
	(0.02)	(0.02)	
Post	0.42***	0.42***	
	(0.02)	(0.02)	
County-Agency Fixed Effects	Yes		
Year Fixed Effects	Yes	Yes	
County Fixed Effects		Yes	
County-Year Fixed Effetcs			Yes
Observations	90,957	89,170	89,170
R-squared	0.98	0.34	0.33

Table 3.A

Preemption of National Banks and Boom-Bust in Loan Origination

The table reports coefficient estimates of weighted least square regressions relating the amount of newly originated purchase loans to the preemption of national banks with weights equal to the population of each county. Loan amounts is based on HMDA and is the amount of loans originated for purchainsg a house aggregated at county level for each year. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). To facilitate the comparison with Column 5, Column 4 restricts attention to the subsample of counties for which the Elasticity measure is available. The sample includes years from 2000 to 2006. Robust standard errors, clustered at county level, are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	1	2	3	4	5
	Log of Loan amount				
	Full Sample			*Counties with Elasticity Measure*	
APL X Post X Fraction OCC	0.449***	0.493***	0.472***	0.949***	0.828***
	(0.133)	(0.115)	(0.120)	(0.223)	(0.223)
APL X Post	-0.174***	-0.201***	-0.196***	-0.324***	-0.289***
	(0.0477)	(0.0414)	(0.0416)	(0.0703)	(0.0690)
APL X Fraction OCC	-0.242***	-0.229**	-0.156	-0.258	-0.227
	(0.0935)	(0.100)	(0.101)	(0.170)	(0.175)
Post X Fraction OCC	-0.537***	-0.426***	-0.446***	-0.836***	-0.598***
	(0.0987)	(0.0806)	(0.0877)	(0.173)	(0.163)
APL	0.0546	0.0588	0.0384	0.0676	0.0515
	(0.0342)	(0.0369)	(0.0363)	(0.0544)	(0.0557)
Elasticity X Post					-0.0428***
					(0.00857)
Log(Median Income)		1.613***	1.552***	1.725***	1.528***
		(0.155)	(0.142)	(0.157)	(0.170)
Log(Population)			1.191***	1.196***	1.271***
			(0.156)	(0.184)	(0.179)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
County Fixed Effect	Yes	Yes	Yes	Yes	Yes
Observations	21,564	21,539	15,533	5,390	5,390
R-squared	0.020	0.098	0.147	0.194	0.209
Number of counties	3,085	3,081	2,219	770	770

Table 3.B

Preemption of National Banks and Boom-Bust in Loan Origination

The table reports coefficient estimates of weighted least square regressions relating the change in newly originated purchase loans to the preemption of national banks with weights equal to the population of each county. Loan amounts is based on HMDA and is the amount of loans originated for purchainsg a house aggregated at county level for each year. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). To facilitate the comparison with Column 4 and 8, Column 3 and 7 restrict attention to the subsample of counties for which the Elasticity measure is available. Heteroskedasticity-robust standard errors are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	1	2	3	4	5	6	7	8
	Change in Loan Amount in 2003-2005				*Change in Loan Amount in 2007-2009*			
APL X Fraction OCC	0.401***	0.434***	0.953***	0.858***	-0.633***	-0.576***	-1.070***	-0.971***
	(0.152)	(0.133)	(0.234)	(0.227)	(0.215)	(0.197)	(0.373)	(0.353)
APL	-0.194***	-0.228***	-0.386***	-0.355***	0.217***	0.191**	0.340***	0.315***
	(0.0558)	(0.0486)	(0.0768)	(0.0738)	(0.0837)	(0.0755)	(0.126)	(0.119)
Fraction OCC	-0.584***	-0.373***	-0.775***	-0.604***	0.966***	0.861***	1.485***	1.207***
	(0.112)	(0.101)	(0.177)	(0.168)	(0.180)	(0.149)	(0.297)	(0.254)
Change in Median Income		1.553***	1.841***	1.560***		1.181***	1.199***	1.230***
		(0.149)	(0.173)	(0.190)		(0.259)	(0.346)	(0.339)
Change in Population		1.868***	1.895***	1.959***		1.584***	1.821***	1.549***
		(0.228)	(0.266)	(0.261)		(0.495)	(0.585)	(0.555)
Elasticity				-0.0344***				0.0470***
				(0.00798)				(0.0130)
Observations	2,219	2,219	770	770	2,219	2,219	770	770
R-squared	0.063	0.265	0.363	0.386	0.062	0.131	0.185	0.220

Table 4.A

Preemption of National Banks and Boom-Bust in House Prices

The table reports coefficient estimates of weighted least square regressions relating house prices to the preemption of national banks and the increase in the supply of loans induced by the preemption where the weights are given by the population of each county. House prices are from Zillow.com. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). To facilitate the comparison with Column 5, Column 4 restricts attention to the subsample of counties for which the Elasticity measure is available. In column 6, "APL X Post X Fraction OCC" is used as an instrument for the log of loan amounts. The sample includes years from 2000 to 2006. Robust standard errors, clustered at county level, are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	1	2	3	4	5	6
	House Prices Growth					
	Full Sample			*Counties with Elasticity Measure*		
						IV
APL X Post X Fraction OCC	0.335***	0.321***	0.310***	0.346**	0.315**	
	(0.110)	(0.110)	(0.108)	(0.137)	(0.142)	
Amounts						0.362**
						(0.157)
APL	0.0187	0.0218	0.0254	0.0253	0.0254	0.0113
	(0.0357)	(0.0364)	(0.0368)	(0.0489)	(0.0497)	(0.0290)
APL X Post	-0.116***	-0.117***	-0.112***	-0.117**	-0.108**	0.00217
	(0.0348)	(0.0357)	(0.0350)	(0.0459)	(0.0496)	(0.0216)
APL X Fraction OCC	-0.121	-0.125	-0.136	-0.143	-0.152	-0.0965
	(0.104)	(0.108)	(0.109)	(0.142)	(0.145)	(0.0855)
Post X Fraction OCC	-0.196***	-0.168***	-0.164***	-0.196**	-0.137	0.188
	(0.0605)	(0.0604)	(0.0591)	(0.0776)	(0.0896)	(0.125)
Elasticity X Post					-0.0103	0.0102
					(0.00640)	(0.0118)
Log(Median Income)		0.316*	0.316*	0.380*	0.346*	0.0364
		(0.171)	(0.171)	(0.204)	(0.190)	(0.245)
Log(Population)			0.459***	0.455***	0.503***	0.103
			(0.118)	(0.134)	(0.135)	(0.261)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
County Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,075	4,075	4,057	2,754	2,754	2,754
R-squared	0.020	0.035	0.039	0.040	0.043	-0.052
Number of counties	696	696	693	472	472	472

Table 4.B

Preemption of National Banks and Boom-Bust in House Prices

The table reports coefficient estimates of weighted least square regressions relating the change in house prices to the preemption of national banks and the increase in the supply of loans induced by the preemption, where the weights are given by the population of each county. House prices are from Zillow.com. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). To facilitate the comparison with Column 4 and 8, Column 3 and 7 restrict attention to the subsample of counties for which the Elasticity measure is available. Heteroskedasticity-robust standard errors are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in House Prices in 2003-2005				*Change in House Prices in 2008-2010*			
APL X Fraction OCC	0.489*	0.484**	0.754***	0.560**	-0.396*	-0.411*	-0.705***	-0.603**
	(0.277)	(0.218)	(0.265)	(0.258)	(0.224)	(0.223)	(0.262)	(0.261)
APL	-0.161*	-0.209***	-0.292***	-0.234***	0.139*	0.145*	0.232***	0.206**
	(0.0905)	(0.0683)	(0.0820)	(0.0798)	(0.0746)	(0.0742)	(0.0856)	(0.0850)
Fraction OCC	-0.827***	-0.407**	-0.585***	-0.334	0.565***	0.539***	0.811***	0.637***
	(0.196)	(0.175)	(0.213)	(0.203)	(0.203)	(0.201)	(0.235)	(0.234)
Change in Median Income		2.138***	2.300***	1.972***		-0.277	-0.334	-0.218
		(0.295)	(0.331)	(0.358)		(0.210)	(0.259)	(0.269)
Change in Population		1.013***	1.078***	1.210***		0.996*	0.880	0.546
		(0.236)	(0.259)	(0.246)		(0.510)	(0.578)	(0.561)
Elasticity				-0.0484***				0.0304***
				(0.0111)				(0.00784)
Observations	678	678	459	459	713	713	478	478
R-squared	0.055	0.444	0.478	0.512	0.062	0.081	0.116	0.154

Table 5.A

Preemption of National Banks and Boom-Bust in Employment in Non-Tradable Sector

The table reports coefficient estimates of WLS regressions relating employment in non-tradable sector to the preemption of national banks and the increase in the supply of loans induced by the preemption, with weights equal to the population of each county. Employment data comes from County Business Pattern and non-tradable sectors are definied according to Main and Sufi (2013). "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). To facilitate the comparison with Column 5, Column 4 restricts attention to the subsample of counties for which the Elasticity measure is available. In column 6, "APL X Post X Fraction OCC" is used as an instrument for the log of loan amounts. The sample includes years from 2000 to 2006. Robust standard errors, clustered at county level, are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	1	2	3	4	5	6
	Employment in Non-Tradable Sector					
	Full Sample			*Counties with Elasticity Measure*		
						IV
APL X Post X Fraction OCC	0.207***	0.220***	0.161***	0.184**	0.168**	
	(0.0698)	(0.0739)	(0.0596)	(0.0730)	(0.0739)	
Instrumented Log of Loan Amounts						0.206**
						(0.0836)
APL	0.0544***	0.0533***	0.0343**	0.0264	0.0247	0.0131
	(0.0172)	(0.0173)	(0.0160)	(0.0193)	(0.0192)	(0.0162)
APL X Post	-0.0696***	-0.0762***	-0.0607***	-0.0710***	-0.0664***	-0.00724
	(0.0222)	(0.0234)	(0.0182)	(0.0218)	(0.0220)	(0.00651)
APL X Fraction OCC	-0.171***	-0.163***	-0.0902*	-0.0633	-0.0605	-0.0130
	(0.0538)	(0.0528)	(0.0482)	(0.0597)	(0.0598)	(0.0555)
Post X Fraction OCC	-0.191***	-0.144***	-0.103**	-0.106*	-0.0764	0.0503
	(0.0560)	(0.0540)	(0.0448)	(0.0570)	(0.0589)	(0.0433)
Elasticity X Post					-0.00497*	0.00304
					(0.00280)	(0.00425)
Log(Median Income)		0.326***	0.287***	0.309***	0.286***	-0.0295
		(0.0596)	(0.0443)	(0.0480)	(0.0466)	(0.134)
Log(Population)			0.893***	0.954***	0.962***	0.687***
			(0.0741)	(0.0787)	(0.0785)	(0.149)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
County Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,362	5,362	5,362	3,721	3,721	3,721
R-squared	0.014	0.044	0.226	0.281	0.283	0.171

Table 5.B

Preemption of National Banks and Boom-Bust in Employment in Non-Tradable Sector

The table reports coefficient estimates of WLS regressions relating the changes in employment in non-tradable sector to the preemption of national banks and the increase in the supply of loans induced by the preemption, with weights equal to the population of each county. Employment data comes from County Business Pattern and non-tradable sectors are definied according to Main and Sufi (2013). "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). To facilitate the comparison with Column 4 and 8, Column 3 and 7 restrict attention to the subsample of counties for which the Elasticity measure is available. Heteroskedasticity-robust standard errors are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in Employment in Non-Tradable Sector in 2003-2005				*Change in Employment in Non-Tradable Sector in 2008-2010*			
APL X Fraction OCC	0.163**	0.141**	0.189**	0.182**	-0.164**	-0.166**	-0.233**	-0.213**
	(0.0708)	(0.0637)	(0.0766)	(0.0767)	(0.0745)	(0.0744)	(0.0973)	(0.0999)
APL	-0.0583***	-0.0498***	-0.0656***	-0.0633***	0.0519**	0.0525**	0.0695**	0.0643**
	(0.0222)	(0.0192)	(0.0225)	(0.0225)	(0.0245)	(0.0244)	(0.0312)	(0.0317)
Fraction OCC	-0.138**	-0.0735	-0.102*	-0.0905	0.0567	0.0530	0.0869	0.0407
	(0.0541)	(0.0470)	(0.0589)	(0.0605)	(0.0395)	(0.0400)	(0.0559)	(0.0584)
Change in Median Income		0.139***	0.146***	0.128**		0.0392	0.0834	0.120
		(0.0484)	(0.0482)	(0.0510)		(0.104)	(0.122)	(0.121)
Change in Population		0.865***	0.944***	0.948***		0.321	0.385	0.294
		(0.0894)	(0.0957)	(0.0953)		(0.215)	(0.236)	(0.223)
Elasticity				-0.00219				0.00759***
				(0.00269)				(0.00281)
Observations	759	759	532	532	764	764	538	538
R-squared	0.016	0.161	0.232	0.233	0.013	0.019	0.030	0.044

Table 6.A

Preemption of National Banks and Decline and Subsequent Increase in Mortgages Delinquencies

The table reports coefficient estimates of weighted least square regressions relating the percentage of delinquent mortgages to the preemption of national banks with weights equal to the population of each county. Delinquency is defined as at least 90 days late payments and comes from Federal Reserve Bank of New York Consumer Credit Panel. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). To facilitate the comparison with Column 5, Column 4 restricts attention to the subsample of counties for which the Elasticity measure is available. The sample includes years from 2000 to 2006. Robust standard errors, clustered at county level, are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	1	2	3	4	5
	Delinquency Rates				
	Full Sample			*Counties with Elasticity Measure*	
APL X Post X Fraction OCC	-0.874***	-0.910***	-0.869***	-1.862***	-1.701***
	(0.328)	(0.307)	(0.309)	(0.473)	(0.473)
APL	-0.0520	-0.0562	-0.0435	-0.166	-0.144
	(0.0943)	(0.0970)	(0.0953)	(0.130)	(0.131)
APL X Post	0.402***	0.431***	0.420***	0.705***	0.659***
	(0.107)	(0.100)	(0.101)	(0.148)	(0.148)
APL X Fraction OCC	0.0596	0.0416	-0.00465	0.360	0.319
	(0.282)	(0.288)	(0.284)	(0.401)	(0.406)
Post X Fraction OCC	0.877***	0.710***	0.683***	1.180***	0.863***
	(0.190)	(0.175)	(0.178)	(0.302)	(0.286)
Elasticity X Post					0.0569***
					(0.0200)
Log(Median Income)		-1.981***	-1.930***	-2.312***	-2.051***
		(0.339)	(0.325)	(0.374)	(0.411)
Log(Population)			-0.827*	-0.874*	-0.974*
			(0.435)	(0.523)	(0.516)
Year Fixed Effect		Yes	Yes	Yes	Yes
County Fixed Effect		Yes	Yes	Yes	Yes
Observations	15,533	15,533	15,533	5,390	5,390
R-squared	0.007	0.020	0.022	0.064	0.070
Number of counties	2,219	2,219	2,219	770	770

Table 6.B

Preemption of National Banks and Decline and Subsequent Increase in Mortgages Delinquencies

The table reports coefficient estimates of weighted least square regressions relating the change in delinquency rates to the preemtion of national banks with weights equal to the population of each county. Delinquency is defined as at least 90 days late payments and comes from Federal Reserve Bank of New York Consumer Credit Panel. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). To facilitate the comparison with Column 4 and 8, Column 3 and 7 restrict attention to the subsample of counties for which the Elasticity measure is available. Heteroskedasticity-robust standard errors are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in Delinquency Rates in 2003-2005				*Change in Delinquency Rates in 2008-2010*			
APL X Fraction OCC	-0.821**	-0.858**	-1.984***	-1.987***	2.167	2.382	8.110**	6.618*
	(0.366)	(0.346)	(0.541)	(0.544)	(2.220)	(2.149)	(3.947)	(3.682)
APL	0.387***	0.422***	0.757***	0.758***	-0.970	-1.039	-2.984**	-2.618**
	(0.120)	(0.114)	(0.170)	(0.170)	(0.858)	(0.828)	(1.347)	(1.245)
Fraction OCC	0.888***	0.703***	1.602***	1.607***	-7.786***	-7.556***	-13.75***	-9.851***
	(0.243)	(0.230)	(0.377)	(0.384)	(1.885)	(1.810)	(3.389)	(3.012)
Change in Median Income		-1.423***	-1.576***	-1.584***		3.765**	4.298	1.434
		(0.342)	(0.395)	(0.438)		(1.589)	(2.732)	(2.594)
Change in Population		-1.493***	-1.294**	-1.292**		-24.98***	-29.89***	-21.30***
		(0.536)	(0.616)	(0.610)		(5.292)	(6.631)	(5.650)
Elasticity				-0.00103				-0.692***
				(0.0180)				(0.0931)
Observations	2,219	2,219	770	770	2,219	2,219	770	770
R-squared	0.019	0.035	0.116	0.116	0.078	0.115	0.195	0.299

Table 7

Heterogeneous Effects I: Subprime Regions

The table reports coefficient estimates of weighted least square regressions relating the amount of newly originated purchase loans, house prices, employment in non-tradable sector, and deliqneuency rates to the preemption of national banks with weights equal to the population of each county. Subprime counties are defined as counties with the fraction of subprime borrowers (FICO <620) in the top tercile, while Prime counties are those in the bottom tercile. Loan amounts is based on HMDA and is the amount of loans originated for purchainsg a house aggregated at county level for each year. House prices are from Zillow.com. Employment data comes from County Business Pattern and non-tradable sectors are definied according to Main and Sufi (2013). Delinquency is defined as at least 90 days late payments and comes from Federal Reserve Bank of New York Consumer Credit Panel. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. In all columns, we control for changes in median income, population and for the elasticity measure. Other interactions omitted. Heteroskedasticity-robust standard errors are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in Loan Amount in 2003-2005	*Change in Loan Amount in 2007-2009*	*Change in House Prices in 2003-2005*	*Change in House Prices in 2008-2010*	*Change in Employment in Non-Tradable Sector in 2003-2005*	*Change in Employment in Non-Tradable Sector in 2008-2010*	*Change in Delinquency Rates in 2003-2005*	*Change in Delinquency Rates in 2008-2010*
Subprime County X APL X Fraction OCC	1.475***	-0.799**	0.525	-1.225**	0.338**	-0.301	-2.552**	13.80**
	(0.354)	(0.357)	(0.400)	(0.606)	(0.138)	(0.200)	(1.015)	(6.532)
Prime County X APL X Fraction OCC	0.396	-0.138	0.547*	-0.314	0.0675	-0.192*	-1.402***	2.415
	(0.260)	(0.332)	(0.327)	(0.193)	(0.0864)	(0.110)	(0.543)	(3.990)
Observations	764	764	455	474	528	534	764	764
R-squared	0.431	0.187	0.516	0.228	0.245	0.049	0.144	0.331

Table 8

Heterogeneous Effects II: House Affordability

The table reports coefficient estimates of weighted least square regressions relating the amount of newly originated purchase loans, house prices, employment in non-tradable sector, and deliqneuency rates to the preemption of national banks with weights equal to the population of each county. Counties with least affordable housing are defined as those with the ratio of median house prices to median income in the top tercile, while the counties with most affordable housing are those in the lowest tercile. Loan amounts is based on HMDA and is the amount of loans originated for purchainsg a house aggregated at county level for each year. House prices are from Zillow.com. Employment data comes from County Business Pattern and non-tradable sectors are definied according to Main and Sufi (2013). Delinquency is defined as at least 90 days late payments and comes from Federal Reserve Bank of New York Consumer Credit Panel. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. In all columns, we control for changes in median income, population and for the elasticity measure. Other interactions omitted. Heteroskedasticity-robust standard errors are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in Loan Amount in 2003-2005	*Change in Loan Amount in 2007-2009*	*Change in House Prices in 2003-2005*	*Change in House Prices in 2008-2010*	*Change in Employment in Non-Tradable Sector in 2003-2005*	*Change in Employment in Non-Tradable Sector in 2008-2010*	*Change in Delinquency Rates in 2003-2005*	*Change in Delinquency Rates in 2008-2010*
Least Affordable Housing X APL X Fraction OCC	2.206*	-3.699**	1.009	-1.684*	0.511***	0.294	-6.683***	52.07***
	(1.162)	(1.545)	(0.739)	(0.898)	(0.185)	(0.392)	(2.248)	(16.48)
More Affordable Housing X APL X Fraction OCC	0.822**	-0.512**	0.321	-0.124	0.0675	-0.0420	-1.882**	9.127*
	(0.367)	(0.254)	(0.286)	(0.298)	(0.101)	(0.0957)	(0.804)	(4.952)
Observations	445	445	445	445	376	380	445	445
R-squared	0.425	0.264	0.522	0.208	0.259	0.036	0.215	0.403

Table 9

Heterogeneous Effects III: Elasticity of Housing Supply

The table reports coefficient estimates of weighted least square regressions relating the amount of newly originated purchase loans, house prices, employment in non-tradable sector, and deliqneuency rates to the preemption of national banks with weights equal to the population of each county. Inelastic counties are those with the measure of elasticity of housing supply provided by Saiz (2010) in the lowest tercile, while elastic counties are those in the top tercile. Loan amounts is based on HMDA and is the amount of loans originated for purchainsg a house aggregated at county level for each year. House prices are from Zillow.com. Employment data comes from County Business Pattern and non-tradable sectors are definied according to Main and Sufi (2013). Delinquency is defined as at least 90 days late payments and comes from Federal Reserve Bank of New York Consumer Credit Panel. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. In all columns, we control for changes in median income, population and for the elasticity measure. Other interactions omitted. Heteroskedasticity-robust standard errors are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in Loan Amount in 2003-2005	*Change in Loan Amount in 2007-2009*	*Change in House Prices in 2003-2005*	*Change in House Prices in 2008-2010*	*Change in Employment in Non-Tradable Sector in 2003-2005*	*Change in Employment in Non-Tradable Sector in 2008-2010*	*Change in Delinquency Rates in 2003-2005*	*Change in Delinquency Rates in 2008-2010*
Inelastic County X APL X Fraction OCC	1.471**	-1.689*	1.334*	-1.284**	0.277	-0.556*	-0.162	25.01*
	(0.663)	(1.012)	(0.774)	(0.599)	(0.212)	(0.305)	(1.561)	(12.77)
Elastic County X APL X Fraction OCC	0.717***	-0.0514	0.380	-0.258	0.191**	-0.146*	-2.030***	4.309
	(0.245)	(0.242)	(0.273)	(0.307)	(0.0878)	(0.0815)	(0.554)	(3.113)
Observations	770	770	459	478	532	538	770	770
R-squared	0.394	0.143	0.517	0.177	0.248	0.075	0.134	0.391

Table 10

Robustness Test I: Securitization

The table reports coefficient estimates of weighted least square regressions relating the amount of newly originated purchase loans, house prices, employment in non-tradable sector, and deliqneuency rates to the preemption of national banks with weights equal to the population of each county, controlling for the fraction of loans that in each county were securitized. Loan amounts is based on HMDA and is the amount of loans originated for purchainsg a house aggregated at county level for each year. House prices are from Zillow.com. Employment data comes from County Business Pattern and non-tradable sectors are definied according to Main and Sufi (2013). Delinquency is defined as at least 90 days late payments and comes from Federal Reserve Bank of New York Consumer Credit Panel. Fraction of Securitized loans come from BlackBox Logic, which covers 90% of the securitization market. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). In the odd columns we include the change in the fraction of loans securitized between 2003 and 2005, while in the even columns we control for the change in the fraction of loans securitized between 2002 and 2006. Heteroskedasticity-robust standard errors are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in Loan Amount in 2003-2005	*Change in Loan Amount in 2007-2009*	*Change in House Prices in 2003-2005*	*Change in House Prices in 2008-2010*	*Change in Employment in Non-Tradable Sector in 2003-2005*	*Change in Employment in Non-Tradable Sector in 2008-2010*	*Change in Delinquency Rates in 2003-2005*	*Change in Delinquency Rates in 2008-2010*
APL X Fraction OCC	0.821***	-0.998***	0.525**	-0.561***	0.175**	-0.210**	-1.979***	6.652**
	(0.207)	(0.349)	(0.240)	(0.199)	(0.0744)	(0.0969)	(0.536)	(2.998)
APL	-0.356***	0.334***	-0.228***	0.201***	-0.0628***	0.0650**	0.758***	-2.787***
	(0.0660)	(0.119)	(0.0721)	(0.0642)	(0.0216)	(0.0305)	(0.168)	(1.005)
Fraction OCC	-0.509***	1.125***	-0.269	0.414***	-0.0765	0.0152	1.587***	-7.873***
	(0.149)	(0.231)	(0.182)	(0.153)	(0.0582)	(0.0525)	(0.371)	(2.048)
Change in Median Income	1.240***	1.060***	1.824***	0.274	0.0873	0.165	-1.517***	-1.938
	(0.173)	(0.317)	(0.516)	(0.181)	(0.0563)	(0.118)	(0.433)	(2.437)
Change in Population	1.786***	1.127*	1.094***	0.352	0.920***	0.257	-1.256**	-17.44***
	(0.250)	(0.575)	(0.250)	(0.518)	(0.0948)	(0.215)	(0.606)	(5.642)
Elasticity	-0.00503	0.0207	-0.0327**	-0.0180**	0.00153	0.00226	-0.00716	-0.203**
	(0.00772)	(0.0163)	(0.0136)	(0.00712)	(0.00286)	(0.00289)	(0.0198)	(0.0806)
Securitization boom between 2003-2005	0.954***		0.427		0.122***		-0.199	
	(0.129)		(0.348)		(0.0335)		(0.307)	
Securitization boom between 2002-2006		-0.514**		-0.802***		-0.106***		9.663***
		(0.256)		(0.108)		(0.0367)		(1.560)
Observations	769	769	459	478	532	538	769	769
R-squared	0.478	0.250	0.535	0.478	0.246	0.066	0.117	0.462

Table 11

Robustness Test II: State Borders

The table reports coefficient estimates of weighted least square regressions relating the amount of newly originated purchase loans, and house prices to the preemption of national banks, with weights equal to the population of the census tract. We restrict attention to tracts within 10 miles from state borders. Loan amounts is based on HMDA and is the amount of loans originated for purchainsg a house aggregated at census tract level for each year. House prices are from Zillow.com. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Fraction OCC" is the fraction of OCC lenders in 2003 at the census tract level. In all columns, we control for state-fixed effects and for state-border fixed effects. Heteroskedasticity-robust standard errors are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	1	2	3	4
	Change in Loan Amount in 2003-2005	*Change in House Prices in 2003-2005*	*Change in Loan Amount in 2007-2009*	*Change in House Prices in 2008-2010*
APL X Fraction OCC	0.290***	0.232***	-0.265**	-0.0516**
	(0.0994)	(0.0444)	(0.116)	(0.0248)
APL	-0.0880***	-0.0796***	-0.00993	-0.00959
	(0.0318)	(0.0135)	(0.0387)	(0.00856)
Fraction OCC	-0.0204	0.00450	0.261***	0.0319
	(0.0625)	(0.0200)	(0.0736)	(0.0228)
Change in County Median Income	0.511***	0.644***	-0.248	-0.352***
	(0.146)	(0.0901)	(0.164)	(0.0517)
Observations	11,587	7,525	11,404	7,514
R-squared	0.114	0.369	0.158	0.402

Table 12

Robustness Test III: Only APL States

The table reports coefficient estimates of weighted least square regressions relating the amount of newly originated purchase loans, house prices, employment in non-tradable sector, and deliqneuency rates to the preemption of national banks with weights equal to the population of each county, restricting attention only to the states that at some point in time decided to implement an anti-predatory law. Loan amounts is based on HMDA and is the amount of loans originated for purchainsg a house aggregated at county level for each year. House prices are from Zillow.com. Employment data comes from County Business Pattern and non-tradable sectors are definied according to Main and Sufi (2013). Delinquency is defined as at least 90 days late payments and comes from Federal Reserve Bank of New York Consumer Credit Panel. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). The results are for years 2000 to 2006. All regressions are weighted using the total number of households in a county as weights. Robust standard errors , clustered at county level, are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1)	(2)	(3)	(4)
	Log of Loan amount	*House Prices Growth*	*Employment in Non-Tradable Sector*	*Delinquency Rates*
APL X Post X Fraction OCC	0.779***	0.374***	-0.0203	-2.206***
	(0.280)	(0.140)	(0.0681)	(0.661)
APL	0.0326	0.0129	0.0303*	-0.113
	(0.0508)	(0.0471)	(0.0165)	(0.129)
APL X Post	-0.173**	-0.0234	0.00967	0.486***
	(0.0771)	(0.0361)	(0.0184)	(0.184)
APL X Fraction OCC	-0.175	-0.102	-0.0863*	0.245
	(0.166)	(0.138)	(0.0511)	(0.410)
Log(Median Income)	1.679***	0.0868	0.323***	-2.491***
	(0.199)	(0.172)	(0.0468)	(0.473)
Log(Population)	1.148***	0.302***	0.871***	-0.501
	(0.233)	(0.103)	(0.0647)	(0.562)
Elasticity X Post	-0.0328***	-0.00906	-0.00343	0.0311
	(0.0112)	(0.0105)	(0.00334)	(0.0239)
Post X Fraction OCC	-0.567**	-0.176*	0.136**	1.348**
	(0.273)	(0.107)	(0.0674)	(0.611)
Year Fixed Effect	Yes	Yes	Yes	Yes
County Fixed Effect	Yes	Yes	Yes	Yes
Observations	2,842	1,514	2,838	2,842
R-squared	0.238	0.019	0.339	0.068
Number of counties	406	260	406	406

Table 13

Robustness Test IV: CRA Lending

The table reports coefficient estimates of weighted least square regressions relating the amount of newly originated Community Reinvestment Act (CRA) loans, house prices, employment in non-tradable sector, and deliqneuency rates to the preemption of national banks with weights equal to the population of each county. The dependent variable in columns 1 and 2 is the change in CRA lending for the boom and the bust period, aggregated at the county level for each year. House prices are from Zillow.com. Employment data comes from County Business Pattern and non-tradable sectors are definied according to Main and Sufi (2013). Delinquency is defined as at least 90 days late payments and comes from Federal Reserve Bank of New York Consumer Credit Panel. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Fraction OCC" is the fraction of OCC lenders in 2003. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). For columns 3-8 we control for the change in CRA lending at the county level. Heteroskedasticity-robust standard errors are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in CRA Lending in 2003-2005	Change in CRA Lending in 2007-2009	*Change in House Prices in 2003-2005*	*Change in House Prices in 2008-2010*	*Change in Employment in Non-Tradable Sector in 2003-2005*	*Change in Employment in Non-Tradable Sector in 2008-2010*	*Change in Delinquency Rates in 2003-2005*	*Change in Delinquency Rates in 2008-2010*
APL X Fraction OCC	-1.242***	-0.242	0.510*	-0.537**	0.154**	-0.204*	-1.812***	5.099
	(0.288)	(0.272)	(0.266)	(0.261)	(0.0786)	(0.107)	(0.563)	(3.212)
Change in CRA lending			-0.0381	0.0956**	-0.0166*	0.0251	0.167**	-3.520***
			(0.0393)	(0.0422)	(0.00953)	(0.0163)	(0.0710)	(0.492)
APL	0.401***	0.0742	-0.221***	0.186**	-0.0553**	0.0607*	0.711***	-2.205**
	(0.0900)	(0.0950)	(0.0832)	(0.0852)	(0.0230)	(0.0341)	(0.174)	(1.086)
Fraction OCC	0.161	0.863***	-0.340	0.529**	-0.0806	0.0270	1.609***	-7.383***
	(0.169)	(0.214)	(0.208)	(0.231)	(0.0606)	(0.0617)	(0.391)	(2.658)
Change in Median Income	0.207	0.223	1.956***	-0.196	0.110**	0.112	-1.505***	1.265
	(0.232)	(0.197)	(0.368)	(0.273)	(0.0514)	(0.121)	(0.436)	(2.333)
Change in Population	0.429*	0.167	1.196***	0.767	0.969***	0.329	-1.242**	-24.62***
	(0.226)	(0.455)	(0.250)	(0.552)	(0.0960)	(0.228)	(0.612)	(5.502)
Elasticity	-0.0726***	0.0538***	-0.0527***	0.0239***	-0.00512*	0.00616**	0.0186	-0.544***
	(0.0122)	(0.00787)	(0.0123)	(0.00810)	(0.00297)	(0.00290)	(0.0194)	(0.0864)
Observations	740	742	442	463	514	522	740	742
R-squared	0.188	0.197	0.513	0.174	0.243	0.050	0.130	0.424

Table 14
Anti-Predatory Laws, National Banks and the Amount of High Cost Loans

The table reports coefficient estimates of weighted least square regressions relating the amount of newly originated high cost loans under OCC lenders and non-OCC lenders to the passage of Anti-Predatory laws and the regulatory agency of loan originator. Loan amounts is based on HMDA and is the amount of high cost loans -loans with more than three percent spread rate- originated for purchainsg a house aggregated for each regulatory agency at county level for each year. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "OCC" is equal to one if the regulating agency is OCC. The sample includes years from 2004 to 2007 (HMDA does not report high cost loans before 2004). Robust standard errors, clustered at county level, are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	1	2	3
	Log of loan amount	*Log (Loan Amounts / Loan Amounts in 2004)*	
APL X OCC	0.39***	0.17***	0.17***
	(0.07)	(0.05)	(0.05)
APL	-0.13*	-0.10*	
	(0.07)	(0.06)	
Year Fixed Effects	Yes	Yes	
County Fixed Effects		Yes	
Agency Fixed Effects		Yes	Yes
County-Agency Fixed Effects	Yes		
County-Year Fixed Effetcs			Yes
Observations	85,328	51,312	51,312
R-squared	0.91	0.48	0.53

Table 15
Bank Holding Companies Agency

The table reports coefficient estimates of weighted least square regressions relating the amount of newly originated purchase loans, house prices, employment in non-tradable sector, and deliqneuency rates to the preemption of national banks with weights equal to the population of each county. Loan amounts is based on HMDA and is the amount of loans originated for purchainsg a house aggregated at county level for each year. House prices are from Zillow.com. Employment data comes from County Business Pattern and non-tradable sectors are definied according to Main and Sufi (2013). Delinquency is defined as at least 90 days late payments and comes from Federal Reserve Bank of New York Consumer Credit Panel. Fraction of Securitized loans come from BlackBox Logic, which covers 90% of the securitization market. "APL" is equal to one if the state has passed anti-predatory law and zero otherwise. "Post" is a dummy equal to one for years after 2004. "Fraction OCC" is the fraction of OCC lenders in 2003 where we have only considered the agency assigned to the bank holding company rather than the one of the single subsidiary. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). In the odd columns we include the change in the fraction of loans securitized between 2003 and 2005, while in the even columns we control for the change in the fraction of loans securitized between 2002 and 2006. Heteroskedasticity-robust standard errors are below the coefficients in paranthesis. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in Loan Amount in 2003-2005	*Change in Loan Amount in 2007-2009*	*Change in House Prices in 2003-2005*	*Change in House Prices in 2008-2010*	*Change in Employment in Non-Tradable Sector in 2003-2005*	*Change in Employment in Non-Tradable Sector in 2008-2010*	*Change in Delinquency Rates in 2003-2005*	*Change in Delinquency Rates in 2008-2010*
APL X Fraction OCC	0.820***	-1.001***	0.523**	-0.565***	0.174**	-0.209**	-2.002***	6.701**
	(0.207)	(0.350)	(0.239)	(0.199)	(0.0741)	(0.0969)	(0.536)	(2.998)
APL	-0.356***	0.335***	-0.227***	0.202***	-0.0625***	0.0648**	0.765***	-2.804***
	(0.0661)	(0.119)	(0.0721)	(0.0642)	(0.0215)	(0.0305)	(0.168)	(1.006)
Fraction OCC	-0.510***	1.127***	-0.269	0.418***	-0.0762	0.0158	1.611***	-7.948***
	(0.149)	(0.231)	(0.181)	(0.153)	(0.0579)	(0.0526)	(0.371)	(2.048)
Change in Median Income	1.240***	1.056***	1.824***	0.273	0.0874	0.165	-1.518***	-1.936
	(0.173)	(0.317)	(0.516)	(0.181)	(0.0563)	(0.118)	(0.433)	(2.437)
Change in Population	1.785***	1.125*	1.094***	0.351	0.919***	0.258	-1.251**	-17.42***
	(0.250)	(0.575)	(0.250)	(0.518)	(0.0949)	(0.215)	(0.605)	(5.636)
Elasticity	-0.00492	0.0206	-0.0327**	-0.0180**	0.00154	0.00225	-0.00767	-0.201**
	(0.00773)	(0.0163)	(0.0136)	(0.00713)	(0.00287)	(0.00289)	(0.0198)	(0.0806)
Securitization boom between 2003-2005	0.954***		0.427		0.122***		-0.199	
	(0.129)		(0.348)		(0.0335)		(0.306)	
Securitization boom between 2002-2006		-0.514**		-0.802***		-0.106***		9.660***
		(0.256)		(0.108)		(0.0367)		(1.558)
Observations	769	769	459	478	532	538	769	769
R-squared	0.478	0.250	0.535	0.478	0.246	0.066	0.118	0.463