Deregulation, Competition and the Race to the Bottom*

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Abstract

We take advantage of the pre-emption of national banks from state anti-predatory lending laws as a quasi-experiment to study the effect of deregulation and its interaction with competition on the supply of complex mortgages (interest only, negative amortization, and teaser mortgages). We first show that following the pre-emption ruling, national banks significantly increased their origination of loans with prepayment penalties and negative amortization features, relative to non-OCC regulated lenders, and lenders in states without anti-predatory lending laws. This increase in the supply of complex mortgages is significantly more pronounced for banks that poorly performed in the previous quarters. Further, we highlight a competition channel: in counties where OCC regulated lenders had larger market share prior to the pre-emption, even non-OCC lenders responded by increasing in a non-linear fashion the presence of predatory terms to the extent permitted by the state anti-predatory lending laws. Overall, our evidence is suggestive that the deregulation of credit markets ignited a "race to the bottom" among distressed financial institutions, working through the competition between lenders.

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1 Introduction

The financial "deregulation" of the last two decades is the subject of a heated political and scholarly debate as it might have played an important role in creating a permissive lending environment. In fact, critics sustain that regulators incentivized looser underwriting standards in order to encourage the making of more and more marginal loans. Effective regulation of lending practices could have also prevented the aggressive lenders from abusing vulnerable borrowers by offering riskier and more complex mortgages.[1] Moreover, on the one hand market forces and lenders reputation concerns may discipline banks' behavior, on the other hand, fiercer competition could induce lenders to "race to the bottom" by originating even riskier loans.

A crucial challenge in empirically identifying the effects of deregulation in fueling the increase in mortgage origination is the fact that policy interventions usually affect all lenders at the same time. This precludes the possibility to distinguish between the direct effects of the policy and other confounding factors affecting mortgage originations, such as changes in the demand for mortgages. In this paper, we are able to overcome these difficulties by exploiting the 2004 pre-emption of state anti-predatory lending laws for lenders regulated by the Office of Comptroller and Currency as an exogenous shock to the competitive landscape. Specifically, this was a shock which expanded the set of loans OCC-regulated lenders were allowed to originate, while leaving unchanged the set that non-OCC regulated lenders were allowed to originate. The pre-emption ruling creates an ideal environment to test for the effects of deregulation by providing us with a clean set of affected banks, i.e. the ones regulated by the OCC, and a set of unaffected banks, i.e. those regulated by the state regulators as well as by the department of housing and urban development (HUD). Thus,

[1] President Barack Obama justified the need for a Consumer Financial Protection Agency by claiming that predatory lending by unregulated mortgage brokers was a cause of the financial crisis: "Part of what led to this crisis were not just decisions made on Wall Street, but also unsustainable mortgage loans made across the country. While many folks took on more than they knew they could afford, too often folks signed contracts they didn't fully understand offered by lenders who didn't always tell the truth" (White House news release, September 19, 2009, available at www.whitehouse.gov/the_press_office/Weekly-Address-President-Obama-Promotes-Tougher-Rules-on-Wall-Street-to-Protect-Consumers). .

we can exploit it to understand how lenders respond to de-regulation, as well as how de-regulation might have spillover effects on other lenders, due to intensified competition among mortgage originators.

There is a large literature in household finance studying the demand-side determinants of the different loan contracts observed in the data. This literature takes important steps towards understanding the types of borrowers who take on different forms of debt, such as adjustable rate mortgages (ARM), fixed rate mortgages (FRM) and interest-only mortgages (IO).[2] However, much less is known about the lenders' supply of these loan contracts. The deregulation in 2004, by differentially affecting different types of originators, gives us the unique opportunity to show that the supply of these mortgages significantly changed in the years preceding the crisis.

Our first result uses a difference-in-difference analysis on a sample of loans issued in states with anti-predatory lending laws (henceforth "APL laws") to show that the pre-emption of these laws for OCC regulated lenders led them to increase the issuance of loans with predatory terms, such as prepayment penalties, negative amortization, balloon payments and lengthy prepayment penalty terms. Our most conservative estimation shows that OCC regulated lenders were about 10% more likely, relative to non-OCC regulated lenders, to issue loans with prepayment penalties following the pre-emption ruling. Compared to an unconditional probability of prepayment penalties of about 30% in our sample, this represents an economically significant increase. These prepayment penalties are particularly important as they enable other features of the mortgage, such as negative amortization, teaser rates and balloon payments to be used profitably. In order to capture any change in the demand for these mortgages, we control for county by month fixed effects in our main specification. Moreover, our results remain robust to using a triple differences-in-difference analysis, which also uses as a control group loans originated in states where anti-predatory lending laws were not in effect.

[2] See Campbell (2006) for a survey of this literature.

Next, we explore if the preemption ruling also influenced the pool of borrowers receiving credit from national banks. Specifically, we analyze various salient borrower's characteristics at origination: the FICO score, the borrower's combined loan-to-value (CLTV) ratio, the presence of a second lien, and whether the mortgage was a cash out refinance. We compare these characteristics before and after the preemption rule within states that adopted an APL law. We find that after the preemption, borrowers have on average 40 points lower FICO scores and a 7% higher CLTV. Moreover, it is 4% more likely that the property has a second lien and a 6% more likely to be a cash out refinance. These results highlight how the deregulation taking place in 2004 not only affected the features of the mortgages that OCC lenders originated, but it also significantly affected the characteristics of the borrowers they started catering to.

One important feature of our data is the possibility to observe the mortgage originators' identities. This allows us to explore if there is any heterogeneity in the responses of OCC lenders to the pre-emption ruling. Specifically, we address the following question: what are the banks that are more likely to issue these mortgages? Consistent with the *risk-shifting-hypothesis*, we show that OCC lenders, following the pre-emption ruling, became more responsive to their recent stock price returns. In other words, following poor stock returns, OCC lenders were more likely to issue loans with predatory features following the pre-emption than prior to it. This is suggestive evidence that OCC might resort to issuing riskier mortgages as a way to improve their profitability in the short-term.

Having established that the deregulation enacted by the OCC had a direct effect on the supply of riskier mortgages and on the pool of borrowers having access to credit, we can now examine if it also had an *indirect* effect on the non-OCC lenders. Intuitively, this deregulation affected the competitive landscape by providing an advantage to national banks which were able to increase their lending to riskier borrowers, while the other financial institutions remained subject to the APL laws. Hence, we can expect non-OCC lenders to react to this preemption more forcefully in an environment where OCC lenders have a more

dominant position. However, the effect might be non-linear, namely, in counties where the OCC lenders exert a significant market power, the non-OCC lenders might respond less to the preemption, because they do not expect to be able to effectively contend the leading position in the market. In other words, the hypothesis is that in counties where OCC lenders have a significant but not dominant market share, the pre-emption rule might significantly affect also non-OCC lenders.

We test this hypothesis by computing the fraction of loan amounts originated by OCC lenders in the pre-period and investigate the non-OCC lenders' response by separately considering the response in counties with the bottom, middle and top terciles of presence of OCC. We find that non-OCC lenders respond by issuing mortgages with features that were not directly restricted by the APL laws. Specifically, we find that non-OCC lenders issue significantly more adjustable-rate mortgages, interest-only mortgages, mortgages featuring deferred amortization and prepayment penalties after the preemption ruling. Interestingly, these effects are mainly concentrated in counties where OCC lenders have an intermediate level of market share. In fact, consistent with the hypothesis outlined above, the results are broadly not present in the counties where OCC lenders have little market power, become large and significant in the counties in the intermediate tercile and then becomes significantly smaller in the top tercile. Our results point out that rather than attenuating the effects of deregulation, competition might induce also the banks not directly affected by the preemption to compete by issuing riskier and more complex mortgages and the effects are non-linear.

Taken together, our results indicate two main channels through which deregulating the mortgage market might have an effect. First, it directly increase the origination of loans with "predatory"-like features by OCC-regulated lenders. Second, our tests also show that preemption rule induced a response even from those lenders who remained subject to the regulation in the same markets. Our results are suggestive of a "*race to the bottom*" which began with the OCC regulated lenders, worked it's way through the local mortgage market,

and forced the hand of the non-OCC regulated lenders to alter their mortgage terms as a competitive response.

Finally, to provide further evidence on the mechanism and to test for the external validity of these results, we also employ the Home Mortgage Disclosure Act (HMDA) dataset for loan applications. We show that OCC lenders were also more likely to securitize their mortgages, which might explain why they were less concerned to issue riskier mortgages.

1.1 Related Literature

Our key contribution is to directly estimate the effect of deregulation on the supply of riskier and complex mortgages through both a direct channel, the behavior of the deregulated national banks, and through an indirect one, the response of their non-national competing institutions.

Our paper is related to Amromin et al. (2013), who shed new lights on the demand for complex mortgages, namely, what type of borrowers are more prone to take on complex mortgages during the years preceding the crisis. They show that these riskier loans were chosen by prime borrowers with high income levels seeking to purchase expensive houses relative to their incomes. However, these borrowers tend to default more often than borrowers with traditional mortgages with similar characteristics. We complement these findings by showing how the supply side of the market is shaped by changes in the regulatory environment. We also show that when competition is more intense, the lenders not affected by the preemption rule tend to adjust not only the interest rate but also a number of other different mortgage features.

Two recent papers have investigated different policy interventions in the mortgage market. First, we share with Amromin and Kearns (2014) its focus on the effect of policy changes on the competitive landscape. Amromin and Kearns (2014) explore whether market competitiveness affects mortgage interest rates exploiting the introduction of the Home Affordable Refinancing Program (HARP). Specifically, lenders that currently service loans eligible for

refinancing enjoyed substantial advantages over their competitors under HARP. They show a significant increase in mortgage interest rates, about 15 to 20 basis points, precisely at the HARP eligibility threshold. Second, Agarwal et al. (2012) analyze the effect of the Community Reinvestment Act (CRA) on banks' lending activity. They find that adherence to the act led to an increase in lending by banks, in fact, during the six quarters surrounding the CRA exams lending is 5 percent higher, but these loans default more often. We share the focus on the effect of deregulation on the pre-crisis loan origination, however, we exploit loan-level data to study how lenders modified key features of the mortgages they originated to remain competitive. Moreover, we also complement these findings by showing that the poor-performing banks were significantly more likely to take advantage of the deregulation.

After the crisis, a novel literature relating the changes in the mortgage market conditions and the real economy emerged. For instance, in their seminal paper, Mian and Sufi (2009) show that zip codes with a higher fraction of subprime borrowers experienced unprecedented relative growth in mortgage credit and a corresponding increase in delinquencies. Our paper advances this literature by exploiting an exogenous shock supply of credit and the competitive environment, to estimate how the specific contracting features offered by the financial institutions and the approved borrowers' characteristics significantly changed.

Our paper also related to the several studies investigating the changes in lending behavior during the years preceding the crisis. Few studies, such as Jiang et al. (2014), Agarwal et al. (2014), Haughwout et al. (2011), Chinco and Mayer (2014) and Barlevy and Fisher (2010), have pointed out that weakened lending standards is one of the main causes behind the subprime crisis; while others, such as among others Rajan et al. (2010), Purnanandam (2011), Nadauld and Sherlund (2013) and Keys et al. (2010), have highlighted the failure of ratings models and the rapid expansion of non-agency securitization markets as one of the main driving factors. We complement these studies by providing evidence that deregulation might have ignited a race to the bottom among lenders in the years preceding the crisis.

We borrow the same identification strategy proposed by Di Maggio and Kermani (2014),

based on the introduction of the preemption rule in 2004 by the OCC and the variation across states with and without anti-predatory laws. However, our paper differs both in focus and results. The main results of Di Maggio and Kermani (2014) are about the real effects of an outward shift in the credit supply, specifically, the possibility to induce a boom and bust cycle in economic activity at the county level. Our paper exploits, instead, individual-level data to first show the effect of the preemption rule on the features of mortgages originated after the preemption rule by national banks. We then investigate the response of the non-OCC regulated banks, such as state banks and credit unions, to show how competition might shape the response to deregulation.

Other related papers include Jayaratne and Strahan (1996), Favara and Imbs (2015), Greenstone and Mas (2012), and Adelino et al. (2012). Jayaratne and Strahan (1996) show that per capita growth rates in income and output increased significantly following the relaxation of bank branch restrictions in the United States. We share with Favara and Imbs (2015) the use of a deregulation as quasi-experiment, in fact, Favara and Imbs (2015) exploit 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 main difference with the current paper is that we document an increase in credit supply due to the preemption rule of 2004, which in contrast to the IBBEA targeted subprime lending and riskier borrowers. Greenstone and Mas (2012) investigate the importance of the credit channel for employment by assessing the role of bank lending to small businesses in the employment decline during the Recession. 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 complement these studies by showing how the mortgage originators directly affected by the deregulation significantly changed the contracting features of the mortgages offered, which also made other market participants compete by adopting complex and predatory lending

practices as well.[3]

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, while Section 4 illustrate our research design.Section 5 provides the first results on the effect of the deregulation on the composition of borrowers and the mortgage features. Section 6 explores how past performance affects OCC lenders response to the preemption. Section 7 investigates a competition mechanism by which non-OCC lenders also changed their origination behavior. Finally, Section 8 performs some robustness checks, while Section 9 concludes.

2 Regulatory Framework

2.1 Mortgage Regulators

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 mortgage companies are regulated by the Department of Housing and Urban Development (HUD) and the Federal Trade Commission.

One potential source of concern is the possibility for mortgage companies to shop for the most lenient regulator. However, Agarwal et al. (2012) 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,

[3] Piskorski et al. (2015) and Griffin and Maturana (2015) have shown that about one out of every ten loans exhibits a form asset quality misrepresentation, such as misreported occupancy status of the borrower and misreported second liens. They also provide evidence that an important fraction of this misrepresentation is driven by financial institutions rather than borrowers. Our results contribute to this debate by showing that deregulation might significantly increase the incentive of the lenders to issue riskier mortgages.

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. Moreover, Rosen (2005)explores switching in regulatory agencies between 1970 and 2003, and finds 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. 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

early repayment penalties, all of which can increase the risk of foreclosure significantly.[4] The first comprehensive state APL law was that of North Carolina in 1999, which was targeted at the subprime mortgage market. As of January 2007, 20 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 680) these effects are even stronger.

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 characteristics. 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. (2014) estimate the effect on mortgage default rates of a pilot

[4] 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.

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]

We follow this literature employing the measure constructed by Ding et al. (2012), which considers only the states that passed anti-predatory laws that were not just small-scale home ownership and equity protection acts implemented to prevent local regulation.

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, lending and deposit relationships 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.[6]

[5] For a theoretical model of predatory lending see Bond et al. (2009).

[6] For instance, New Century mentioned in its 2004 10-K filing the following: "Several states and cities are considering or have passed laws, regulations or ordinances aimed at curbing predatory lending practices. In general, these proposals involve lowering the existing federal HEPA thresholds for defining a "high-cost" loan, and establishing enhanced protections and remedies for borrowers who receive such loans. [...] Because of enhanced risk and for reputational reasons, many whole loan buyers elect not to purchase any loan labeled as a "high cost" loan under any local, state or federal law or regulation. This would effectively preclude us

Specifically, the OCC preempted all regulations pertaining the terms of credit, including repayment schedules, interest rates, amortization, payments due, minimum payments, loan-to-value ratios, the aggregate amount that may be lent with real property as security 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.

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 significantly less constrained by APLs in providing credit to riskier borrowers.

3 Data

We collected data from a number of different sources. The primary source of our data is the ABSNet Loan Database. This database covers almost 90% of the private-label Residential Mortgage Backed Securitization issuances and provides data on the underlying loans, as well as, data on key borrowers' characteristics. The main advantage of this dataset over the other standard datasets used in the literature, such as LPS and Blackbox, is the possibility to identify the mortgage originator, which is key to our identification. In fact, this allows us to use a classification of the lenders into those who were regulated by federal agencies (henceforth "OCC Lenders") and all other lenders (henceforth "Non-OCC Lenders").[7] We consider all first-lien mortgages originated in the pre-period, January 2002 to January 2004, and in the post-period, February 2004 to December 2005, with a final sample including close to 7 million individual loans.

Another main advantage of this fine-grained data, is the possibility to observe all the spe-

from continuing to originate loans that fit within the newly defined thresholds. [...] Moreover, some of our competitors who are, or are owned by, national banks or federally chartered thrifts may not be subject to these laws and may, therefore, be able to capture market share from us and other lenders. For example, the Office of the Comptroller of the Currency issued regulations effective January 7, 2004 that preempt state and local laws that seek to regulate mortgage lending practices by national banks." (available at http://www.sec.gov/Archives/edgar/data/1287286/000119312505052506/d10k.htm pag. 45).

[7] This classification has been graciously provided to us by Nancy Wallace and the Fisher Center for Real Estate and Urban Economics at the Haas School of Business.

cific features of these loans at the origination date. For instance, the first part of our analysis will exploit this by analyzing how the national banks changed the presence of prepayment penalties, length of the prepayment penalty term, balloon payment, negative amortization, and interest rates in response to the preemption rule. We shall show that the ability to impose prepayment penalties enabled lenders to issue more complex mortgages such as those with negative amortization or balloon payments, and those that were interest only or had adjustable rates. One shortcoming of the data, however, is that we do not observe the loan fees and points so as to classify loans into those that were "high cost". Additionally, we do not observe the amount or size of the prepayment penalty.

Table 1 displays summary statistics for our sample of loans. There are about 3.6 million loans in our sample that were originated in states that had APL laws in place. Panel A focuses on the covariates that we use in our specification, while Panel B focuses on the mortgage features at origination both for the period before the preemption rule (2001-2004) in Table 1A and for the post-period February 2004-December 2006 in Table 1B. As our sample comes from private label securitization, which were the way in which a large quantity of subprime and non-conforming loans were securitized, we have an average FICO score of 687 for OCC lenders in the pre-period and slightly smaller for other financial institutions. While it increases for the non-OCC lenders in the post period, it decreases to 674 for the OCC lenders. The average LTV is 72% for OCC lenders and about 76% on average for the non-OCC in the pre-period. While it remained stable for non-OCC lenders, it increased to 75.8% for OCC lenders. We also show that about 7% of the loans have a second lien in the pre-period which increases to 14% for OCC-originated loans. Finally, about 40% of the loans have low or no documentation, while about 15% exhibit private mortgage insurance. Unconditionally, 29% of the loans in our sample have a prepayment penalty, a variable that will constitute a key focus of the analysis. 64% of the loans have ARMs while 17% are interest only loans.

To provide few more descriptives about the changes in the mortgage market during the

years preceding the crisis, we plot in Figure 1 the fraction of mortgages featuring prepayment penalties, those with deferred amortization, as well as the fraction of adjustable rate and interest-only mortgages over our sample period 2001-2006. To distinguish betweek pre and post period, the red line depicts the second half of 2003. The level of all four clearly increased in the second half of our sample. The effect is most pronounced for IO and mortgages with deferred amortization because they were not very common in the pre-period, but became significantly more prevalent in the second half of the period. The level itself is indicative of the fact that our sample only covers securitized loans, but is consistent with previous papers analyzing similar data (see for example, Griffin and Maturana (2015)).

Table 1C, instead, provides summary statistics for the county-level information such as the fraction of subprime borrowers (i.e. those with a FICO score below 660), the fraction of loan amounts originated by OCC lenders in 2003, the average zip code income from IRS and housing affordability computed as the ratio of the median income and the median house price in the pre-period. As expected, there is significant heterogeneity in all of these dimensions across different counties. Our main results exploit within county variation, but we are going to exploit this heterogeneity to check if the response of OCC lenders to the preemption rule is different across regions.

To provide further results on the expansion of credit by OCC lenders after the preemption, and also to show the external validity to our results, we collect data on the new mortgage loans originated every year through the Home Mortgage Disclosure Act (HMDA) dataset for loan applications. This dataset records the final status (i.e. denied, approved or originated), reason for borrowing (i.e. home purchase, refinancing or home improvement), if the loan has been sold to another party (i.e. if it has been securitized), and other characteristics such as the loan amount, race, sex, income, and home ownership status. This allows us to investigate if also the approval rates of OCC lenders have been affected by the preemption.

4 Research Design

Our identification strategy is designed to exploit the preemption rule as a shock to the OCC lenders' ability to issue more complex mortgages or to give credit to riskier borrowers. We do so using both a difference-in-difference approach, as well as a triple difference-in-difference approach. There are advantages to both approaches. For instance, by comparing loans originated by OCC and non-OCC lenders in states that eventually adopted an APL law, before and after the preemption rule, we avoid any confounding factor coming from states that never adopted an APL law. Formally, the specification we consider is as follows:

$$\begin{aligned} Y_{i,c,t} &= \beta_0 + \beta_1 \cdot Post_t \cdot OCC_i + \\ &\quad + \beta_2 \cdot Post_t + \beta_3 \cdot OCC_i + \beta_4 \cdot X_{i,t} + \eta_{c,t} + \epsilon_{i,c,t} \end{aligned}$$

where $Y_{i,c,t}$ are various loan-level outcomes that will be explained in the next section, OCC_i is an indicator for whether the lender originating loan i was regulated by the OCC; and $Post_t$ is an indicator equal to 1 after the preemption rule. We include several controls $X_{i,t}$ aim to capture heterogeneity across different mortgages: the LTV ratio, the log of the appraised value, the FICO score, an indicator for the presence of second liens, a low or no documentation indicator, an indicator for loan purposes (i.e. cash out refinance, rate refinance or other), and an indicator for the presence of private mortgage insurance. We also include linear and squared agency time trends, which capture the possibility that banks regulated by different regulatory agencies respond differentially to the preemption rule, i.e. that they are on different trends.

An outstanding concern may be that we may not be accounting for time-varying unobserved heterogeneity at the county level. For instance, unobserved fluctuations in the local credit demand might drive changes in the origination of these mortgages by OCC lenders. In order to put these concerns to rest, we also include county by month fixed effects $\eta_{c,t}$. These allow us to capture any another potentially unobserved shock at the county-month

level that might influence our estimates. β_1 is the coefficient of interest as it estimates:

$$\left[\bar{Y}^{APL}_{OCC,Post} - \bar{Y}^{APL}_{OCC,pre}\right] - \left[\bar{Y}^{APL}_{Non-OCC,Post} - \bar{Y}^{APL}_{Non-OCC,Pre}\right],$$

that is, it compares the difference between outcomes by OCC lenders before and after the preemption to the same difference for non-OCC lenders. This methodology effectively exploits only within county variation and has the advantage of showing that our effects are really driven by the treatment group, i.e. OCC lenders in states with APL laws. The underlying identifying assumption is that OCC and non-OCC lenders would have been on parallel trends in absence of the preemption rule.

The triple differences-in-difference methodology uses as a control set not only the loans made by lenders subject to a different regulator (non-OCC), but also those loans made in states where the pre-emption should not have had any effect as no APL laws were in place. In other words, we can relax the identifying assumption, in this approach we are basically assuming that the difference between OCC and non-OCC lenders' origination behavior in states with and without APL would have been the same in absence of the preemption ruling. Formally, we use the following specification:

$$\begin{aligned} Y_{i,c,t} \;=\; & \beta_0 + \beta_1 \cdot Post_t \cdot OCC_i \cdot APL_{g,t} + \beta_2 \cdot Post_t \cdot OCC_i + \beta_3 \cdot OCC_i \cdot APL_{g,t} + \\ & \beta_4 \cdot Post_t \cdot APL_{g,t} + \beta_5 \cdot Post_t + \beta_6 \cdot OCC_i + \beta_7 \cdot APL_{g,t} + \beta_5 \cdot X_{i,t} + \eta_{c,t} + \epsilon_{i,c,t} \end{aligned}$$

where $APL_{g,t}$ indicates whether state g had a anti-predatory lending law in effect at time t, the month of origination of the loan. We define $APL_{g,t}$ to be equivalent to the $ineffect$ variable of Ding et al. (2012). The coefficient of interest is β_1. It estimates:

$$\begin{aligned} & \left(\left[\bar{Y}^{APL}_{OCC,Post} - \bar{Y}^{APL}_{OCC,pre}\right] - \left[\bar{Y}^{APL}_{Non-OCC,Post} - \bar{Y}^{APL}_{Non-OCC,Pre}\right]\right) \\ & - \\ & \left(\left[\bar{Y}^{Non-APL}_{OCC,Post} - \bar{Y}^{Non-APL}_{OCC,pre}\right] - \left[\bar{Y}^{Non-APL}_{Non-OCC,Post} - \bar{Y}^{Non-APL}_{Non-OCC,Pre}\right]\right), \end{aligned}$$

which effectively compares loans originated by OCC to non-OCC lenders across states with and without APL around the preemption rule. We shall show that with both approaches the results are broadly consistent, which reassures us that we are able to capture the effect of the deregulation rather than preexisting trends or confounding factors.

5 OCC Response to the Preemption Rule

In this section, we focus on the effect of the deregulation on the OCC lenders' mortgage origination before and after the preemption.

5.1 Borrowers' Quality and the Supply of Complex Mortgage

We start by presenting our main results on the change in the pool of borrowers that obtain credit from OCC lenders and the features of the mortgages originated after the enactment of the preemption rule. Specifically, our set of outcome variables $Y_{i,c,t}$ is the credit score, the combined LTV, the presence of a second lien or an indicator which captures if the mortgage is a cash out refinance. These features should capture the quality of the borrowers' at origination, as they can proxy for his credit-worthiness, his equity in the house, and overall his risk to default. If the preemption rule has dampen the lenders' concerns about the borrowers' ability to repay their mortgages, we should observe a significant change along these dimensions after 2004.

We test this hypothesis in Table 2. Column 1 shows that individuals borrowing by OCC lenders exhibit lower FICO scores by about 41 points after the preemption. Column 2 and 3 provides evidence that OCC were also willing to lend to borrowers with less equity in their homes, as the average LTV increased by 6% after the preemption and the probability to have a second lien was 4 percentage points higher. Finally, these borrowers were also 6% more likely to get a cash out refinance. In all of these specifications, we include county by month fixed effects to absorb any time-varying unobserved heterogeneity at the county level.

Overall, these results suggest that the pool of borrowers obtaining credit from OCC lenders changed significantly after the preemption rule.

Next, we test if the features of the mortgages originated by OCC lenders to these riskier borrowers after the preemption also changed significantly. In Table 3 our dependent variables $Y_{i,c,t}$ include an indicator of whether the loan had a prepayment penalty, the length of the prepayment term (e.g. the borrower is subject to prepayment penalties if he repays the mortgage within the first two years from origination), whether the prepayment penalty term of the loan would have been in violation of existing APL laws that applied to "high cost" loans[8], as well as, whether the loan is an adjustable rate mortgage, whether the loan had deferred amortization features as defined by APL laws (i.e. negative amortization or balloon features), and whether the loan features an interest-only period. Prepayment penalties is probably the most important feature, because they allow lenders to offer less sophisticated and poorer borrowers higher mortgage rates than they are eligible for and locking them into these high cost loans with the use of prepayment penalties. Moreover, as argued by Mayer et al. (2013), riskier loans tend to exhibit prepayment penalties, because the high-quality borrowers would refinance as soon as their creditworthiness has improved.[9]

Table 3 presents the regression results. The results in Column 1 shows that an OCC lender in an APL state was about 15% more likely to make a loan with a prepayment penalty relative to a non-OCC lender following the pre-emption. This compares to an unconditional mean of the presence of prepayment penalties of 31.6%. This result suggests that the pre-emption led to an economically important increase in the presence of this loan feature. Additionally, as shown in Column 2, they also made prepayment penalty terms 4 months longer relative to non-OCC lenders (unconditional mean of 8 months). Moreover, OCC lenders were 10% more likely to originate loans that would have been in violation of the existing APL law (Column 3), originated 11% more ARMs (Column 4) and made 4.2% more deferred amortization loans

[8] For this purpose we use the Bostic et al. (2008) classification of prepayment penalty term related APL laws. See Table 2 of Bostic et al. (2008) .

[9] This idea is related to an empirical prepayment literature which observed path dependence of prepayment (see, for instance, **?**)).

(Column 5). Column 6 shows that OCC lenders were 5% less likely to originate interest-only mortgages. This is not a surprise as loans featuring interest-only repayment terms were not prohibited by the APL laws.

Overall these results have identified an exogenous component to the change in the pool of borrowers and in the loan contract features from the pre-period to the post-period.

5.2 Securitization Activity

Now we can provide evidence addressing the following question: why do OCC lenders seem to be less sensitive to the mortgage default risk? One potential reason is that the preemption has significantly affected their ability to securitize these loans. In fact, there is evidence that the anti-predatory laws had a significant impact on the banks' incentives for securitization. In fact, the market might impose tighter constraints on the issuers of these loans who might have been in violation of state APL laws. Specifically, in the words of the credit rating agencies: "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".[10] Interestingly, the effect of the APL laws on securitization has been recently employed by Keys et al. (2010) as an instrument for the lenders' securitization activity and its effect on their screening decisions. Consistently with the credit rating concerns', they find that the incentives to screen the borrowers significantly increased during a period of strict enforcement of anti-predatory lending laws. We test this hypothesis in Table 4, which reports results from the estimation of a linear probability model relating the lenders' decision to securitize with the preemption ruling. We find that OCC lenders became 5% more likely to securitize, even after controlling for the borrower's characteristics at origination and county by month fixed effects. This suggests that the outward shift in the supply of complex mortgages after the preemption was also due to the increased possibility of these lenders, and not the other non-OCC ones, to securitize these

[10] Available at http://www.iflr.com/Article/2026825/Predatory-lending-and-RMBS-securitizations-in-the-US.html.

riskier mortgages without incurring in the requirement of credit enhancement from credit rating agencies.

In the next set of analysis, we focus on how deregulation interacted with past performance and local mortgage market competition to drive the lenders' response to the preemption rule.

6 Risk-Shifting by De-Regulated Lenders

In this section, we look to further investigate which lenders used this larger set of mortgage products made possible by the pre-emption ruling, and what determined whether they did so. To motivate our next analysis we look to the "*risk-shifting hypothesis.*" Landier et al. (2011) outline this hypothesis, wherein they describe how a subprime lender who has received a negative shock, due to the monetary policy tightening in mid-2000s, would want to expose themselves to loans that were more sensitive to house prices. The economic intuition is the following: because the lender would be bankrupt in case of a collapse in real estate prices, loans with a high beta to real estate prices became more attractive to the lender. Landier et al. (2011) considers interest-only mortgages, we are going to test this hypothesis by investigating all the features mentioned in the previous section. Loans with features such as negative amortization, balloon payments, and interest only mortgages are those that were more sensitive to house prices; as most of the payments were back-loaded via these features and depended on the ability of the homeowner to refinance their mortgages. Pre-emption of the state APL laws would mean that OCC lenders would now have more of an opportunity to take advantage of such risk-shifting opportunities. These opportunities would be enabled by using prepayment penalty terms which locked borrowers out from early prepayments. We wish to test whether OCC regulated lenders exhibited more of this risk-shifting behavior following the de-regulation. In other words, were OCC regulated lenders more likely to respond to lower returns by issuing "riskier" loans following the pre-emption ruling?

We design our test along the lines of Titman and Tsyplakov (2010). We follow their

methodology in constructing for each of our top 20 federally-chartered originators, a time series measuring for each month, the cumulative returns over the past 6 months. Each loan level observation now has an additional variable measuring the returns of the originator of the loan over the six month period prior to the month of origination.

In order to facilitate our analysis, we focus on the top 12 OCC lenders in our sample. Due to the concentration of lending among the OCC lenders, this accounts for about 90% of the OCC-originated loans in the sample. For each of the lenders, we obtain the monthly adjusted price from Datastream, and form a time series of lagged 6-month-returns for each month that the lender originated a mortgage in the sample. We construct $Return_{l,t-7,t-1}$, i.e, the 6 month return of lender l over the period, $t-1$, the month prior to the origination of the loan, going back to $t-7$[11]. We consider the following differences-in-difference specification to test the risk-shifting hypothesis:

$$Y^{OCC}_{i,c,g,t} = \beta_0 + \beta_1 \cdot Post_t \cdot APL_{g,t} \cdot \mathrm{Re}\, turn_{l,t-7,t-1} + \Theta \cdot \Gamma_{i,t} + \eta_{c,t} + \eta_l + \epsilon_{i,c,t}$$

where, compared to the previous specifications, we also add lender fixed effects η_l. The coefficient of interest is β_1 which indicates the sensitivity of an OCC lender's post period response to past 6 month returns, in APL states vs. non-APL states. Columns 1, 2, 4 and 5 of Table 5 show that in the post period relative to the pre-period, the lower the prior 6 month return of an OCC lenders, the more likely they were to originate loans with prepayment penalties, and longer prepayment penalty terms. In addition, they were more likely to make loans with negative amortization features.

The results of this subsection indicate that lenders did appear to engage in risk-shifting behavior following the pre-emption ruling by using prepayment penalties, and longer prepayment penalty terms to make their loan portfolios more sensitive to house prices, and to issue more loans with features such as negative amortizations.

[11] More specifically, this is calculated as; $Return_{t-6,t} = \frac{Price_t - Price_{t-6}}{Price_{t-6}}$.

7 Competition and the Non-OCC Lenders' Response

We now wish to consider if the preemption also had an *indirect* effect on the non-OCC lenders. The pre-emption created an un-level playing field whereby the non-OCC regulated lenders still had to adhere to the state APL laws. On the one hand, non-OCC lenders may have responded to the change in the competitive landscape by serving less risky borrowers. In other words, the preemption rule might have increased market segmentation, especially in regions where OCC have a dominant position, which reduced the non-OCC lenders' incentives to compete for the same borrowers. On the other hand, non-OCC lender could increase the origination of loans with prepayment penalties, changed the prepayment penalty terms up to the level allowed by the state laws, or by originating more complex loans, such as IO and ARMs, that were not directly governed by the APL laws, but were still riskier in nature. Moreover, non-OCC lenders might be more prone to do so to protect their market share in an environment where OCC lenders have a more dominant position. Then, the reaction of non-OCC lenders to the deregulation is an empirical question.

As a proxy for the competitiveness of the local mortgage market, we construct the *Fraction OCC*, which is the fraction of purchase loans (by volume) originated by OCC lenders in 2003. Intuitively, if national banks capture a higher market share, then non-OCC lenders might be even more adversely affected by the preemption ruling, because OCC lenders might take advantage of their position to issue these mortgages and capture an even higher market share. Before analyzing the non-OCC lenders origination behavior, we first report in Table 6 the coefficient estimates of cross-sectional regressions relating the presence of national banks to several county characteristics. The fraction of loans originated by national banks is correlated with several important characteristics of the county. For instance, less populated counties (Column 2) and those with more elastic housing supply (Column 3), fewer subprime borrowers (Column 4), and less intense securitization activity (Column 5) are also regions with a higher fraction of loans originated by national banks. However, these correlations do not differ significantly in states with and without anti-predatory laws, as shown by the lack

of significance of the coefficient on the interaction $Fraction\ OCC \times APL_{g,2004}$. The only exception is the elasticity of housing supply, but since we exploit within county variation, that heterogeneity does not affect our estimates. In other words, the correlation between fraction of OCC and county characteristics does not vary by whether the state adopted an anti-predatory law or not. This reassures us that fraction of OCC does not proxy for other characteristics of the mortgage market that might drive loan origination.

The hypothesis discussed above suggest that if it is true that competition might shape the non-OCC behavior after the preemption, the effect need not have to be linear. In fact, for very high level of market power by OCC lenders, the non-OCC lenders might respond less to the preemption, because they do not expect to be able to effectively contend the leading position in the market. In other words, the hypothesis is that in counties where OCC lenders have a significant but not dominant market share, the pre-emption rule might significantly affect non-OCC lenders.

Table 7 tests this hypothesis by separately considering the non-OCC behavior in counties with the bottom, middle and top terciles of presence of OCC. We find that non-OCC lenders respond by issuing mortgages with features that were not directly restricted by the APL laws. Specifically, we find that non-OCC lenders issue significantly more adjustable-rate mortgages, interest-only mortgages, mortgages featuring deferred amortization after the preemption ruling. As hypothesized, these effects are mainly concentrated in counties where OCC lenders have an intermediate level of market share. In fact, the results are broadly not present in the counties where OCC lenders have little market power, but become large and significant in the counties in the intermediate tercile, and then tend to be significantly weaker in the top tercile.

These results point out that rather than attenuating the effects of deregulation, competition might induce also the banks not directly affected by the preemption to compete by issuing riskier and more complex mortgages and the effects are non-linear.

8 Robustness: Triple Difference Estimation

The results in Tables 2 and 3 have identified an exogenous change in the loan contracts issued in states with APL laws, induced by the pre-emption ruling via the channel of the expanded choice set of OCC lenders relative to non-OCC lenders. One potential concern with that estimation methodology is that we are assuming that OCC and non-OCC lenders would have been on parallel trends in absence of the preemption. We can relax this assumption by including as an additional control group the difference between OCC and non-OCC lenders in the states without APL laws.

Results appear in Tables 8 and 9. Table 8 analyze the borrowers' characteristics and it shows that the credit score score decreases by about 10 points, the combined LTV increases by 4%, while the probability of the mortgage being a cash out refinancing increases by about 8%. Table 9, instead, investigates the results for the mortgages features. The two main mortgage features that OCC lenders can now exploit to take advantage of the preemption are the term length and the presence of prepayment penalties. The magnitude of the effect on the origination of loans with prepayment penalties is mitigated, but remains statistically significant and economically significant.

9 Conclusion

In this paper, we the pre-emption of state anti-predatory lending laws for banks regulated by the OCC - as a quasi-experiment to test for the effect of deregulation on the supply of complex mortgages. This was a shock which expanded the set of loans OCC-regulated lenders were allowed to make while leaving unchanged the set that non-OCC regulated lenders were allowed to make. To further make our results robust, we are able to also use as a control group those loans made in states that did not have anti-predatory lending laws in place.

We first show that the supply of loans with prepayment penalties, negative amortization features, and ARMs increased in response to the deregulation. Additionally, the length of

prepayment penalties increased as well. Prepayment penalties enable the profitable use by the lenders of features such as interest only, or negative amortization. Additionally, while most state APLs did not fully restrict prepayment penalties, they did curb the length of the prepayment penalty term. Our initial results confirm our initial hypothesis that the supply of complex, and perhaps predatory, mortgages increased in response to the deregulation.

Next, we look to further investigate the mechanism via which these effects are propagated. In particular, we study separately the lending response of OCC regulated lenders and non-OCC regulated lenders. Considering the response of OCC-regulated lenders, we find that, following the pre-emption ruling, the supply of these complex mortgages became more responsive to recent returns - the higher the recent returns, the less likely a lender was to issue these "risky" loans. Our results indicate that lenders were more likely to respond to risk-shifting incentives as a result of the deregulation. This suggests that poorly performing lenders appeared to have taken advantage of the de-regulation in an attempt to compete for rents in local mortgage markets.

Finally, we explore how local mortgage market competition between lenders regulated by different agencies may have had perverse effects. We show that in counties where OCC lenders had a high market share, non-OCC lenders became more aggressive in the origination of loans with prepayment penalties to the extent permitted by state APL laws. In addition, they increased the origination of loans with interest only payments and ARMs, features not directly controlled by the state APL laws. We find a similar response of non-OCC regulated lenders in mortgage markets that were more competitive (less concentrated). This is striking because these non-OCC regulated lenders were not directly affected by the pre-emption ruling. Our evidence is suggestive of a competition channel that ignited a "*race to the bottom*" and induced a potentially adverse response even from those lenders who continued to fall under the regulation.

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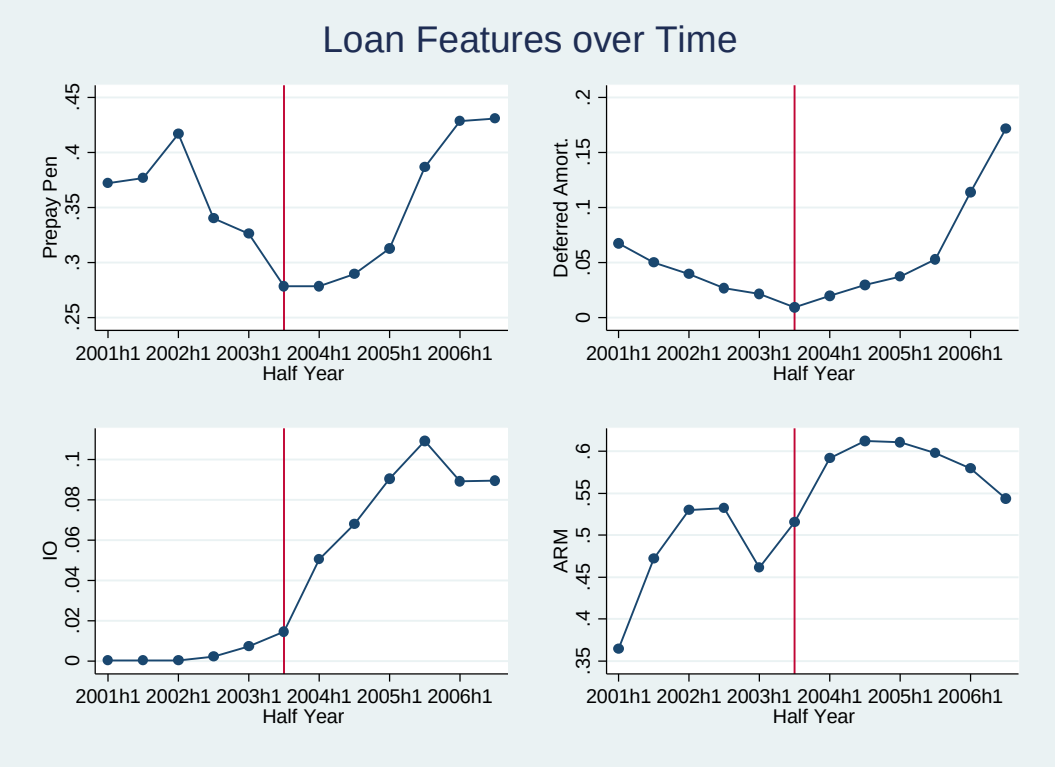

Figure 1

The figure depicts the fraction of loans with prepayment penalties or deferred amortization, and the fraction of interest-only and adjustable rate mortgages.

Table 1

Summary Statistics Loan Level (January 2001 to January 2004)

The table below presents Summary Statistics by Regulatory Agency of Lender for Loans that were originated between and including January 2001 and January 2004 in those states that had implemented APL laws by February 2004. OCC refers to loans originated by national banks who were regulated by the OCC. OTS indicates Federal Reserve Banks regulated by the Office of Thrift Supervision. Non-OCC/OTS includes all state charted banks and state chartered savings and loans institutions as well as mortgage companies, funding companies and credit unions. Credit Score, LTV Ratio and Appraised Value have been winsorized at the 1st and 99th percentile. Second Lien Present is an indicator variable for whether the property had a second lien at the time of origination. PMI is an indicator variable equal to one if the mortgage had private mortgage insurance. Prepayment Penalty Term Violation is an indicator variable capturing whether a loan issued was in violation of the maximum prepayment penalty term length as classified by Bostic et al. (2009). Prepayment Penalty, Interest Only and ARM are indicator variables equal to 1 if the mortgage had each of these features respectively. Deferred Amortization is an indicator variable equal to one if the mortgage had a negative amortization or a balloon payment feature.

	OCC		*Federal Savings Banks (OTS)*		*Non-OCC/OTS*	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
Panel A: Covariates						
CreditScore	686.875	77.632	663.234	74.206	637.305	70.406
LTV Ratio	0.721	0.194	0.741	0.139	0.792	0.141
Appraised Value	266642	236584	418298	307013	246102	180121
Second Lien Present	0.075	0.263	0.117	0.321	0.081	0.272
Low or No Doc	0.484	0.500	0.473	0.499	0.347	0.476
PMI	0.146	0.353	0.009	0.096	0.121	0.326
Panel B: Loan Contract Features						
Prepayment Penalty	0.177	0.382	0.337	0.473	0.275	0.447
Prepayment Penalty Term Violation	0.120	0.325	0.210	0.407	0.167	0.373
Deferred Amortization	0.019	0.136	0.186	0.389	0.016	0.124
Interest Only Loan	0.013	0.113	0.025	0.156	0.036	0.187
ARM Loan	0.224	0.417	0.645	0.478	0.549	0.498
Observations	75112		80884		990193	

Table 1B

Summary Statistics Loan Level (February 2004 to December 2006)

The table below presents Summary Statistics by Regulatory Agency of Lender for Loans that were originated between and including February 2004 and December 2006 in those states that had implemented APL laws by February 2004. OCC refers to loans originated by national banks who were regulated by the OCC. OTS indicates Federal Reserve Banks regulated by the Office of Thrift Supervision. Non-OCC/OTS includes all state charted banks and state chartered savings and loans institutions as well as mortgage companies, funding companies and credit unions. Credit Score, LTV Ratio and Appraised Value have been winsorized at the 1st and 99th percentile. Second Lien Present is an indicator variable for whether the property had a second lien at the time of origination. PMI is an indicator variable equal to one if the mortgage had private mortgage insurance. Prepayment Penalty Term Violation is an indicator variable capturing whether a loan issued was in violation of the maximum prepayment penalty term length as classified by Bostic et al. (2009). Prepayment Penalty, Interest Only and ARM are indicator variables equal to 1 if the mortgage had each of these features respectively. Deferred Amortization is an indicator variable equal to one if the mortgage had a negative amortization or a balloon payment feature.

	OCC		*Federal Savings Banks (OTS)*		*Non-OCC/OTS*	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
Panel A: Covariates						
CreditScore	674.048	70.165	678.020	64.915	652.977	68.824
LTV Ratio	0.758	0.150	0.749	0.127	0.781	0.127
Appraised Value	327011	256682	471593	293497	342702	235484
Second Lien Present	0.138	0.345	0.239	0.427	0.225	0.418
Low or No Doc	0.412	0.492	0.613	0.487	0.451	0.498
PMI	0.193	0.395	0.030	0.170	0.039	0.194
Panel B: Loan Contract Features						
Prepayment Penalty	0.263	0.440	0.454	0.498	0.332	0.471
Prepayment Penalty Term Violation	0.156	0.363	0.281	0.450	0.201	0.401
Deferred Amortization	0.046	0.210	0.398	0.489	0.175	0.380
Interest Only Loan	0.198	0.398	0.239	0.426	0.250	0.433
ARM Loan	0.500	0.500	0.769	0.422	0.724	0.447
Observations	307082		582207		2956710	

Table 1C

Summary Statistics County Level Covariates

The table below reports summary statistics on geographic variables used to examine the heterogeneity of treatment effects of the pre-emption of the state APL laws. Column "Geography" indicates the geographic level at which the variable is measured. Column "Only APL04?" indicating a "Y" points to the fact that we have provided summary statistics for only those counties in states that passed APL laws before 2004. This is because this measure will be subsequently used in a Difference in Difference approach on this particular subsample. Fraction Subprime is measured using HMDA data from 2001 as the fraction of borrowers with FICO score below 680. Housing affordability is constructed using zillow data and by dividing the median county income by the median county house price. Fraction OCC is calculated as the fraction of loans in 2003 HMDA originated by lenders regulated by the OCC. Avg. Zip Code IRS Income uses data from the IRS on total Adjusted Gross Returns, and the no. of tax returns filed at the zip code level.

Variable	*Geography*	*Only APL04?*	*N*	*Mean*	*SD*	*Min*	*10th*	*25th*	*Median*	*75th*	*90th*	*Max*
Fraction Subprime (2001)	County	Y	1227	0.473	0.115	0.212	0.326	0.379	0.467	0.567	0.626	0.78
Housing Affordability (2000)	County	Y	316	0.395	0.117	0	0.251	0.326	0.396	0.476	0.541	0.802
Fraction OCC (2003)	County	N	3067	0.334	0.156	0.019	0.169	0.227	0.304	0.408	0.547	1
Avg. IRS Income (2001) '000s	Zip Code	Y	14757	45.392	48.033	1.345	25.728	30.01	36.004	48.078	68.338	3087.45

Table 2

Effect of Pre-Emption Rulng on Borrower Quality (Diff in Diff)

The table reports coefficient estimates from a linear probability model relating various borrower characteristics to the pre-emption ruling of national banks. The sample includes loans made in states which had implemented APL laws by 2004. The dependent variable in Column 1 is the borrower's FICO core, the dependent variable in Column 2 is the borrowers combined LTV ratio at origination, the dependent variable in Column 3 is an indicator variable for whether the property had a second lien at the time of origination, and the dependent variable in Column 4 is an indicator variable for whether the mortgage was a Cash Out Refinance. OCC is an indicator for whether the mortgage was issued by an OCC regulated lender. APL is a time varying indicator variable for whether the the state in which the loan was originated had an APL law in place at time of origination. Post is an indicator equal to one if the loan was originated at or after February 2004. Standard errors are clustered at the county level. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1) *Credit Score*	(2) *CLTV*	(3) *Second Lien*	(4) *Cash Out*
OCC x Post	-40.990***	0.063***	0.040***	0.061***
	(1.357)	(0.005)	(0.005)	(0.010)
OCC X APL	15.648***	-0.062***	0.020***	-0.062***
	(4.238)	(0.013)	(0.005)	(0.016)
OCC	-10.159***	0.024***	-0.062***	-0.420***
	(3.453)	(0.008)	(0.005)	(0.014)
Observations	4,175,298	4,315,707	4,315,707	4,315,707
R-squared	0.120	0.109	0.079	0.062
County by Month FE	Yes	Yes	Yes	Yes
Mean of Dep Var	651.5	0.806	0.183	0.450

Table 3

Effect of Pre-Emption Ruling on Loan Features (Diff in Diff)

The table reports coefficient estimates from a linear probability model relating the presence of various mortgage terms to the pre-emption ruling of national banks. The sample contains loans made in those states that implemented APL laws before February 2004. The dependent variable in Column 1 is an indicator variable for whether the loan has a prepayment penalty, the dependent variable in Column 2 is an indicator variable capturing whether a loan originated was in violation of the maximum prepayment penalty term length as classified by Bostic et al. (2009), the dependent variable in Column 3 indicates the length of the prepayment penalty term, with 0 if there is no prepayment penalty, Column 4 is an indicator variable for whether a loan has an ARM feature, Column 5 for whether a loan has either negative amortization or a balloon feature, and Column 6 for whether a loan has an interest only feature. OCC is an indicator for whether the mortgage was issued by an OCC regulated lender. APL is a time varying indicator variable for whether the the state in which the loan was originated had an APL law in place at time of origination. Post is an indicator equal to one if the loan was originated at or after February 2004. All columns include the following controls: the LTV ratio at origination, the Log of appraised value at origination, the borrower's FICO score, an indicator for the presence of second liens, a low or no documentation indicator, an indicator for loan purpose (i.e. cash out refinance, rate refinance or other), and an indicator for the presence of PMI. Standard errors are clustered at the county level. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1) *Prepay Pen*	(2) *Term Violation*	(3) *Term Length*	(4) *ARM*	(5) *Def. Amort*	(6) *IO*
OCC x Post	0.142***	0.104***	4.169***	0.114***	0.042***	-0.052***
	(0.018)	(0.016)	(0.540)	(0.011)	(0.004)	(0.008)
OCC X APL	-0.172***	-0.112***	-4.494***	-0.077***	-0.014***	-0.036***
	(0.024)	(0.016)	(0.659)	(0.014)	(0.003)	(0.006)
OCC	0.148***	0.090***	3.436***	-0.108***	0.063***	-0.017*
	(0.018)	(0.016)	(0.595)	(0.016)	(0.011)	(0.010)
Observations	4,177,118	3,988,453	3,974,483	4,177,118	4,177,118	4,177,118
R-squared	0.179	0.213	0.176	0.191	0.226	0.216
County by Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean of Dep Var	0.316	0.193	8.113	0.660	0.126	0.195

Table 4

Increase in Private Securitization by OCC Lenders

The table reports coefficient estimates from a linear probability model estimated on the HMDA sample of conventional loans originated from years 2001 to 2006 (HMDA action code=1). The model estimates the effect of the pre-emption on the probability that an originated loan was sold to an entity other than the GSEs (i.e. recorded in HMDA with purchase code>4). OCC is an indicator variable equal to 1 whenever the lender in HMDA is regulated by the OCC. APL is an indicator for whether the state in which the loan was originated had an APL in place at the year of origination. Post is an indicator variable equal to 1 for all years 2004 and beyond. Control variables include dummy variables for race, occupancy status, loan purpose and property type. Standard errors are clustered at the county level. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1) *DD*	(2) *DD*	(3) *DDD*	(3) *DDD*
OCC x Post x APL			0.051***	0.057***
			(0.007)	(0.007)
OCC x Post	0.055***	0.018**	0.014***	-0.011*
	(0.006)	(0.008)	(0.004)	(0.006)
OCC x APL	-0.064***	-0.102***	-0.060***	-0.058***
	(0.006)	(0.009)	(0.006)	(0.007)
OCC	-0.215***		-0.218***	
	(0.005)		(0.004)	
Observations	36,055,095	36,055,095	76,376,527	76,376,527
R-squared	0.131	0.234	0.129	0.228
County by Year FE	Yes	Yes	Yes	Yes
Agency Trends	No	Yes	No	Yes
Borrower Controls	Yes	Yes	Yes	Yes
Mean of Dep Var	0.416	0.416	0.387	0.387

Table 5

Risk Shifting by OCC Lenders

The table reports coefficient estimates from a linear probability model relating the presence of various mortgage terms to the pre-emption ruling of national banks, and their stock returns. The sample contains loans originated in states with and without APL laws. It restricts the sample to loans originated by the national banks in our sample for which stock return data were available. The dependent variable in Column 1 is an indicator variable for whether the loan has a prepayment penalty, the dependent variable in Column 2 indicates the length of the prepayment penalty term, with 0 if there is no prepayment penalty. The dependent variable in Column 3 is an indicator variable for whether a loan has an ARM feature, Column 4 for whether a loan has either negative amortization or a balloon feature, and Column 5 for whether a loan has an interest only feature. OCC is an indicator for whether the mortgage was issued by an OCC regulated lender. APL is a time varying indicator variable for whether the the state in which the loan was originated had an APL law in place at time of origination. Post is an indicator equal to one if the loan was originated at or after February 2004. Prior 6 month period return indicates the return of the loan originator over the 6 months prior to the loan origination date. All columns include the following controls: the LTV ratio at origination, the Log of appraised value at origination, the borrower's FICO score, an indicator for the presence of second liens, a low or no documentation indicator, an indicator for loan purpose (i.e. cash out refinance, rate refinance or other), and an indicator for the presence of PMI. Standard errors are clustered at the county level. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1) *Prepay Pen*	(2) *Term Length*	(3) *ARM*	(4) *Deferred Amort.*	(5) *IO*
Post x APL x Prior 6 mth Return	-0.693***	-15.573***	-0.082	0.004	0.176*
	(0.063)	(1.676)	(0.110)	(0.047)	(0.099)
APL x Prior 6 mth Return	0.551***	13.683***	0.313***	0.022	-0.040*
	(0.052)	(1.459)	(0.065)	(0.016)	(0.022)
Post x Prior 6 mth Return	0.715***	19.087***	0.304***	0.293***	-0.162***
	(0.049)	(1.357)	(0.061)	(0.040)	(0.054)
Prior 6 mth Return	-0.298***	-7.680***	0.043	0.046***	-0.047***
	(0.035)	(1.014)	(0.032)	(0.013)	(0.008)
Observations	696,225	664,624	696,225	696,225	696,225
R-squared	0.506	0.497	0.461	0.217	0.383
County by Month FE	Yes	Yes	Yes	Yes	Yes
Originator FE	Yes	Yes	Yes	Yes	Yes
Borrower Controls	Yes	Yes	Yes	Yes	Yes
Mean of Dep Var	0.289	7.257	0.425	0.0344	0.124

Table 6

Examining the Competition Measure (HMDA Fraction OCC in 2003)

The table reports coefficient estimates of cross-sectional regressions relating the county level coviariates to our measure of competition, Fraction of shares originated by OCC. "Fraction OCC" is computed using HMDA data, by considering the share of lending in each county that was done by a lender regulated by the OCC in the year 2003. "APL" is equal to 1 if the state has an anti-predatory-lending law in place by 2004 and zero otherwise. "Elasticity" is a measure of elasticity of housing supply provided by Saiz (2010). "Fraction of Subprime" is the fraction of borrowers with FICO scores below 680 in 2003 for each county. Fraction of Securitized loans is estimated by dividing the number of loans in Blackbox data by the total number of loans in HMDA. Robust standard errors, clustered at county level, are below the coefficients in parenthesis. All regressions are weighted by the the population of each county in 2003. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1)	(2)	(3)	(4)	(5)
VARIABLES	*Fraction of Subprime*	*Ln(Population)*	*Elasticity*	*Fraction Securitized*	*Ln(Median Income)*
APL x Fraction OCC	-0.029	-1.837	-3.559**	-0.089	0.037
	(0.070)	(1.387)	(1.573)	(0.086)	(0.182)
APL in 2004	0.021	1.186**	0.815*	0.088***	0.058
	(0.024)	(0.573)	(0.482)	(0.032)	(0.060)
Fraction OCC	-0.116***	-3.471***	6.647***	-0.129***	-0.008
	(0.043)	(0.643)	(0.954)	(0.028)	(0.089)
Constant	0.475***	13.271***	-0.009	0.148***	10.646***
	(0.016)	(0.258)	(0.282)	(0.011)	(0.033)
Observations	2,217	2,217	769	2,160	2,217
R-squared	0.019	0.116	0.129	0.142	0.022

Table 7

Competition and Loan Features (HMDA Fraction OCC in 2003)

The table below reports coefficient estimates of regressions relating the pre-emption of state anti-predatory lending laws for national banks and features of mortgages originated. The sample contains loans originated in states with and without APL laws. Columns 1 to 3 further restrict the sample to only those loans made by non-OCC/OTS lenders. Columns 4 to 6, instead, further restrict the sample to loans made by OCC regulated lenders. We divide our sample of mortgages into terciles depending on the share of OCC lending in the county of origination as at 2003, based on HMDA data (see previous table). Tercile 1 corresponds to the lower share of OCC lending, and Tercile 3 to the higher share of OCC lending. The dependent variable for the regressions reported in Panel A is an indicator variable equal to one if the mortgage had an interest only feature, for Panel B it is an indicator variable equal to one if the mortgage was an Adjustable Rate Mortgage, for Panel C it is an indicator variable equal to one if the mortgage had either a negative amortization or a balloon payment feature, for Panel D it is a measure of the length of the prepayment penalty term, with a 0 if there is no prepayment penalty, and for Panel E it is an indicator variable for whether a mortgage had a prepayment penalty. APL is a time varying indicator variable for whether the the state in which the loan was originated had

	Non-OCC Sample		
	(1)	(2)	(3)
	Tercile 1	Tercile 2	Tercile 3
Panel A: Interest Only			
Post x APL	0.067	0.329***	0.240***
	(0.071)	(0.063)	(0.044)
APL	-0.064	-0.141**	-0.169***
	(0.068)	(0.059)	(0.036)
Observations	2,360,160	2,207,889	2,249,910
R-squared	0.175	0.200	0.181
Mean of Dep Var	0.184	0.203	0.149
Panel B: Adjustable Rate			
Post x APL	0.107*	0.344***	0.203***
	(0.057)	(0.041)	(0.058)
APL	-0.171***	-0.264***	-0.204***
	(0.064)	(0.043)	(0.039)
Observations	2,360,160	2,207,889	2,249,910
R-squared	0.130	0.135	0.145
Mean of Dep Var	0.664	0.691	0.646
Panel C: Deferred Amortization			
Post x APL	0.086	0.349***	0.247***
	(0.062)	(0.057)	(0.060)
APL	-0.128**	-0.246***	-0.169***
	(0.064)	(0.048)	(0.040)
Observations	2,360,160	2,207,889	2,249,910
R-squared	0.186	0.186	0.156
Mean of Dep Var	0.137	0.133	0.103
Panel D: Prepayment Term Length			
Post x APL	-1.781	2.057	1.222
	(1.851)	(1.365)	(1.529)
APL	-3.697	-0.117	-0.400
	(2.828)	(2.324)	(1.340)
Observations	2,219,271	2,093,576	2,151,029
R-squared	0.146	0.142	0.139
Mean of Dep Var	10.68	9.477	9.579
Panel E: Prepayment Penalty Indicator			
Post x APL	0.004	0.074***	0.063
	(0.040)	(0.028)	(0.056)
APL	-0.225***	-0.085	-0.016
	(0.076)	(0.076)	(0.049)
Observations	2,360,160	2,207,889	2,249,910
R-squared	0.143	0.146	0.142
Mean of Dep Var	0.394	0.359	0.346
County FE	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes
Borrower Controls	Yes	Yes	Yes

Table 8

Effect of Pre-Emption Rulng on Borrower Quality (Diff in Diff in Diff)

The table reports coefficient estimates from a linear probability model relating various borrower characteristics to the pre-emption ruling of national banks. The sample contains loans originated in states with and without APL laws. The dependent variable in Column 1 is the borrower's FICO core, the dependent variable in Column 2 is the borrowers combined LTV ratio at origination, the dependent variable in Column 3 is an indicator variable for whether the property had a second lien at the time of origination, and the dependent variable in Column 4 is an indicator variable for whether the mortgage was a Cash Out Refinance. OCC is an indicator for whether the mortgage was issued by an OCC regulated lender. APL is a time varying indicator variable for whether the the state in which the loan was originated had an APL law in place at time of origination. Post is an indicator equal to one if the loan was originated at or after February 2004. Standard errors are clustered at the county level. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1) *Credit Score*	(2) *CLTV*	(3) *Second Lien*	(4) *Cash Out*
Post x APL x OCC	-7.977**	0.044***	-0.007	0.077***
	(3.193)	(0.009)	(0.006)	(0.012)
OCC x Post	-37.022***	0.029***	0.032***	-0.020**
	(1.828)	(0.004)	(0.006)	(0.008)
OCC X APL	8.203**	-0.053***	0.018***	-0.056***
	(3.387)	(0.013)	(0.004)	(0.011)
Post x APL	32.919***	-0.035***	0.016***	-0.060***
	(0.115)	(0.000)	(0.001)	(0.001)
OCC	-16.300***	0.043***	-0.068***	-0.404***
	(2.104)	(0.005)	(0.004)	(0.010)
Observations	7,554,275	7,793,625	7,793,625	7,793,625
R-squared	0.118	0.109	0.081	0.063
County by Month FE	Yes	Yes	Yes	Yes
Borrower Controls	649.0	0.817	0.177	0.444
Mean of Dep Var	9.740	0.361	0.646	0.117

Table 9

Effect of Pre-Emption Ruling on Loan Features (Diff in Diff in Diff)

The table reports coefficient estimates from a linear probability model relating the presence of various mortgage terms to the pre-emption ruling of national banks. The sample contains loans originated in states with and without APL laws. The dependent variable in Column 1 is an indicator variable for whether the loan has a prepayment penalty, the dependent variable in Column 2 indicates the length of the prepayment penalty term, with 0 if there is no prepayment penalty. The dependent variable in Column 3 is an indicator variable for whether a loan has an ARM feature, Column 4 for whether a loan has either negative amortization or a balloon feature, and Column 5 for whether a loan has an interest only feature. OCC is an indicator for whether the mortgage was issued by an OCC regulated lender. APL is a time varying indicator variable for whether the the state in which the loan was originated had an APL law in place at time of origination. Post is an indicator equal to one if the loan was originated at or after February 2004. All columns include the following controls: the LTV ratio at origination, the Log of appraised value at origination, the borrower's FICO score, an indicator for the presence of second liens, a low or no documentation indicator, an indicator for loan purpose (i.e. cash out refinance, rate refinance or other), and an indicator for the presence of PMI. Standard errors are clustered at the county level. Asterisks denote significance levels (***=1%, **=5%, *=10%).

	(1) *Prepay Pen*	(2) *Term Length*	(3) *ARM*	(4) *Def. Amort*	(5) *IO*
Post x APL x OCC	0.150***	4.634***	0.010	-0.010	0.020**
	(0.016)	(0.438)	(0.010)	(0.008)	(0.009)
OCC x Post	0.024*	0.666	0.107***	0.040***	-0.050***
	(0.013)	(0.476)	(0.007)	(0.006)	(0.008)
OCC X APL	-0.102***	-2.686***	-0.034***	-0.010***	-0.031***
	(0.024)	(0.622)	(0.008)	(0.003)	(0.005)
Post x APL	-0.297***	3.195***	0.021***	-0.265***	-0.105***
	(0.005)	(0.519)	(0.003)	(0.002)	(0.002)
OCC	0.149***	-7.886***	-0.130***	0.042***	-0.014**
	(0.015)	(0.138)	(0.012)	(0.008)	(0.006)
Observations	7,555,361	7,169,712	7,555,361	7,555,361	7,555,361
R-squared	0.177	0.177	0.188	0.207	0.213
County by Month FE	Yes	Yes	Yes	Yes	Yes
Borrower Controls	Yes	Yes	Yes	Yes	Yes
Mean of Dep Var	0.361	9.740	0.646	0.117	0.176