

RESEARCH REPORT

THE APL EFFECT:
The Impacts of State Anti-Predatory Lending Laws on Foreclosures

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Roberto G. Quercia
Director

Janneke Ratcliffe
Associate Director



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*For printed copies contact:
UNC Center for Community Capital, (919) 843-2140, communitycapital@unc.edu*

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Research Report - March 23, 2010

Center for Community Capital
University of North Carolina, Chapel Hill

Lei Ding, Wayne State University
Roberto G. Quercia, University of North Carolina at Chapel Hill
Carolina Reid, Federal Reserve Bank of San Francisco*
Alan White, Valparaiso University School of Law

Contact: Roberto G. Quercia
quercia@email.unc.edu Phone: 919.843.2493

*The views expressed here are those of the authors and do not represent the views of the Federal Reserve Bank of San Francisco or the Federal Reserve System.

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1 Executive Summary

Many aspects of subprime lending and other exotic mortgage products are now widely recognized in retrospect to have contributed to the current foreclosure crisis. However, some state and local authorities identified these concerns early on. As far back as 1999, North Carolina implemented the first anti-predatory law (APL) designed to expand consumer protections. By the end of 2007, 30 states and the District of Columbia had passed some sort of mortgage regulation statute. Most of these were modeled after the Homeownership Equity Protection Act (HOEPA) of 1994, although many were broader in coverage and more restrictive than the federal legislation. There has been some debate about the effect and consequences of APLs, and research is important to identify what worked in the midst of all that went wrong. This report firmly concludes that state APLs provided an important safeguard against predatory mortgage lending.

This report is divided into two separate sections: a loan-level analysis and a neighborhood-level analysis of the impact of state APL laws which control for other borrower or neighborhood factors. At the loan-level, state APLs are found to be associated with a 13 percent reduction in prepayment penalties and may also reduce the incidence of option adjustable-rate mortgages (ARMs). These laws also reduced the likelihood of a loan becoming 90+ days delinquent by 13 percent. At the neighborhood-level, the presence of an APL is found to reduce the foreclosure rate up to 18 percent. Both studies find that the degree of coverage and restrictions matter, with more stringent APLs having a stronger dampening effect on default rates.

The results demonstrate the importance of strong consumer protections in the mortgage market. Unfortunately, federal regulators excused some mortgage lenders from state oversight immediately preceding the boom in subprime lending. In 2004, the Office of the Comptroller of the Currency (OCC) joined the Office of Thrift Supervision (OTS) in ruling that nationally chartered banks (like the OTS-regulated thrifts) were not subject to these state regulations. Consequently, preemption deprived some borrowers of additional protections that would have encouraged better underwriting and likely reduced the level of foreclosures. (For an analysis of the effects of OCC preemption, see the companion report “The Preemption Effect: The Impact of Federal Preemption of State Anti-predatory Lending Laws on the Foreclosure Crisis”).

The proven record of success of state APLs should encourage additional states to adopt stricter mortgage regulations appropriate to their markets. However, more state legislation will be less effective if it can be preempted by federal regulators. The results of these studies support the argument that consumer protections should not be reduced to the least common denominator. Instead, reasonable federal regulation should act as a floor for consumer protection from which states may build more stringent legislation if desired based on local market conditions.

2 Literature Review

Since North Carolina passed the first state anti-predatory lending law in 1999, researchers have tried to understand how APLs impact the mortgage market, including credit flows, cost of credit, and mortgage product substitution. Recent research has started to examine how APLs affect the use of more exotic loan types and how state laws have impacted mortgage foreclosure rates across states and neighborhoods.

Impact of State Anti-Predatory Lending Laws on Mortgage Market

During the period leading up to the subprime foreclosure crisis, from 1999 through 2007, many states adopted laws regulating subprime mortgage lending. The laws were intended to curb so-called “predatory practices” while permitting non-abusive subprime lending to develop (Li and Ernst 2007). As a result, most empirical studies on the impact of APLs have focused on the effect of state laws on credit flows and loan prices. Some of these studies focus on one jurisdiction’s law; others analyze outcomes nationally. One group of studies that focused on the first state anti-predatory lending law, in North Carolina, found that the subprime market in the state diminished in size as a result of the passage of the law (Ernst, Farris, and Stein 2002; Quercia, Stegman, and Davis 2004; Elliehausen and Staten 2004; Harvey and Nigro 2004). This is consistent with other studies that have looked at APLs and subprime lending in Chicago and Philadelphia (Harvey and Nigro 2003). However, taken as a whole, the national data show a lack of overall relationship between state laws and credit flows. Studies using state-level law indices find that APLs appear to have little impact on subprime originations, applications, or rejections at the aggregate level. But APLs with stronger restrictions are associated with a decrease in subprime lending (Ho and Pennington-Cross 2006; Elliehausen, Staten, and Steinbuks 2006; Bostic, Engel, McCoy, Pennington-Cross, and Wachter 2008a).

There are some possible explanations of these results. First, there is a fundamental difference between the states that extended restrictions on subprime mortgages beyond federal requirements and states that simply copied federal HOEPA restrictions into their state statutes. Some state laws did not extend coverage beyond mortgages covered by federal law. In several instances, the intent of these laws was to preempt local laws and ordinances that imposed greater restrictions than federal law. So it is important to distinguish between these two types of state laws when evaluating results.

Second, in addition to examining overall credit flows, it is also important to examine which segment of the subprime market declined, which remained stable, and which increased. Since APLs were intended to reduce the number of predatory or abusive subprime loans, a decline in

subprime lending, especially of loans with these traits, is not surprising. If anti-predatory lending laws have curbed so-called predatory practices while permitting non-abusive subprime lending to develop, the laws have done what they were intended to do. Except for Ernst et al (2002), Quercia et al. (2004), and Pennington-Cross, Chomsisengphet, Bostic, Engel, McCoy, and Wachter (2008), current research has not examined this issue closely.

Another group of studies focuses on the impact of APLs on the cost of credit. If there are costs in complying with regulatory requirements, then these costs are likely to be, at least in part, passed on to the consumer through higher interest rates or higher points and fees. However, the evidence suggests that APLs generally do not drive up loan prices. Although more restrictive laws may drive up the cost of borrowing through higher interest rates, this effect is limited to fixed-rate loans and its magnitude is typically fairly small (Li and Ernst 2007; Pennington-Cross and Ho 2008).

Impact of State Anti-Predatory Lending Laws on Foreclosure Rates

Another line of research has started to investigate whether differences in regulatory environment, including state anti-predatory lending laws, contribute to differences in the quality of loans originated and subsequent rates of foreclosure. Many of the features covered under APLs, such as prepayment penalties, balloon payments, lack of verification of borrowers' repayment capacity, and very high interest rates and fees, have been associated with higher default risk. Calhoun and Deng (2002) and Quercia, Stegman, and Davis (2007) found that subprime adjustable-rate mortgages (ARMs) have a higher risk of foreclosure because of the interest-rate risk, the underwriting using teaser rates, and other such practices. At the aggregate level, the share of ARMs appears to be positively associated with market risk, as measured by house price declines (Immergluck 2008). Subprime hybrid ARMs, which usually have prepayment penalties, bear particularly high risk of default at the time the interest rate is reset (Ambrose, LaCour-Little, and Huszar 2005; Pennington-Cross and Ho 2010).

As to prepayment penalties and balloons, Quercia et al. (2007) found that compared to loans without these features, refinance loans with prepayment penalties are 20 percent more likely to experience a foreclosure, while loans with balloon payments are about 50 percent more likely to do so. Prepayment penalties also tend to reduce prepayments and increase the likelihood of delinquency and default among subprime loans (Danis and Pennington-Cross 2005). Ding, Quercia, Li, and Ratcliffe (2008) identified that ARMs, prepayment penalties, and broker originations all contribute significantly to subprime loans' increased risk of default.

Although the literature does document a clear link between these product features and foreclosures, given the limited information publicly available on loan performance, very few studies have explicitly examined the link between state APLs and local- or state-level foreclosure

rates. In a working paper, Goodman and Smith (2009) suggest that the laws governing mortgage underwriting, mortgage foreclosures, and the potential costs to the lender differ substantially across states. They found some evidence that mini-HOEPA laws – those modeled after the federal law – reduce the level of foreclosure, which suggests that higher lender costs for foreclosure and stringent controls on predatory lending are connected to lower foreclosure rates. However, since Goodman and Smith are only able to use a cross-sectional dataset for one particular month, their paper’s applicability may be limited. As regulations are being proposed and amended to address the current mortgage crisis, further research in the area of laws and regulations and the measurement of their effectiveness is needed (Richter 2008).

3 Loan Level Analysis of the Impact of Anti-Predatory Lending Laws during the Subprime Crisis

Introduction

An issue of primary concern is whether APLs work to protect consumers by restricting the origination of loans with predatory features. This research question has taken on critical significance as policymakers are being tasked with developing new regulations that would strengthen consumer protection and mitigate the risk of future foreclosures. If APLs work, for example, by improving the quality of loans originated and by reducing the likelihood of default, then they can help to inform the regulatory landscape going forward. But do they work? And what features of APLs are the most important in ensuring consumer protection in the mortgage market?

In this paper, we contribute to this discussion by first answering the question of whether APLs are associated with lower rates of originations of loans with “risky” features, and whether certain aspects of APLs are more important than others in ensuring responsible lending. Using a national, loan-level database of mortgages originated between 2002 and 2006, we examine differences in loan quality in states with and without APLs, controlling for a wide range of borrower, neighborhood and economic characteristics that might influence underwriting practices. We also examine the effect of different components of the APL by testing whether certain restrictions—such as banning prepayment penalties or requiring the lender to verify a borrower’s ability to repay—influence the quality of originated loans.

Then, we look explicitly at the question of whether APLs served to mitigate the foreclosure crisis. Again, using loan level data, we examine whether loans in states with APLs were less likely to be 90+ days delinquent than loans made in non-APL states. This effect of APLs is hypothesized to work in two ways. First, APLs may reduce the incidence of foreclosure by limiting the number of loans with risky loan features, such as prepayment penalties or option ARM features. Second, by improving overall underwriting quality, APLs may help to ensure that lenders are more attuned to the borrower risk profile and their ability to pay for the loan over the long term.

We find that APLs have a strong and positive effect on reducing the likelihood of predatory lending and default. In other words, during a period of rapid deterioration in mortgage underwriting (Demyanyk and Hemert 2008), state APLs provided an important level of consumer protection, reducing the origination of loans with risky terms and reducing the risk of default. These results prove to be remarkably consistent, even after testing for different samples

and law specifications. This analysis, coupled with the other papers in this series examining the effect of APLs and federal preemption (Ding et al. 2009), leads us to conclude that strong state APLs are an important tool for consumer protection and that state APLs should not be preempted by federal law.

Data and Methodology

Because there is significant variation in the coverage and strength of APLs across different states, most researchers have developed a set of indices to quantify the substantial variation in the laws. This paper relies on a state law coding system that includes measures that not only test for the presence of a state law, but also its strength and the nature of its restrictions (See Section 7).

The binary variable *ineffect*, modeled on Pennington-Cross et al. (2008) and Bostic et al. (2008a), in combination with the effective date variable for the same state and law, is intended to identify states with mortgage statutes that could plausibly have an impact on high-cost or subprime mortgage lending. In a departure from some prior studies, states that simply copied the federal Homeownership Equity Protection Act (HOEPA) restrictions without additional restrictions are not identified as having an anti-predatory lending statute by the *ineffect* variable. In several instances, the intent of these laws was to preempt local laws and ordinances that imposed greater restrictions than federal law. However, these states are included in an alternative specification, *ineffectb*.

In addition to the presence of a state law, this study also identifies the nature of its restrictions. The binary variable *pointstrigger* identifies states that prohibit points and fees above federal HOEPA thresholds. The variable *prepaymentpenalty* captures the scope and extent of prepayment penalty restrictions on a scale of 0 to 4. Finally, the binary variable *repaymentability* identifies states in which a significant portion of the mortgage market was subject to a requirement that repayment ability be determined and/or verified, or that borrowers receive counseling as a precondition to obtaining a mortgage loan, and that these requirements be subject to some enforcement or sanction. (For more details on the coding system used for state laws, see Section 7.1)

The quantitative analysis used in this paper relies on a proprietary dataset on loan performance collected by LPS Applied Analytics, Inc. (LPS). (For more details on the LPS dataset, see Section 7.2). The sample of data used in the analysis consists of approximately 1.2 million loans that were originated between January 1, 2002 and December 31, 2006. We selected a random 10 percent sample of the 14.6 million loans in the LPS dataset, limiting the sample to owner

occupied, conventional, and first-lien loans in this analysis. The data were cleaned to account for missing information (FICO score, LTV) and to remove data with clear reporting errors (e.g. reported zip code not in property state, LTV less than 10). Performance is observed from origination through December 2008; after 2008, the combination of the recession, sharp increase in unemployment, and the rapidly changing policy environment make it difficult to isolate the impact of APLs on loan performance. Each loan is repeatedly observed from the month it is originated until the loan was 1) paid off, 2) became 90 days delinquent, or 3) was still active and never experienced 90+day delinquency in December 2008 (right censored). We focus on 90 days delinquency as opposed to foreclosure since state laws governing foreclosure can have strong impacts on the length or duration of the foreclosure spell, thus clouding the analysis of the effect of state anti-predatory lending laws (Cutts and Merrill, 2008).

We tested the similarity of the sample against the overall mortgage market. One drawback of the LPS data is that it under-represents the subprime market, and that it does not include either combined loan-to-value ratio (LTV) or debt-to-income (DTI) information. However, its broad geographic coverage and inclusion of both securitized and portfolio loans allows for an examination of a wider swath of the mortgage market. In terms of the geographic coverage at the state level, the sample is not significantly different from the geographic distribution of loans in the full LPS database, or for originations as reported in the Home Mortgage Disclosure Act (HMDA) data (See Table 1 in Section 8). The one exception is a light overrepresentation of loans originated in California. The performance of the loans in the sample parallels national delinquency rates for all loans. Of the loans in the sample, 32.08 percent were paid off, 4.23 percent became 90 days delinquent, and the remaining 63.69 percent were still active as of December 2008. The relatively strong performance of loans in the sample attests to the distribution of loans in LPS and its underrepresentation of the subprime market.

Because differences in both loan originations and loan performance are driven by factors such as borrower risk profiles and local and national economic conditions, the analysis also controls for a set of variables that may influence mortgage performance. First of all, differences in borrower credit risk profiles, mortgage types, changes in house prices, and local economic conditions are all determinants of mortgage performance. We include neighborhood average FICO credit score, average loan-to-value ratio (LTV), average debt-to-income ratio (DTI), percentage of refinance loans, percentage of subprime loans, percentage of FHA loans, percentage of owner-occupied properties, average property values, and the percentage of loans originated in different year cohort (2002-2005). To capture local economic conditions, county unemployment rates in the observation period and area house price dynamics are also included. In addition, some studies suggest that loan origination channels play an important role in determining the types of mortgages borrower receive, the cost of credit, and consequently the foreclosure rate (Ernst, et al. 2008; Ding et al. 2008), so the percentage of loans originated by brokers and the percentage of loans originated by correspondent lenders were controlled for in the model. Loan features other than loan purposes (home purchase or refinance) and loan types (subprime, FHA, fixed-rate, or

adjustable-rate) were not included in the model since they are endogenous variables. All the variables mentioned above are time-varying variables.

To account for housing market dynamics, we constructed a house-price-change variable for each loan. Economic analyses conducted at the Federal Reserve Bank of San Francisco and the Federal Reserve Bank of Boston have shown that house price dynamics are important predictors of foreclosure (Doms, Furlong and Krainer 2007; Gerardi, Shapiro and Willen 2007). For the models predicting loan origination, we construct a variable that measures house price changes in the Metropolitan Statistical Area (MSA)/metropolitan division in the two years prior to the loan origination. For the models predicting loan performance and repayment, we include a measure of the repeated monthly changes in house prices from the time of origination until the time of last observation. While not a direct measure of current LTV, this variable controls for areas in which borrowers are more likely to be underwater due to declining house values. House price changes are measured at the MSA/Metropolitan Division and are based on the Federal Housing Finance Agency (FHFA) (formerly Office of Federal Housing Enterprise Oversight (OFHEO)) house price index. We also include a yearly measure of housing affordability at the county level; areas with lower affordability scores saw a large gap between local incomes and housing prices, thus suggesting that fewer households were able to afford a home in those counties and may have been more likely to rely on riskier mortgage products.

We also include time-varying variables that capture general housing, mortgage market, and economic conditions. These include county unemployment rates from Bureau of Labor Statistics (BLS) and the change in prevailing contract interest rates on commitments for conventional fixed rate mortgages from Freddie Mac. Furthermore, a set of time-invariant variables is included in the model. Since households with similar characteristics often sort themselves into defined neighborhoods, we expect neighborhood composition plays an important role in determining the types of loan products offered to and received by borrowers and consequently the mortgage default risk (Phillips and VanderHoff 2004). The share of African Americans, the share of Hispanics, and the share of population with a bachelors degree or higher from the 2000 Census are included to capture the neighborhood demographic characteristics. We also created a set of time dummies for loans originated in different years. Table 2 presents the variables used in the analysis, and Table 3 provides summary statistics and descriptions of the estimation data.

For each step of the analysis, we present the results for all loans, and then provide additional analyses for various loan types.

To better capture the correlation between APLs and foreclosure rates, we also incorporated analysis using the cross-border approach similar to the one used by others (Bostic et al. 2008a; Pennington-Cross et al. 2008), which takes into account intrastate variation in economic conditions that can significantly influence mortgage performance. This sampling technique helps to control for many important unobservable characteristics by focusing on zip codes that are in the same housing and labor markets. Borrowers on either side of the border are likely to be

experiencing similar housing market and economic conditions, thereby eliminating unobservable differences between different markets that we cannot control for in the model. As a result, the major remaining difference is the legal landscape between the neighboring zip codes. The approach focuses on zip codes located on state borders (with the center of the zip code within 5 miles of the state lines), where one of the two bordering states had an anti-predatory lending law; these zip codes had at least 25 loans in June 2008, with an average of 744 loans per zip code.

However, the cross-border approach also has limitations, since many zip codes are dropped from the analysis, and loans originated in large cities that are not near state borders were not included in the estimation, nor were those originated in areas like California's Central Valley, Florida, Nevada and Arizona. If the impact of a state anti-predatory lending law on these observations is systematically different from that of state border zip codes, the results will be biased. Furthermore, zip codes along state borders are relatively small ones, in terms of the number of active loans per zip codes.¹ Since mortgage default is generally a rare incident, the calculated default rate may not be especially accurate if the number of active mortgages was too small. To help address these problems and improve upon the cross-border approach, we also used a set of 5,235 zip codes with relatively large numbers of active mortgages (at least 1,500 loans as of June 2008). Taken together, loans in these large zip codes represent 72 percent of all active mortgages. This approach allows us to include observations in big cities that are not close to state borders, and the large number of active loans in these neighborhoods also help us obtain more accurate measures of mortgage default. Thus, for supplemental analyses, we focus on snapshots of the performance of active loans in large zip codes and zip codes along state borders. By presenting both the cross-border zip analysis and the analysis for all the loans in the sample, we believe that we are able to more rigorously assess the effect of state APLs on loan performance than we would be by presenting either method alone.

Empirical Results

3.1.1 Effect of Anti-Predatory Lending Laws on Mortgage Originations

In the first stage of the analysis, we examine whether the existence of APLs influenced the characteristics of originated loans, reducing the incidence of loans with risky features such as prepayment penalties, interest-only, negative amortization, balloon payments, and low-documentation (Pennington-Cross et al. 2008). We focus on two key loan types in this analysis. First, we examine whether state APLs influence the origination of loans with prepayment

¹ The average number of active loans as of June 2008 was 744 for state border zip codes, significantly smaller than the mean of 969 for all zip codes.

penalties. Prepayment penalties were frequently included in subprime mortgages and have been found to increase the risk of foreclosure, and were the focus of many state APLs.

Second, we examine whether APLs had any effect on the likelihood of the origination of option ARMs, which we define as adjustable-rate mortgages with payment options, including interest-only loans, loans with negative amortization, and ARM loans with balloon payments. During the subprime boom, option ARMs became widely prevalent as “affordability” products and were particularly risky given the possibility of not assessing the long-term affordability of the mortgage. In addition, option ARMs were often offered with a very low teaser rate (often as low as 1%) which translates into very low minimum payments for the first year of the ARM. There has been significant concern that during the subprime boom, lenders underwrote borrowers for the initial payments that were significantly below the fully amortizing payment level, leading to potentially severe subsequent payment shock. For these loans, we only look at the origination of adjustable rate mortgages. Our *a priori* expectation is that states with APLs that specifically require verification of a borrower’s ability to repay are likely to see a lower incidence in the origination of option ARMs, compared to states with no APLs or states with only minimal APL coverage.

In Table 4, we compare simple descriptive statistics on the origination rates of option ARM loans and loans with prepayment penalties in states with and without APLs. The table shows that there are significant differences in the origination of these riskier loan types, and that these loans were more common rather than less in APL states. The popularity of nontraditional mortgages in California, an APL state, may help explain much of the difference here. In addition, the table also shows that socio-economic conditions in APL states and non-APL states also varied significantly, with APL states having higher housing costs and lower levels of housing affordability, higher rates of unemployment, and a higher percentage of minority residents.

However, once we control for borrower, housing and labor market characteristics, we see that loans in APL states were originated using stricter underwriting standards, particularly when it comes to the likelihood of receiving a prepayment penalty (Table 5). The model results are consistent with expectations. We find that borrowers with lower credit scores and LTVs above 80 percent are more likely to receive a loan with a prepayment penalty, as are loans that are originated by mortgage brokers and loans that have no documentation. Housing affordability also clearly affects the likelihood of receiving a loan with prepayment penalties. Areas that saw high price appreciation prior to origination as well as lower housing affordability (represented as the gap between local house values and income) have increased originations of loans with prepayment penalties. Consistent with other studies, we also find that neighborhoods with higher percentages of minorities are more likely to receive a loan with a prepayment penalty.

Importantly, we find that APLs significantly reduce the likelihood of the origination of loans with prepayment penalties, resulting in an odds ratio of .87. The strong effect on prepayment

penalties is consistent with expectations and prior work (e.g. Pennington-Cross et al. 2008), since many state laws focus on restricting or banning prepayment penalties in their design.

In the second half of Table 5, we examine whether the presence of any APL had an effect on the incidence of option ARM loans. Here, we find that the *ineffect* variable is positive, but not significant. Nevertheless, the fact that the coefficient is not significant is quite remarkable, especially when we consider the high rate of option ARMs in California, which although it is an APL state, did not have any repaymentability restrictions in its APLs. To test this hypothesis, we re-ran the model excluding California from the analysis. The results are presented in Table 6, and show that the *ineffect* variable now has a positive and significant effect on reducing the likelihood of option ARM originations. The full model also shows the degree to which option ARMs were offered as affordability products in ‘hot markets;’ housing markets that saw rapid price appreciation and a large gap between house values and incomes saw a greater incidence of option ARM loans. Lower FICO scores, higher LTVs, and a lack of documentation also significantly increased the likelihood of receiving an option ARM, as did mortgage broker originations. This analysis suggests that the strength of the APL, in particular APLs that restrict more contract terms, can significantly influence the types of loan products that are originated. In California, which did not have repaymentability restrictions as part of its APL statutes and therefore did not require either the verification of a borrower’s ability to repay or financial counseling, had insufficient consumer protections built into its APL to limit the number of option ARM originations, particularly given its rapidly rising house prices.

In Table 7, we examine the effects of APLs by loan cohort. Here, we see a marked difference between the results for prepayment penalties and option ARMs. State APLs reduced the likelihood of prepayment penalties most strongly for loans originated in 2005 and 2006, with some effect for loans originated in 2004. This likely demonstrates the effect of states passing laws governing the use of prepayment penalties during the 2003/2004 time period. In contrast, state APLs seemed to become less effective in reducing the likelihood of receiving an option ARM for the later cohorts. This could reflect the overall deterioration of lending standards at the height of the subprime boom and the greater use of affordability ARMs to help borrowers in areas with very rapid house price appreciation.

Table 8 presents results using alternative specifications of the APL variable. For states with APLs that did not go beyond the federal statutes (*APL ineffectB*), there was no decrease in the likelihood of origination of either prepayment penalties or option ARMs. In contrast, stronger restrictions—such as the repaymentability requirement—greatly reduced the likelihood of both prepayment penalties and option ARMs. The *pointstrigger* specification has a stronger effect for loans with prepayment penalties than for loans with option ARMs.

The table also demonstrates the importance of the scope and coverage of state APLs in influencing lender underwriting behavior. States with the strongest restrictions on prepayment penalties—coded “4”—reduced the likelihood of borrowers receiving a loan with a prepayment

penalty by almost half (odds ratio = .56). In contrast, states that restricted prepayment penalties for only part of the mortgage market—coded “1”—saw no such effect. States with strong prepayment penalty APLs also saw lower rates of option ARMs, however this is likely more due to the fact that there is substantial overlap between states with strong prepayment penalty laws and requirements to underwrite for ability to repay than it is the fact that prepayment penalty APLs have a direct effect on the incidence of option ARM originations. There is significant overlap between states that have strong prepayment penalty restrictions and those that have *repaymentability* and *pointtrigger* coverage as well (see table in Section 7.1).

In the bottom half of the table, we examine the effect of APL specifications, for only those loans originated along the border zips. Overall, the results are quite consistent with the results for all loans, with APLs decreasing the likelihood of both prepayment penalties and option ARMs. Interestingly, *repaymentability* and *pointtrigger* restrictions emerge as only important for option ARMs, proving to be insignificant in the likelihood of the origination of loans with prepayment penalties. Prepayment penalty restrictions, though, have a stronger negative effect for loans with prepayment penalties. If the border zip codes are effectively controlling unobservable differences between communities that might influence the origination of loans with these characteristics (thus clouding the interpretation of the model including all loans), these results would suggest that targeted APLs really do influence the origination of loans they are intended to: stronger prepayment penalty restrictions reduce loans with prepayment penalties but have less of an effect on option ARMs, while *repaymentability* restrictions may have a greater influence on the origination of option ARMs. More research into these relationships is certainly warranted, especially as policymakers struggle with finding a balance between consumer protections on the one hand and not unduly restricting access to credit on the other.

3.1.2 Effect of Anti-Predatory Lending Laws on Loan Performance

In the next stage of the analysis, we examine whether state APLs have an effect on loan performance. We expect that states with stronger restrictions on predatory loan terms would have, on balance, lower foreclosure rates, once we control for borrower, housing and labor market characteristics. We theorize that APLs will affect foreclosure rates in two ways, either by limiting the origination of loans with risky loan features or by improving the overall quality of underwriting, thereby ensuring that borrowers are not placed into a loan that they cannot afford over the long term.

To account for changes over time in macroeconomic conditions, the variables capturing interest rate changes, unemployment, house price changes, and affordability are allowed to be time-varying covariates, up until the last point of observation. As was mentioned earlier, each loan is repeatedly observed from the month it is originated until either 1) it is paid off, 2) it became 90 days delinquent, or 3) December 2008 (right censored). We also include a variable, loan age, which captures the length of time that a loan is in the sample. We do not include loan features in

the model because they are endogenous variables. We also include the mortgage origination channel. Since the wholesale mortgage origination channel was more conducive to mortgage fraud (by brokers/correspondents, appraisers, and, sometimes but not always, borrowers), we would expect to see higher levels of both serious delinquencies and prepayments in this channel.

Table 9 presents the results of our competing risk model using all loans, which is estimated as a multinomial logit model specification. Delinquency and prepayment are theorized as competing risks, with loans that remained active as of December 2008 serving as the reference group. We report the coefficient, standard error, as well as the "relative risk" ratio. The relative risk ratio gauges the effect of an independent variable on the two reported outcomes—delinquency and prepayment—relative to the likelihood of remaining active, given that the other variables in the model are held constant.

The model shows a strong and significant effect of state APLs on the likelihood of default. Loans originated in states with APLs are significantly less likely to be 90+ days delinquent, with a relative risk ratio of .85. APLs also have a small but significant negative effect on the likelihood of prepayment, with a relative risk ratio of .93. These results suggest that APLs, by reducing the number of loans with risky features and by ensuring prudent underwriting, reduce the number of foreclosures, and also reduce possible forced sales or refinancings of unaffordable loans.

The full model reveals important information about the determinants of default and prepayment. First, it is clear that borrowers with riskier credit profiles—most notably captured in FICO scores—are much more likely to be in default than are borrowers with higher credit scores. In addition, a high loan-to-value ratio significantly increases the likelihood of default. Further, borrowers that saw a drop in neighborhood house values—or a smaller increase—were more likely to be in default than those who saw continued house price appreciation after origination. As expected, we also see a strong, positive effect of wholesale origination channel on both the likelihood of delinquency and prepayment.

In contrast, borrowers who saw house price declines were much less likely to prepay. This is as we would expect. Borrowers who saw their equity erode as a result of declining house prices would have to pay a higher risk premium on a new mortgage, therefore reducing the likelihood of prepayment, all other things being equal. The model also attests to the importance of interest rates. Increases in interest rates significantly decrease the likelihood of prepayment. We also see a decreased risk of delinquency, and an increased risk of prepayment for loans originated in 2002/2003 compared to those originated in 2005/2006, which likely reflects the large wave of refinances that occurred during the subprime boom. Areas with more affordable housing in relation to local incomes saw both fewer delinquencies and fewer prepayments. Borrowers living in neighborhoods with higher percentages of minorities were more likely to experience a delinquency, and less likely to prepay, than areas with lower shares of minority households.

Table 10 presents the results of the effect of state APLs using alternative samples of loans, reporting only the coefficients and relative risk ratios for the state APL variable. Here, the results are remarkably consistent. The effect of APLs appears to be relatively consistent across loan types, reducing the likelihood of serious delinquency in the purchase/refinance and fixed interest rate/adjustable interest rate markets. We also see that APLs reduce the likelihood of prepayment in all these different specifications. In comparison to our analysis of the effects of OCC preemption (e.g. Ding et al. 2010), in this paper we find that the effect of APLs is stronger in the purchase market than in the refinance market. This is likely due to the differences in data samples. Compared to the Columbia Collateral File data used in the study of OCC preemption—which is predominantly securitized subprime and Alt-A loans—the LPS data used here reflects a broader cross-section of the mortgage market. The inclusion of loans held in portfolio in the LPS data, as well as a higher share of prime loans, could account for the differences in results between the two studies.

Lastly, in Table 11, we examine alternative specifications for the APL state law variable. While in all of the previous model specifications the general *ineffect* variable proved to reduce the likelihood of serious delinquency, the components of the legal framework also turn out to be important. Notably, when we include states with HOEPA copycat statues as APL states, the significance and protective effect of APLs disappear. In fact, loans originated in states with nominal APLs (*ineffectb*) see a slightly higher serious delinquency rate than loans originated in states without APLs. This could be due to the inclusion of states such as Nevada and Florida, both states that had APLs that did not go beyond federal law, and that saw a high percentage of subprime lending during our period of observation.

In contrast, borrowers in states with more coverage and more restrictions were significantly less likely to be seriously delinquent. We find that the requirement for lenders to verify borrower’s ability to repay (*repaymentability*), is associated with a significant reduction in the likelihood of delinquency. We also found that borrowers in states with laws that had a broader coverage on points and fees (*pointstrigger*) were significantly less likely to be seriously delinquent, even more so than for APLs as a whole (a relative risk ratio of .76 compared with .85). The strength of restrictions on prepayment penalties also matters, with the states that ban prepayment penalties on some or all loans (*prepayment penalty*=3 and 4) showing a much stronger effect than the states that merely restrict them (*prepayment penalty*=1 and 2). States with APLs also saw a small but noticeable effect on the likelihood of prepayment. While some of this may be due to differing housing dynamics in those states, it could also be an indication that borrowers in appropriate loan products are less likely to seek to refinance, either to get out of a risky “affordability” product or to sell their home if they are no longer able to make their mortgage payments.

In the bottom panel, we examine the effects of APLs for loans originated in border zip codes. Interestingly, here we see a reduction in delinquencies not only for APL states (relative risk ratio .86), but also for the alternative specification of APL which includes states that did not go

beyond federal law (relative risk ratio .88). The only main difference in the border zip analysis is that states that banned prepayment penalties for only a subset of mortgages (*prepayment penalty=3*), based on loan amount or price, saw a greater effect than states with the strongest prepayment penalty restrictions. Nevertheless, the results of the border analysis suggest that the effects of APLs are quite robust, and that with few exceptions, strong APLs reduce the likelihood of borrowers becoming seriously delinquent on their mortgage.

Linking these results with the product choice models presented earlier, it becomes clear that directly restricting certain predatory loan terms does have an influence both on the products offered to consumers as well as on loan performance. Future research is necessary to further tease out the various elements of state APLs that would have the greatest effects in terms of consumer protection. Expanding the sample of border state loans, for example, or looking specifically at some case study states with similar housing and mortgage markets, could further illuminate how state APLs can be designed to best protect consumers from predatory loan terms. In addition, similar analyses on other datasets—including national datasets such as Loan Performance that has better coverage of the subprime market—are warranted. Nevertheless, this study provides important new evidence on the effectiveness of state APLs that should help policy-makers as they re-examine the regulatory landscape for financial products.

4 State Anti-Predatory Lending Laws and Neighborhood Foreclosure Rates

Introduction

In this section of the study, we examine the impact of APLs on neighborhood foreclosure and delinquency rates using a set of panel data regression models. Consistent with findings for the loan level analysis, we find strong evidence of lower default rates for neighborhoods in states with laws that extended federal coverage and/or restricted more contract terms, in states with broader coverage of subprime loans with high points and fees, and in those with more restrictive regulation on prepayment penalties. The results are robust enough that they remain consistent when focus on either state-border neighborhoods or large neighborhoods. A typical APL lowered neighborhood default rates by 3.8 percent to 18 percent, depending on the default risk measure considered. Overall, the results suggest that APLs that extend HOEPA coverage and that ban risky loan characteristics such as prepayment penalties are associated with significantly lower neighborhood default rates. The results have important implications for the current debate over the regulation of the financial system.

Data and Methodology

The data set construction is described in detail in section 3.2 of this report. As noted, the quantitative analysis used in this paper relies on a proprietary dataset on loan performance collected by LPS Applied Analytics, Inc. (LPS). (For more details on the LPS dataset, see Section 3.2). The most detailed geographic information provided in the LPS data is the 5-digit zip code. Since we are interested in how state anti-predatory laws impacted neighborhood foreclosure rates, the loan data from LPS were aggregated to the five-digit zip code for all 50 states and the District of Columbia. We focus on originations from 2002 to 2006 only because most APLs were enacted after 2001, and because the policy environment for mortgage origination changed radically after 2007. To observe how mortgage performance changed over time, we constructed the zip code delinquency and foreclosure rates data in June 2006, June 2007, and June 2008. We also constructed measures of the mortgages that make up the subsamples for each zip code, such as the number of loans in serious delinquency (90+day), the number of loans in foreclosure, and the share of loans with different features, average loan to value ratio, average FICO score, average debt-to-income ratio, and etc. The county-level socioeconomic characteristics and the neighborhood demographic information have been obtained from the economy.com, a division of Moody's Analytics that provides economic analysis, data, and credit risk services, and from the 2000 Census.

With the zip code data created from the LPS data as described above, we used a panel data regression method to identify the impact of APLs on neighborhood foreclosure rates. We tested the impact of the law, and individual law components, on a series of different mortgage default measures in separate regressions that use the same control variables and the same sampling technique.

Neighborhood mortgage default rates are assumed to be determined by:

$$y_{it} = \alpha_0 + \sum_j \beta_j * X_{jit} + \gamma * law_i + e_{it} \quad (1)$$

where y is the measure of neighborhood mortgage default rates observed for each zip code at a particular time. Since the process of a mortgage default includes several stages, we constructed three separate measures of neighborhood mortgage default rates:

- *pct_del90*: the serious delinquency rate (90+day but not in foreclosure);
- *pct_fc*: the share of loans in foreclosure process (not including real-estate-owned properties, or REOs).
- *pct_fcreo*: the share of loans in foreclosure process and REOs

As mentioned earlier, we include state-level proxies for predatory lending legislations (*law*). A total of 21 states were identified as those with strong APLs before 2008 and were coded as 1 for the *ineffect* variable. We also consider a different specification of state laws; *ineffectb* codes eight states with copycat HOEPA statutes as having a law in effect. As explained earlier, we further take account of specific restrictions in state laws. These include *pointstrigger*, *prepay1-prepay4*, and *repaymentability*. A set of four dummies (*prepay1-prepay4*) capture both the scope and extent of prepayment penalty restrictions, ranging from a partial restriction (*prepay1*) to a complete ban (*prepay4*) of prepayment penalties. Here we set the states without any restriction on prepayment penalties as the reference group (*prepaymentpenalty=0*). Definitions of all variables are provided in Table 12 in Section 8. Mortgage default rates by observation year and APL status are summarized in Table 13 and means for other variables are provided in Tables 14. See Section 7 for more detail on state law coding methodology.

As has been noted elsewhere (Pennington-Cross 2006; Cutts and Merrill 2008), the length of the foreclosure process varies significantly across states primarily due to different state foreclosure laws. As a result, two similar neighborhoods may exhibit different foreclosure rates depending on the state in which they are located. Using Freddie Mac's experience with lenders, Cutts and Merrill (2008) provided data across different states on the average time between the due date of the last paid mortgage installment and the foreclosure sale. We use the average length of a foreclosure from their study (*timeline*) as a proxy of the strength of state foreclosure regulations.

A strong pattern emerges in the data when we look at the state border zip codes (Tables 13 and 14): the default rates were significantly lower in the APL states in most cases, while the differences for most explanatory variables were marginal compared to those for large zip codes. The default rates of border zip codes in APL states, measured by share of serious delinquencies, share of foreclosures, and share of foreclosures and REOs, were lower than those in non-APL states. For large zip codes, however, there was no such clear pattern in the mortgage default rates. As Table 13 shows, large neighborhoods in APL states had slightly higher delinquency and foreclosure rates in 2006 and slightly lower foreclosure rates in 2008. However, the descriptive statistics suggest that on average, large zip codes in APL states had a longer duration of the foreclosure process, more brokers, a higher unemployment rate, and lower house price appreciation, which may help explain the seemingly higher default rates in APL states (Table 14). For example, since the length of the foreclosure process was longer in APL states (25 days longer) and lenders needed to hold the property for a longer period, it is possible that the share of foreclosures was higher even though the cumulative foreclosure rates were similar or lower in APL states.

Finally, since we are using a panel dataset, which contains repeated observations for each zip code, we need to set some specifications of the model. A couple of factors need to be considered. First of all, we cannot use a fixed-effect model since it does not allow us to identify the impact of state-level legislation. Second, we find that there is significant heteroskedasticity in

the error terms, as well as a significant autocorrelation among panels.² Though the existence of heteroskedasticity and autocorrelation does not bias the coefficient estimates, the standard errors tend to be underestimated. Heteroskedastic models are usually fitted with estimated or feasible generalized least squares (EGLS or FGLS). GLS models can also be used to correct for the autocorrelation problem in the model. So we chose to use the *xtgls* command in STATA, which allows estimation in the presence of first-degree autocorrelation and heteroskedasticity within panels.³

Empirical Results

Here we look at the relationship between state anti-predatory lending laws and loan delinquency and foreclosure rates at the neighborhood level using a panel data regression estimated by the generalized least squares method. We tested different dependent variables— share of serious delinquency, share of foreclosures, and share of foreclosures and REOs— given the fact that these represent different stages in the default process. Table 15 summarizes the regression results when we use *ineffect* (strong APL) as the law variable for both samples of zip codes, and Table 16 summarizes the results for other law variables only.

The coefficients of the *ineffect* variable can be interpreted as the average impact of a typical state anti-predatory lending law on the probability of serious delinquencies/foreclosures in a neighborhood. For example, if the coefficient of the *ineffect* variable is -0.1, it can be interpreted that a typical APL lowers the neighborhood default rate by 0.1 percentage point. The results consistently suggest that the existence of a strong state anti-predatory lending law is significantly associated with a lower mortgage default rate. When we focus on zip codes along state borders, on average, the APL is associated with a 0.06 percentage point reduction in the serious delinquency rate, a 0.08 percentage point reduction in foreclosure rate, and a 0.06 percentage point reduction in the share of both foreclosures and REOs. For a typical neighborhood, that can be translated into a 4.7 percent relative reduction in serious delinquency rate, a 9.7 percent reduction in foreclosure rate, and a 3.8 percent reduction in the share of foreclosures and REOs.

When we focus on large zip codes, the results are quite consistent in terms of the direction of the effect and the significance of the coefficient. On average, the existence of a strong APL is associated with a 0.05 percentage point reduction in the serious delinquency rate, a 0.17 percentage point reduction in the foreclosure rate, and a 0.08 percentage point reduction in the

² The likelihood ratio test of heteroskedasticity suggests there is significant heteroskedasticity for both the large zip codes sample and the state border sample. Following the method provided by Drukker (2003), we also identified that there is autocorrelation in the model, or autocorrelation from one temporal period to another for the same zip code.

³ We used the options *p(h)* and *c(a)* after the command *xtgls*, which fit panel-data linear models by using feasible generalized least squares.

share of foreclosures and REOs. That is equivalent to a 4.1 percent reduction in serious delinquency rate, an 18 percent reduction in foreclosure rate, and a 5.5 percent reduction in the share of foreclosures and REOs. Compared to the results based on the sample of state border zip codes, the results for large zip codes suggest an even greater impact of APLs on foreclosure rates.

As expected, most individual components of the legal framework turn out to be important. Table 17 summarizes the impact of state law variables and different law components with the results for other control variables not listed. First of all, neighborhoods in states with more coverage and/or stronger restrictions on prepayment penalties (*prepay2-prepay4*) see a lower foreclosure rate—a reduction of 0.06 to 0.40 percentage point in the foreclosure rate in different models, though the impact on the delinquency rate is generally insignificant. The finding for the partial restriction on prepayment penalties (*prepay1*) seems to be mixed: it is associated with a lower serious delinquency rate but with a higher foreclosure rate. We also find that states with laws that have a broader coverage on points and fees (*pointstrigger=1*) had significantly lower delinquency rates and foreclosure rates (a 0.02 percentage to 0.10 percentage point reduction).

We find that the requirement for lenders to verify borrowers' affordability (*repaymentability=1*) is associated with a reduced serious delinquency rate (a 0.09 percentage point reduction) for state border zip codes. However, we find the impact of the *repaymentability* variable on neighborhood foreclosure rates to be insignificant. As Ding et al. (2009) showed, the mean foreclosure rates in 2006 and 2007 were higher in *repaymentability* states, though the pattern reverses in 2008. This could be reflected in the differences in the geographic spread of foreclosures over this time period: states with higher levels of foreclosures at the start of the crisis (e.g., Ohio and Illinois) include *repaymentability* provisions, while states that saw their foreclosure rate accelerate in late 2007 and 2008 (e.g. California and Arizona) do not. Another possible reason might be because states were slow to regulate verification of borrowers' ability to repay.

For states whose laws did not extend beyond the federal HOEPA provisions, we do not find that these laws are associated with reduced risk of foreclosures. When we further consider those states with HOEPA copycat statutes as APL states (*ineffectb*), the results are mixed: the foreclosure rates are generally found to be higher in the “APL” states, though the delinquency rates are found to be slightly lower. In other words, when we treat states with nominal state laws as APL states, the “APL” states *ineffect* have lower delinquency rates but higher foreclosure rates than states without “APLs.” This is not surprising, since the eight states with HOEPA copycat statutes, like Nevada and Florida, had a higher share of subprime loans and loans with nontraditional features, which very likely are associated with the higher default risk in those states.

Overall, for the results from both the model using large zip codes or the one focusing on state border zip codes, the existence of a strong APL is negatively associated with the neighborhood default rate, which supports our expectations that a substantial state APL is associated with lower

mortgage risks. Furthermore, the results suggest different components in a typical APL, including broader coverage on subprime loans with high points and fees and more restrictive regulation on prepayment penalties are associated with lower delinquency and foreclosure rates. The requirement of a verification of borrowers' ability to pay is associated with a lower delinquency rate but has insignificant impact on foreclosures, which needs further investigation. In contrast, we find that state laws that did not extend beyond federal law are not associated with reduced defaults.

Most of the control variables in the model show the expected sign and significance. A higher average FICO credit score, share of refinance loans, share of FHA loans, and the share of owner-occupied units are all associated with a lower neighborhood delinquency/foreclosure rate. In contrast, higher average DTI, average loan-to-value ratio, the share of subprime loans, and the share of broker-originated loans are associated with an increased neighborhood default rate. As expected, higher house-price appreciation lowers the default rate. Black neighborhoods had a higher default rate, while there is some evidence that neighborhoods with more Hispanics and a population with higher educational levels had lower default rates. As expected, the average duration-of-foreclosure process decreases the delinquency rate but increases the share of loans in the foreclosure process and REOs.

5 Conclusion

In this study, we used a nationally representative loan-level dataset to examine whether state anti-predatory lending laws a) reduce the likelihood of origination of loans with riskier loan terms, and b) reduce the likelihood of serious delinquency, both at the loan level and at the neighborhood level.

In the loan-level analysis, we found strong evidence that APLs reduce the incidence of prepayment penalties. The story for option ARMs is more mixed, in that APLs do not have a significant effect on reducing the origination of loans with option ARMs for the full sample. However, once we consider alternate samples, such as loans originated in border states or all loans originated in all states except for California, APLs did significantly reduce the likelihood of option ARMs. In addition, states with broader restrictions in their APLs, such as repaymentability requirements, did see a significant and positive decline in the origination of option ARMs during the subprime boom. This, coupled with the cohort analysis presented in Table 6, leads us to hypothesize that more general APLs without specific restrictions on repaymentability requirements were not strong enough to counteract the deterioration of underwriting standards that occurred during the latter half of the subprime boom, particularly in high-cost states such as California.

Importantly, we also found that APLs significantly reduce the likelihood of default, even after controlling for a wide range of borrower, housing, and mortgage market characteristics. We also found that the strength of the APL coverage matters: we found a reduced likelihood of serious delinquency among borrowers in states with law that extend HOEPA coverage and/or restrict more contract terms, that provide broader coverage of loans with high points and fees, and that impose more restrictive regulation on prepayment penalties. The results are robust enough that we find an effect regardless of loan purpose/interest rate mix and whether we examine all loans or only those made in zip codes along state borders.

Using a neighborhood-level analysis, we found strong evidence that there is a lower default rate for neighborhoods in states with laws that extend HOEPA coverage and/or restrict more contract terms, in states with broader coverage of subprime loans with high points and fees, and in those with more restrictive regulation on prepayment penalties. The results are robust enough that they remain consistent when focused on either state-border neighborhoods or large neighborhoods.

Generally, the goal of anti-predatory lending laws is to ban or restrict the origination of loans with unfair or abusive terms. By reducing the origination of loans with exotic features, such as prepayment penalties, balloon payments, equity-stripping fees, interest only, and lack of verification of borrowers' repayment capacity, the overall mortgage default risk can be

significantly reduced. In fact, strong APLs may have even broader impact on the mortgage market. Many studies have demonstrated that the loose underwriting and the increased availability of nontraditional non-prime mortgages was one primary reason for the run-up in house prices in the first half of the last decade and the subsequent collapse (Mian and Sufi 2008). With a strong APL in place, lenders should be less likely to adopt risky underwriting standards that allow loan applicants to borrow more than they could afford, thereby limiting loan loss risk when house prices decline, interest rates change, or mortgage payments become unsustainable.

Unfortunately, the impact of state anti-predatory lending laws can be weakened by many other factors, for instance federal preemption.

This study helps improve the understanding of the impact of different regulatory environments on the quality of mortgages originated. We believe this paper provides strong evidence that state APLs can serve as an important tool in the landscape of mortgage market regulation and consumer protection. To the extent that APLs improve underwriting standards and limit riskier loan products, they also decrease the likelihood that a borrower will become seriously delinquent. Given the dire consequences of foreclosure on individual households, as well as the negative spillover effects on neighborhoods and even regional economies, there is a strong argument to allow states to implement and enforce strong APLs without the risk of federal preemption.

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7 Appendix

State Anti-Predatory Lending Law Data

To develop a state law coding system for high-cost or predatory mortgage laws, we reviewed the existing studies, including Pennington-Cross et al. (2008), Bostic et al. (2008a), and Li and Ernst (2007). We also reviewed the description of state laws in several treatises, including Renault, Keest, Carter, Wu, and Cohen (2009) and Nelson and Whitman (2007), reviewed various rate matrices that reflect mortgage originators' understanding of state laws, particularly for prepayment penalty restrictions, and then reviewed statutory language itself.

We identified that mini-HOEPA laws were adopted in 25 states and the District of Columbia on or before December 31, 2007. In addition, five states (Michigan, Minnesota, Nevada, Texas, and West Virginia) passed significant subprime mortgage regulation statutes that were not HOEPA extension statutes and not based on rate-and-fee triggers. Of the mini-HOEPA laws, eight (Utah, Pennsylvania, Nevada, Oklahoma, Ohio [prior to 2007], Maine [prior to 2007], Kentucky, and Florida) did not extend coverage beyond mortgages covered by federal law. In several instances, the intent of these laws was to preempt local laws and ordinances that imposed greater restrictions than federal law. Since there is thus a fundamental difference between the states that extended restrictions on subprime mortgages beyond federal requirements, and states that simply copied federal HOEPA restrictions into their state statutes, we developed and coded a set of law variables to describe state laws that could affect the type of subprime mortgages made and the default and foreclosure rates of mortgages in a given state.

The binary variable *ineffect*, modeled on Pennington-Cross et al. (2008) and Bostic et al. (2008a), in combination with the effective date variable for the same state and law, is intended to identify states with mortgage statutes that could plausibly have an impact on high-cost or subprime mortgage lending. A value of 1 was assigned for the *ineffect* variable to the states with any restrictions on charging or financing points and fees, credit insurance, prepayment penalties, balloon payments, negative amortization, determination or documentation of income or repayment ability, and/or significant counseling requirements, so long as the state law covers any share of the subprime (or the entire) mortgage market below the HOEPA rate and/or fee triggers. A value of zero (0) was assigned to the *ineffect* variable for the eight states with HOEPA copycat statutes, which is a departure from some prior studies. This is a departure from some prior studies. While some of these eight statutes imposed minor additional restrictions not found in federal law on high-cost loans above the HOEPA triggers, it is doubtful that a difference in regulation of a negligible slice of the mortgage market would affect the outcome variables. So, based on our definition, states with strong APLs prior to 2007 include Arkansas, California, Connecticut, Georgia, Illinois, Indiana, Maryland, Massachusetts, Michigan, Minnesota, New

Jersey, New Mexico, New York, North Carolina, Rhode Island, South Carolina, Tennessee, Texas, West Virginia, and Wisconsin, as well as the District of Columbia. In this analysis, unless otherwise noted, we classify APL states and non-APL states based on the more stringent *ineffect* definition for this analysis.

HOEPA regulates loans with an APR exceeding the yield for comparable Treasury securities by more than 8 percentage points and loans with points and fees above a certain threshold (8 percent of the loan amount or a set dollar amount, \$583 for 2009). If the state law that prohibits points and fees above the national threshold, the *pointstrigger* is coded as 1, and 0 otherwise. In other words, if the corresponding state law triggers are lower than the federal HOEPA thresholds for points and fees, the *pointstrigger* is set as 1, and 0 otherwise. West Virginia, for example, prohibits points and fees in excess of 3 percent for most mortgages and so is assigned a *pointstrigger* value of 1. For states without a mini-HOEPA law, a value of zero is assigned to the *pointstrigger* variable.

Prepayment penalties were frequently included in subprime mortgages and have been found to increase the risk of foreclosure. Many state laws limit the ability of lenders to impose prepayment penalties. The *prepaymentpenalty* variable captures both the scope and extent of prepayment penalty restrictions on a scale of 0 to 4. A statute banning all prepayment penalties for all, or nearly all, residential mortgages is coded as 4. Statutes banning prepayment penalties but only for a subset of mortgages, based on loan amount or price are coded as 3. Statutes restricting but not banning prepayment penalties for all, or nearly all, mortgages are coded as 2, and statutes banning prepayment penalties only beyond 24 months and covering only a subset of mortgages are coded as 1. Statutes without any restriction on prepayment penalties or only restricting but not banning prepayment penalties are coded as 0 for this analysis.

The *repaymentability* variable is binary and identifies states in which a significant portion of the mortgage market was subject to a requirement that repayment ability be determined and/or verified, or that borrowers receive counseling as a precondition to obtaining a mortgage loan, and that these requirements be subject to some enforcement or sanction. This variable necessarily includes some judgmental assessment of various state law provisions. State laws that impose repayment ability standards, but only on loans above the federal HOEPA triggers, or that do not regulate mortgage repayment ability, are assigned a value of 0. See the following table for a summary of all these state law variables described above.

Table 1. Summary of the Coding of Anti-Predatory Lending Laws

State	Pennington- Cross et al. (2008)	Li and Ernst (2007)	Bostic et al. (2008a)	Effective Date	Ineffect	Ineffectb	Prepayment- penalty	Repayment- ability	Points- trigger
Alabama	0	NA	0	5/20/1996	0	0	0	0	0
Alaska	0	8	0	12/31/1968	0	0	4	0	0
Arizona	0	NA	0	.	0	0	0	0	0
Arkansas	0	10	6.56	7/16/2003	1	1	2	1	1
California	1	NA	4.93	7/1/2002	1	1	2	0	1
Colorado	1	NA	4.18	7/1/2003	1	1	1	1	1
Connecticut	1	NA	4.88	1/1/2002	1	1	1	0	1
Delaware	0	NA	0	.	0	0	0	0	0
D.C.	1	11	7.75	5/7/2002	1	1	2	1	1
Florida	1	8	3.75	10/2/2002	0	1	0	0	0
Georgia	1	12	6.83	3/7/2003	1	1	3	1	1
Hawaii	0	NA		1/1/1967	0	0	4	0	0
Idaho	0	7	0	7/1/1996	0	0	2	0	0
Illinois	1	12	8.11	1/1/2004	1	1	4	1	1
Indiana	1	NA	6.76	1/1/2005	1	1	1	1	1
Iowa	0	8	0	4/13/1979	0	0	4	0	0
Kansas	0	7	0	1/1/1994	0	0	4	0	0
Kentucky	1	7	5.86	6/24/2003	0	1	1	0	0
Louisiana	0	NA		.	0	0	0	0	0
Maine	1	8	3.01	12/31/1995	0	1	4	0	0
Maryland	1	8	3.39	10/1/2002	1	1	4	1	1
Massachusetts	1	16	8.44	11/7/2004	1	1	3	1	1
Michigan	1	8	5.99	12/23/2002	1	1	2	0	0
Minnesota	1	10	7.01	1/1/2003	1	1	2	1	0
Mississippi	0	NA		.	0	0	2	0	0
Missouri	0	NA		.	0	0	2	0	0
Montana	0	NA		.	0	0	0	0	0
Nebraska	0	NA	0	3/20/2003	0	0	0	0	0
Nevada	1	NA	2.81	10/1/2003	0	1	1	1	0
New	0	NA	0	1/1/2004	0	0	0	0	0
New Jersey	1	15	7.34	11/27/2003	1	1	4	0	1
New Mexico	1	18	9.9	1/1/2004	1	1	3	1	1
New York	1	15	5.82	4/1/2003	1	1	3	1	1
North Carolina	1	17	6.4	7/1/2000	1	1	3	1	1
North Dakota	0	NA	0	.	0	0	0	0	0
Ohio	1	7	3.47	5/24/2002	0	1	1	0	0
Oklahoma	1	NA	4.29	1/1/2004	0	1	1	0	0
Oregon	0	NA	0	.	0	0	0	0	0
Pennsylvania	1	NA	3.47	6/25/2002	0	1	3	0	0
Rhode Island	0	NA	0	12/31/2006	1	1	3	1	1
South Carolina	1	13	4.8	1/1/2004	1	1	4	1	1
South Dakota	0	NA	0	.	0	0	0	0	0
Tennessee	0	NA	0	1/1/2007	0	0	1	0	0
Texas	1	10	4.34	9/1/2001	1	1	3	0	1
Utah	1	NA	3.91	5/3/2004	0	1	1	0	0
Vermont	0	8	0	1/1/1997	0	0	4	0	0
Virginia	0	8	0	6/26/2003	0	0	0	0	0
Washington	0	NA	0	.	0	0	0	0	0
West Virginia	1	17	9	6/8/2000	1	1	4	1	1
Wisconsin	0	7	0	2/1/2005	1	1	1	1	1
Wyoming	0	NA	0	.	0	0	0	0	0

Note: *ineffect*: states with APL laws (not including those with marginal protection); *Ineffectb*: alternative specification of APL laws by including those laws with marginal protection.

Lender Processing Services (LPS) Applied Analytics, Inc. Data

In conducting this mortgage default analysis, we rely on proprietary loan performance information compiled by Lender Processing Services Applied Analytics, Inc. (LPS) and aggregated the data to the zip code level. The dataset is sometimes still called the McDash data, although LPS acquired McDash in July 2008.

The LPS data is rich in detail, including over 70 variables related to loan characteristics and performance, such as FICO score, debt-to-income ratio (DTI), loan amount, property value, contract rate type (fixed or adjustable), loan purpose (purchase or refinance), loan type (conventional, FHA, VA, or subprime), occupancy status (owner-occupied or not), documentation status (full documentation or not), existence of a prepayment penalty, loan term to maturity, origination channel (wholesale or retail), and delinquency and foreclosure status in each month, as well as each property's zip code. Additionally, the performance of each loan can be monitored over time. For each month in which a given loan is in the dataset, we know its outstanding balance, the current interest rate, and the borrower's payment status (that is, current; 30-, 60-, or 90-days delinquent; in foreclosure, etc.). We also know whether a loan ended in prepayment or foreclosure.

The LPS dataset is one of the few loan-level databases that provide excellent coverage in both the conventional mortgage market and the FHA market and for both securitized loans and those that are held in portfolio. For the 2004-2006 cohorts, LPS data covered roughly 40 percent of that of the Home Mortgage Disclosure Act (HMDA) data, while its coverage in the conventional market varies from year to year (Ernst, Bocian, and Li 2008). The LPS dataset has grown over time as new servicers have been added, with a substantial increase in coverage of the market in 2005 and in late 2008. Based on our estimation using Mortgage Bankers Association (MBA) data of active loans, the LPS covered about 50 percent of active mortgages in the United States during the period from June 2006 to June 2008 (48 percent in 2006 and 53 percent in 2008).⁴

Of course, one major concern with the LPS is its coverage in the subprime market: Nationally, as of June 2006, the share of subprime loans among all active loans in the LPS was about 2.8 percent, lower than the 13.4 percent of subprime reported by MBA (2008). But LPS only counts B&C loans as subprime, which inevitably underestimates the size of the subprime market. As Ding et al. (2008) documented, the LPS coverage in the subprime market by volume increased from 14 percent for the 2004 cohort to over 30 percent for the 2006 cohort. While any empirical approach needs to consider the changing nature of the LPS data, it should not be a serious problem here since we focus on active loans in recent years in this study, when the coverage of LPS had been significantly expanded.

⁴ The LPS dataset has grown over time as new servicers have been added, with a substantial spread in coverage of the market in 2005. As of December 2008, the coverage of LPS further increased to nearly 60 percent of active residential mortgages in the United States, representing about 29 million loans with a total outstanding balance of nearly \$6.5 trillion (Foote, Gerardi, Goette, and Willen 2009).

8 Tables

Table 1: Geographic Distribution of Sample

State	LPS Sample	LPS Full Data	HMDA	State	LPS Sample	LPS Full Data	HMDA
Alabama	0.79	0.91	1.08	Missouri	1.89	0.31	1.94
Alaska	0.15	0.15	0.17	Montana	0.27	0.31	0.24
Arizona	2.91	2.84	2.90	Nebraska	0.31	0.44	0.46
Arkansas	0.46	0.54	0.60	Nevada	1.33	1.41	1.30
California	19.28	18.03	15.67	New Hampshire	0.47	0.51	0.50
Colorado	2.51	2.47	2.34	New Jersey	3.39	3.56	3.14
Connecticut	1.39	1.35	1.29	New Mexico	0.55	0.55	0.52
Delaware	0.3	0.31	0.33	New York	5.02	4.56	3.63
District of Columbia	0.32	0.27	0.21	North Carolina	2.28	2.33	2.56
Florida	6.77	6.9	7.26	North Dakota	0.12	0.16	0.13
Georgia	2.79	2.85	2.96	Ohio	2.39	2.53	3.50
Hawaii	0.42	0.47	0.38	Oklahoma	0.62	0.68	0.82
Idaho	0.61	0.59	0.52	Oregon	1.71	1.57	1.33
Illinois	4.14	4.58	4.61	Pennsylvania	3.15	3.38	3.73
Indiana	1.52	1.53	1.95	Rhode Island	0.37	0.35	0.45
Iowa	0.69	0.82	0.75	South Carolina	1.05	1.07	1.20
Kansas	0.73	0.79	0.74	South Dakota	0.15	0.2	0.19
Kentucky	0.8	0.87	1.03	Tennessee	1.34	1.44	1.62
Louisiana	0.63	0.68	1.00	Texas	5.32	5.36	5.38
Maine	0.29	0.29	0.39	Utah	0.99	0.95	0.98
Maryland	2.82	2.72	2.62	Vermont	0.15	0.14	0.18
Massachusetts	2.44	2.35	2.56	Virginia	3.36	3.21	3.19
Michigan	3.06	3.27	3.80	Washington	3.56	3.16	2.66
Minnesota	2.4	2.48	2.03	West Virginia	0.19	0.22	0.37
Mississippi	0.28	0.3	0.56	Wisconsin	1.32	1.37	2.11
				Wyoming	0.15	0.17	0.13

*Percent of originations between 2002-2006.

Table 2: Variable Definitions

Variable	Definition
FICO	Borrower FICO Score measured at origination FICO < 580 580<= FICO < 620 620<=FICO < 660 660<= FICO < 720 FICO > 720 (Reference category)
LTV	Borrower LTV measured at origination LTV < 60 (Reference category) 60 <=LTV < 70 70 <= LTV < 80 80 <= LTV < 90 LTV >= 90
No Documentation	Loan was originated with no or limited documentation
Broker/Wholesale Origination	Loan was originated by a broker or wholesale channel
FHFA 2 Years Prior to Origination	Change in FHFA House Price Index 2 years prior to loan origination HPI Change < 10 10 <= HPI Change < 25 HPI Change >25 (Reference category)
FHFA Post Purchase	Repeated monthly change in FHFA House Price Index from origination to last observation HPI Change < 10 10 <= HPI Change < 25 HPI Change >25 (Reference category)
Affordability	County affordability index in the observation month (a higher score translates into greater affordability) Affordability< 87 (Reference category) 87 <= Affordability < 133 133 <= Affordability < 174 Affordability > =174
Unemployment	County unemployment rate in the observation month from the BLS Unemp Rate < 4.4 (Reference category) 4.4 <=Unemp Rate < 5.2 5.2 <=Unemp Rate < 6.2 Unemp Rate > 6.2
Neighborhood Racial Composition (Minority)	Percent of non-whites in the zip code from 2000 Census Minority < 9 percent (Reference category) 9.0 <= Minority < 19 19 <= Minority < 37 Minority >= 37

Neighborhood Education Level (College)	Percent of population with bachelor degree or higher in the zip code from 2000 Census College < 24 24 <= College < 34 34 <= College < 48 College > 48 (Reference category)
Loan Age	Number of days from origination to last observation
Interest Rate	Repeated monthly change in the prevailing contract interest rates on commitments for conventional fixed rate mortgages from Freddie Mac
Year of Origination	Year loan was originated Originated in 2002/2003 Originated in 2004 Originated in 2005/2006
APL Coding	
State APL in Effect	State anti-predatory lending law variable Alternative specification of state anti-predatory lending law variable (including laws with substantial protection and those with marginal protection)
State APL in Effect B	
Repaymentability	Repaymentability requirement in APLs
Prepaymentpenalty	A complete or partial ban on prepayment penalties in APLs
Pointstrigger	State law points and fees triggers lower than the federal HOEPA thresholds

Table 3: Sample Means

	Sample Means All Loans	Sample Means Border Zips
Sample Size	1,200,735	158,486
Legal Framework		
APL In Effect	49.7	36.72
APL In Effect B	63.6	48.51
Repaymentability	20.6	42.43
Pointstrigger	45.1	35.45
Prepayment Penalty		
	0	37.7
	1	8.1
	2	26.9
	3	17.6
	4	9.7
Loan Terms		
Purchase	32.52	35.01
ARM	24.04	21.84
Option ARM	8.05	6.05
Prepayment Penalty Loan	13.65	10.76
No Documentation	11.11	10.23
Loan to Value	68.17	69.05
FICO at Origination	720.37	718.39
Loan Performance		
90+ Days Delinquent	4.23	3.48
Prepayment	32.08	32.21
Housing and Socio-economic Conditions		
FHFA House Price Change (2 years prior to origination)	19.39	19.67
County Unemployment Rate	5.42	5.27
Percent Minority in Zip Code	26.79	24.11
Percent College in Zip Code	37.21	36.70
County Housing Affordability	134.02	141.38
Median House Values in Zip Code	181,891	183,709
Median Household Income in Zip Code	54,074	53,566
Interest Rate	5.35	5.36

Table 4: Differences Between APL and Non-APL States

	Sample Means All Loans			Sample Means Border Zips		
	Non-APL States	APL States		Non-APL States	APL States	
<u>Loan Terms</u>						
Purchase	32.65	32.39		33.32	37.92	***
ARM	20.35	27.77	***	19.41	26.02	***
Option ARM (as share of ARMs)	30.78	41.50	***	26.18	34.88	***
Prepayment Penalty Loan	12.63	14.68	***	10.74	10.79	***
No Documentation	8.19	14.05	***	7.97	14.13	***
Loan to Value	69.83	66.49	***	69.96	67.48	***
FICO at Origination	720.60	720.20	***	719.50	716.50	***
<u>Loan Performance</u>						
90+ Days Delinquent	4.11	4.34	***	4.07	3.87	***
Prepayment	33.84	30.30	***	33.35	30.23	***
<u>Housing and Socio-economic Conditions</u>						
FHFA House Price Change (2 years prior to origination)	17.79	21.26	***	17.96	23.08	***
County Unemployment Rate	5.20	5.65	***	5.30	5.22	***
Percent Minority in Zip Code	20.55	33.09	***	19.58	31.92	***
Percent College in Zip Code	35.99	38.45	***	35.14	39.38	***
County Housing Affordability	149.70	118.10	***	157.20	114.10	***
Median House Values in Zip Code	153,499	210,647	***	155,079	233,144	***
Median Household Income in Zip Code	51,336	56,854	***	51,848	56,527	***
Interest Rate	5.3	5.4	***	5.33	5.40	***

*** p < .0001, ** p < .001, * p < .01

Table 5: Model Predicting the Effect of State APLs on Mortgage Product Origination

		All Loans				Adjustable Rate Loans			
		Likelihood of Receiving a Prepayment Penalty				Likelihood of Receiving an Option ARM			
		Coefficient	Standard Error	Odds Ratio		Coefficient	Standard Error	Odds Ratio	
Intercept		-2.136	0.013	***		-1.952	0.024	***	
FICO	FICO < 580	1.788	0.016	***	5.98	2.075	0.027	***	7.97
	580 <= FICO < 620	0.826	0.013	***	2.29	1.688	0.025	***	5.41
	620 <= FICO < 660	0.310	0.009	***	1.36	0.948	0.016	***	2.58
	660 <= FICO < 720	0.000	0.007		1.00	0.276	0.012	***	1.32
LTV	60 <= LTV < 70	-0.120	0.009	***	0.89	-0.048	0.019	*	0.95
	70 <= LTV < 80	-0.082	0.007	***	0.92	-0.024	0.015		0.98
	80 <= LTV < 90	0.116	0.008	***	1.12	0.337	0.016	***	1.40
	LTV >= 90	0.327	0.015	***	1.38	0.203	0.029	***	1.23
No Documentation		0.598	0.008	***	1.82	2.075	0.012	***	7.97
Broker/Wholesale Channel FHFA 2 Years Prior to Origination		0.154	0.007	***	1.17	1.560	0.010	***	4.76
Housing Affordability	HPI Change < 10	-0.212	0.007	***	0.81	0.023	0.012		1.02
	10 <= HPI Change < 25	-0.098	0.009	***	0.91	-0.133	0.020	***	0.88
	87 <= Affordability < 133	-0.364	0.008	***	0.70	-0.492	0.014	***	0.61
	133 <= Affordability < 174	-0.320	0.009	***	0.73	-0.981	0.017	***	0.38
Unemployment Rate	Affordability >= 174	-0.345	0.009	***	0.71	-1.234	0.020	***	0.29
	4.4 <= Unemp Rate < 5.2	0.159	0.009	***	1.17	0.089	0.014	***	1.09
	5.2 <= Unemp Rate < 6.2	0.403	0.008	***	1.50	0.047	0.015	**	1.05
	Unemp Rate > 6.2	0.370	0.009	***	1.45	-0.040	0.015	*	0.96
Percent Minority	9.0 <= Minority < 19	0.229	0.009	***	1.26	0.103	0.016	***	1.11
	19 <= Minority < 37	0.418	0.009	***	1.52	0.061	0.016	***	1.06
	Minority >= 37	0.578	0.009	***	1.78	-0.002	0.017		1.00
Percent with College Degree	College < 24	-0.012	0.008		0.99	0.489	0.016	***	1.63
	24 <= College < 34	-0.114	0.008	***	0.89	0.338	0.015	***	1.40
	34 <= College < 48	-0.046	0.008	***	0.96	0.179	0.014	***	1.20
APL in Effect		-0.137	0.006	***	0.87	0.003	0.012		1.00
Model Wald Chi-Square		43,395				64,277			
N		1,184,277				260,686			

*** p < .0001, ** p < .001, * p < .01

Table 6: Analysis of the Effect of State APLs on Mortgage Product Origination - Excluding California

	All Loans				Adjustable Rate Loans			
	Likelihood of Receiving Prepayment Penalty				Likelihood of Receiving an Option ARM			
	Coefficient	Standard Error		Odds Ratio	Coefficient	Standard Error		Odds Ratio
All Loans (Excluding California)	-0.303	0.007	***	0.74	-0.151	0.013	***	0.86

*** p < .0001, ** p < .001, * p < .01

Note: These models include all the predictors shown in Table 5.

Table 7: Analysis of the Effect of State APLs on Mortgage Product Origination by Cohort

	All Loans				Adjustable Rate Loans			
	Likelihood of Receiving Prepayment Penalty				Likelihood of Receiving an Option ARM			
	Coefficient	Standard Error		Odds Ratio	Coefficient	Standard Error		Odds Ratio
Originated in 2002/2003	0.173	0.008	***	1.19	-0.189	0.024	***	0.83
Originated in 2004	-0.149	0.018	***	0.86	-0.040	0.022		0.96
Originated in 2005/2006	-0.351	0.015	***	0.70	-0.043	0.020		0.96

*** p < .0001, ** p < .001, * p < .01

Note: These models include all the predictors shown in Table 5.

Table 8: Analysis of the Effect of State APLs on Mortgage Product Origination for Alternative Law Specifications

	All Loans				Adjustable Rate Loans			
	Likelihood of Receiving Prepayment Penalty				Likelihood of Receiving an Option ARM			
	Coefficient	Standard Error		Odds Ratio	Coefficient	Standard Error		Odds Ratio
All Loans								
APL In Effect	-0.131	0.006	***	0.88	0.0013	0.0117		1.00
APL in Effect B (includes 8 additional states whose restrictions do not go beyond federal law)	0.0277	0.00638	***	1.03	0.0989	0.0127	***	1.10
Repaymentability	-0.432	0.00774	***	0.65	-0.318	0.0129	***	0.73
Pointstrigger	-0.0592	0.00634	***	0.94	-0.00582	0.0119		0.99
Prepayment Penalty (reference group: no restrictions)								
1	0.0692	0.00787	***	1.07	0.0648	0.0153	***	1.07
2	-0.4592	0.0124	***	0.63	0.0242	0.0196		1.02
3	-0.3408	0.0088	***	0.71	-0.1088	0.0184	***	0.90
4	-0.5733	0.0117	***	0.56	-0.384	0.019	***	0.68
Border Loans Only								
APL In Effect	-0.126	0.018	***	0.88	-0.116	0.036	**	0.89
APL in Effect B (includes 8 additional states whose restrictions do not go beyond federal law)	-0.022	0.019		0.98	0.081	0.035		1.09
Repaymentability	-0.006	0.020		0.99	-0.229	0.035	***	0.80
Pointstrigger	0.000	0.020		1.00	-0.119	0.037	**	0.89
Prepayment Penalty (reference group: no restrictions)								
1	0.255	0.027	***	1.29	-0.384	0.062		0.68
2	-0.145	0.035	***	0.87	0.334	0.058	***	1.40
3	-0.145	0.026	***	0.87	-0.034	0.049		0.97
4	-0.184	0.025	***	0.83	-0.139	0.046	*	0.87

*** p < .0001, ** p < .001, * p < .01

Note: These models include all the predictors shown in Table 5.

Table 9: The Effect of APLs on Loan Performance

		90+ Delinquency				Prepayment			
		Coefficient	Standard Error		Relative Risk Ratio	Coefficient	Standard Error		Relative Risk Ratio
	Intercept	Intercept	-4.811	*		Intercept	0.639	**	***
FHA Post Purchase	HPI Change < 10	0.164	0.016	***	1.18	-0.656	0.006	***	0.52
	10 <= HPI Change < 25	0.077	0.018	***	1.08	-0.340	0.007	***	0.71
Interest Rate Difference		-0.522	0.011	***	0.59	-0.966	0.005	***	0.38
FICO	FICO < 580	3.435	0.023	***	31.03	1.027	0.018	***	2.79
	580 <= FICO < 620	2.591	0.019	***	13.34	0.564	0.012	***	1.76
	620 <= FICO < 660	2.012	0.015	***	7.48	0.326	0.007	***	1.39
	660 <= FICO < 720	1.216	0.014	***	3.38	0.208	0.005	***	1.23
LTV	60 <= LTV < 70	0.706	0.023	***	2.03	0.144	0.007	***	1.16
	70 <= LTV < 80	1.234	0.019	***	3.44	0.276	0.006	***	1.32
	80 <= LTV < 90	1.733	0.019	***	5.66	0.357	0.006	***	1.43
	LTV >= 90	1.900	0.023	***	6.68	0.350	0.010	***	1.42
No Documentation		0.636	0.013	***	1.89	0.325	0.007	***	1.39
Loan Age		-0.005	0.001	***	1.00	-0.021	0.000	***	0.98
Wholesale Channel		0.587	0.010	***	1.80	0.157	0.005	***	1.17
Unemployment Rate	4.4 <= Unemp Rate < 5.2	0.029	0.014		1.03	0.124	0.006	***	1.13
	5.2 <= Unemp Rate < 6.2	0.089	0.014	***	1.09	0.166	0.006	***	1.18
	Unemp Rate > 6.2	0.090	0.015	***	1.09	0.170	0.007	***	1.19
Minority	9.0 <= Minority < 19	-0.079	0.014	***	0.92	0.007	0.006		1.01
	19 <= Minority < 37	0.019	0.014		1.02	-0.044	0.006	***	0.96
	Minority >= 37	0.216	0.014	***	1.24	-0.079	0.007	***	0.92
Affordability	87 <= Affordability < 133	-0.266	0.015	***	0.77	-0.102	0.006	***	0.90
	133 <= Affordability < 174	-0.222	0.016	***	0.80	-0.374	0.007	***	0.69
	Affordability > =174	-0.095	0.016	***	0.91	-0.463	0.007	***	0.63
Origination Year	Originated in 2002/2003	-0.012	0.016	*	0.99	1.357	0.008	***	3.88
	Originated in 2004	0.104	0.015	***	1.11	1.409	0.007	***	4.09
APL in Effect		-0.164	0.011	***	0.85	-0.069	0.005	***	0.93
Model Wald Chi-Square	152,320								
N	1,200,547								

* Competing risk outcomes are measured against loans still active in December 2008.

*** p < .0001, ** p < .001, * p < .01

Table 10: Analysis of Effect of State APLs on Loan Performance for Different Loan Samples

	90+ Delinquency			Prepayment			Relative Risk Ratio	
	Coefficient	Standard Error	Relative Risk Ratio	Coefficient	Standard Error	Relative Risk Ratio		
Purchase FRM Loans Only	-0.204	0.022	***	0.82	-0.179	0.010	***	0.84
Purchase ARM Loans Only	-0.266	0.026	***	0.77	-0.133	0.014	***	0.88
Refinance FRM Loans Only	-0.139	0.017	***	0.87	-0.027	0.007	***	0.97
Refinance ARM Loans Only	-0.182	0.025	***	0.83	-0.079	0.013	***	0.92

*** p < .0001, ** p < .001, * p < .01

Note: These models include all the predictors shown in Table 9.

Table 11: Analysis of the Effect of State APLs on Loan Performance for Alternative Law Specifications

	90+ Delinquency				Prepayment			
	Coefficient	Standard Error	***	Relative Risk Ratio	Coefficient	Standard Error	***	Relative Risk Ratio
APL In Effect	-0.164	0.011	***	0.85	-0.069	0.005	***	0.93
APL in Effect B (includes 8 additional states whose restrictions do not go beyond federal law)	-0.022	0.011		0.98	-0.082	0.005	***	0.92
Repaymentability	-0.131	0.012	***	0.88	-0.057	0.005	***	0.95
Pointstrigger	-0.271	0.011	***	0.76	-0.076	0.005	***	0.93
Prepayment Penalty (reference group: no restrictions)								
1	-0.059	0.014	***	0.94	0.027	0.006	***	1.03
2	-0.153	0.018	***	0.86	-0.036	0.009	***	0.97
3	-0.393	0.015	***	0.68	-0.216	0.007	***	0.81
4	-0.325	0.018	***	0.72	0.037	0.008	***	1.04
Border Loans	90+ Delinquency				Prepayment			
	Coefficient	Standard Error		Relative Risk Ratio	Coefficient	Standard Error		Relative Risk Ratio
APL In Effect	-0.152	0.032	***	0.86	-0.062	0.013	***	0.94
APL in Effect B (includes 8 additional states whose restrictions do not go beyond federal law)	-0.132	0.029	***	0.88	-0.035	0.012	*	0.97
Repaymentability	-0.103	0.032	**	0.90	-0.079	0.014	***	0.92
Pointstrigger	-0.176	0.033	***	0.84	-0.059	0.014	***	0.94
Prepayment Penalty (reference group: no restrictions)								
1	-0.062	0.046		0.94	0.022	0.020		1.02
2	-0.060	0.050		0.94	-0.001	0.023		1.00
3	-0.291	0.040	***	0.75	-0.084	0.017	***	0.92
4	-0.088	0.040	*	0.92	0.041	0.017	*	1.04

*** p < .0001, ** p < .001, * p < .01

Note: These models include all the predictors shown in Table 9.

Table 12 (Neighborhood Level Analysis): Variable Description

Variable	Definition
pct_del90	share of active loans in 90+day delinquency (not including foreclosures or REOS)
pct_fc	share of active loans that were in the foreclosure process (not including REOs)
pct_fcree	share of loans that were either in foreclosure or REOs
mean_fico	average origination FICO credit score
mean_dti	average debt-to-income ratio
mean_ltv	average origination loan-to-value ratio
pct_refi	share of refinance mortgages
pct_subprime	share of subprime mortgages
pct_fha	share of FHA mortgages
pct_arm	share of adjustable rate mortgages
pct_owner_occ	share of owner-occupied properties
mean_prop_value	average house value (in thousands)
pct_broker	share of loans originated by brokers
pct_corres	share of loans originated through correspondence
pct_y2002	share of loans originated in 2002
pct_y2003	share of loans originated in 2003
pct_y2004	share of loans originated in 2004
pct_y2005	share of loans originated in 2005
timeline	average time (days) between the due date of the last paid mortgage installment and the foreclosure sale
apre_bf06	MSA house price appreciation from the first quarter of 2000 to the second quarter of 2006 (based on Case-Shiller HPI for major MSAs and FHFA HPI for others)
apre_af06	MSA house price appreciation from the second quarter of 2006 to the observation quarter (based on Case-Shiller HPI for major MSAs and FHFA HPI for others)
unemployment	county unemployment rate in the observation month
pct_black	share of non-Hispanic African Americans in the zip code from 2000 Census
pct_hisp	share of Hispanic population in the zip code from 2000 Census
pct_colle	share of population with bachelor+ degree in the zip code from 2000 Census
ineffect	state anti-predatory lending law variable
ineffectb	alternative specification of state anti-predatory lending law variable (including laws with substantial protection and those with marginal protection)
repaymentability	repaymentability requirement in APLs
pointstrigger	state law points and fees triggers lower than the federal HOEPA thresholds
prepay1	statute covers less than 100 percent of market by loan amount or price AND restricts prepayment penalties, but only after 24 or more months for that market segment
prepay2	statute covers 100 percent of residential mortgage market and restricts amount or duration of prepayment penalty but does not prohibit prepayment penalties:
prepay3	statute covers less than 100 percent of market by loan amount or price AND prohibits prepayment penalties for that market segment
prepay4	statute covers 100 percent of residential mortgage market and prohibits prepayment penalties

Table 13 (Neighborhood Level Analysis): Serious Delinquency and Foreclosure Rates in APL and Non-APL States

Year	Variable	State border zip codes			Large zip codes		
		Non_APL	APL	Difference	Non_APL	APL	Difference
2006	pct_del90	0.838	0.749	-0.090*	0.526	0.589	0.064*
	pct_fc	0.619	0.578	-0.041	0.311	0.366	0.055**
	pct_fcreo	0.992	0.935	-0.057	0.446	0.615	0.169**
2007	pct_del90	1.298	1.221	-0.077	0.926	1.047	0.121**
	pct_fc	0.917	0.741	-0.176**	0.735	0.735	-0.001*
	pct_fcreo	1.679	1.436	-0.244**	1.113	1.408	0.295**
2008	pct_del90	2.136	1.922	-0.214**	1.931	1.998	0.067
	pct_fc	1.389	1.244	-0.144**	1.978	1.463	-0.515**
	pct_fcreo	2.645	2.336	-0.309**	2.978	2.928	-0.050
# of zip codes		1,018	922		2,002	3,133	

Note: * significant at 0.1 level; ** significant at 0.05 level.

pct_del90 represents the share of active loans in 90+day delinquency (not including foreclosures or REOS); *pct_fc* represents the share of active loans that were in foreclosure process (not including REOs); and *pct_fcreo* represents the share of loans that were either in foreclosure or REOs.

Table 13: Descriptive Statistics (Neighborhood Level Analysis)

Variable	State border zip codes			Large zip codes		
	Non_APL	APL	Difference	Non_APL	APL	Difference
mean_fico	704.6	703.4	-1.175	716.4	716.4	0.001
mean_dti	38.118	38.063	-0.055	36.688	36.981	0.292
mean_ltv	72.042	71.589	-0.453	69.624	65.884	-3.739
pct_refi	60.792	61.550	0.758	56.949	62.883	5.934
pct_subprime	6.854	6.165	-0.689	5.390	5.196	-0.193
pct_fha	9.398	10.552	1.154	8.164	7.326	-0.839
pct_arm	11.918	11.119	-0.800	18.507	19.967	1.460
pct_owner_occ	87.460	87.127	-0.333	85.578	89.385	3.807
mean_prop_value	196.43	200.53	4.10	254.26	346.14	91.87
pct_broker	19.177	17.979	-1.197	17.430	19.293	1.863
pct_corres	23.385	23.240	-0.146	24.749	24.737	-0.012
pct_y2002	10.733	10.824	0.092	9.629	9.483	-0.146
pct_y2003	25.509	25.527	0.018	25.770	28.728	2.957
pct_y2004	17.404	17.597	0.193	16.237	17.370	1.133
pct_y2005	22.031	22.136	0.106	23.138	21.656	-1.482
Timeline (days)	274	282	8	270	295	25
appre_bf06	0.626	0.659	0.032	0.840	0.812	-0.027
appre_af06	0.031	0.023	-0.007	-0.009	-0.035	-0.026
unemployment	5.778	6.273	0.496	4.972	5.623	0.651
pct_black	0.111	0.087	-0.024	0.080	0.102	0.022
pct_hisp	0.034	0.037	0.003	0.084	0.143	0.059
pct_colle	0.184	0.176	-0.009	0.287	0.310	0.023
# of zip codes	1,018	922		2,002	3,133	
Total # of zip codes codes	1,940			5,135		

Note: Descriptive statistics as of June 2008 only. See definitions of variables in Table 3. Large zip codes include those with at least 1,500 active loans as of June 2008 in the LPS data. State border zip codes include those located on state borders (with the center of the zip code within five miles of the state lines and with at least 25 active loans in 2008), where one of the two bordering states had an anti-predatory lending law.

Table 15: The Impact of Anti-Predatory Lending Laws on Mortgage Default Rates (Neighborhood Level Analysis)

	State border zip codes						Large zip codes (with at least 1,500 loans)					
	pct_del9		pct_fc		pct_fcre		pct_del9		pct_fc		pct_fcre	
	0	P>z	0	P>z	0	P>z	0	P>z	0	P>z	0	P>z
	Coef.		Coef.		Coef.		Coef.		Coef.		Coef.	
mean_fico	-0.0161	0.00	-0.0135	0.00	-0.0106	0.00	-0.0269	0.00	-0.0173	0.00	-0.0251	0.00
mean_dti	0.0089	0.00	0.0011	0.25	0.0009	0.60	0.0119	0.00	0.0057	0.00	0.0137	0.00
mean_ltv	0.0066	0.02	0.0108	0.00	0.0411	0.00	0.0222	0.00	0.0416	0.00	0.0605	0.00
pct_refi	0.0012	0.33	0.0001	0.88	0.0066	0.00	-0.0111	0.00	-0.0084	0.00	-0.0041	0.00
pct_subprime	0.0447	0.00	0.0185	0.00	0.0654	0.00	0.0271	0.00	-0.0056	0.02	0.0293	0.00
pct_fha	0.0177	0.00	0.0002	0.89	0.0095	0.00	-0.0036	0.00	-0.0164	0.00	-0.0234	0.00
pct_arm	-0.0016	0.26	0.0073	0.00	0.0125	0.00	0.0023	0.00	0.0005	0.38	0.0125	0.00
pct_owner_occ	-0.0020	0.00	-0.0052	0.00	-0.0060	0.00	-0.0024	0.00	-0.0078	0.00	-0.0158	0.00
mean_prop_value	0.0007	0.00	0.0005	0.00	0.0010	0.00	0.0008	0.00	0.0008	0.00	0.0008	0.00
pct_broker	0.0251	0.00	0.0276	0.00	0.0513	0.00	0.0272	0.00	0.0322	0.00	0.0545	0.00
pct_corres	-0.0004	0.71	0.0001	0.83	-0.0083	0.00	0.0113	0.00	0.0021	0.00	0.0097	0.00
pct_y2002	-0.0218	0.00	-0.0169	0.00	-0.0358	0.00	-0.0357	0.00	-0.0213	0.00	-0.0364	0.00
pct_y2003	-0.0252	0.00	-0.0152	0.00	-0.0382	0.00	-0.0209	0.00	-0.0345	0.00	-0.0594	0.00
pct_y2004	-0.0316	0.00	-0.0234	0.00	-0.0519	0.00	-0.0684	0.00	-0.0657	0.00	-0.1189	0.00
pct_y2005	-0.0499	0.00	-0.0284	0.00	-0.0682	0.00	-0.0796	0.00	-0.0681	0.00	-0.1238	0.00
timeline	-0.0005	0.00	0.0024	0.00	0.0017	0.00	-0.0010	0.00	0.0016	0.00	0.0015	0.00
appre_bf06	0.0010	0.00	-0.0006	0.00	-0.0034	0.00	-0.0011	0.00	0.0010	0.00	-0.0040	0.00

	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
appre_af06	-0.0087	0	-0.0209	0	-0.0488	0	-0.0595	0	-0.0741	0	-0.1410	0						
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
unemployment	0.0526	0	0.0216	0	0.0678	0	0.0974	0	0.0703	0	0.1651	0						
	0.00	0.76	0.00	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
pct_black	0.0113	0	-0.0001	8	0.0004	9	0.0093	0	0.0050	0	0.0084	0						
	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
pct_hisp	-0.0071	0	0.0033	0	0.0044	2	-0.0044	0	0.0013	0	-0.0020	0						
	0.03	0.03	0.03	0.66	0.00	0.00	0.00	0.21	0.00	0.00	0.00							
pct_colle	0.0015	3	0.0012	7	0.0005	4	-0.0019	0	0.0004	0	-0.0022	0						
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
ineffect	-0.0614	0	-0.0836	0	-0.0602	1	-0.0481	0	-0.1760	0	-0.0852	0						
	0.00	10.189	0.00	0.00	0.00	0.00	0.00	13.919	0.00	0.00	0.00							
_cons	13.2595	0	9	0	8.0957	0	22.1990	0	2	0	21.1615	0						
Num of obs	15,405 of 5,235 zip codes						5,820 of 1,940zip codes											
log likelihood	-8704.3			-7890.1			-15660.2			-6451.7			-4814.0			-7100.8		

Note: The command *xtgls* was used for the estimation. Options *p(h)* and *c(a)* were used to correct for the heteroskedasticity and the autocorrelation across panels. See Table 3 for the definitions of the variables. Coefficients are in bold if they are significant at the 0.01 level.

Table 16: Results of the Impact of Anti-Predatory Lending Laws on Mortgage Default Rates (Neighborhood Level Analysis)

	State border zip codes					
	pct_del90		pct_fc		pct_fcreo	
	Coef.	P>z	Coef.	P>z	Coef.	P>z
<i>pointstrigger</i>	-0.0608	0.000	-0.0233	0.000	-0.1001	0.000
<i>prepay1</i>	-0.087	0.004	0.2970	0.000	0.3270	0.000
<i>prepay2</i>	-0.143	0.000	-0.1984	0.000	-0.0970	0.001
<i>prepay3</i>	0.035	0.154	-0.0675	0.000	-0.1579	0.000
<i>prepay4</i>	-0.024	0.340	-0.0619	0.000	-0.1444	0.000
<i>repay</i>	-0.0864	0.000	-0.0196	0.053	-0.0333	0.096
<i>Ineffectb</i>	-0.1177	0.000	0.0701	0.000	0.0512	0.010
<i>ineffect</i>	-0.0614	0.000	-0.0836	0.000	-0.0602	0.001

	Large zip codes (with at least 1,500 loans)					
	pct_del90	pct_del90	pct_del90	pct_del90	pct_del90	pct_del90
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
<i>pointstrigger</i>	-0.0370	0.008	-0.0374	0.000	-0.0973	0.000
<i>prepay1</i>	-0.0498	0.000	0.0645	0.000	0.0334	0.073
<i>prepay2</i>	-0.0861	0.000	-0.4037	0.000	-0.2273	0.000
<i>prepay3</i>	-0.0025	0.814	-0.1100	0.000	-0.0998	0.000
<i>prepay4</i>	-0.0168	0.131	-0.1368	0.000	-0.1458	0.000
<i>repay</i>	-0.0023	0.719	0.0099	0.107	0.0084	0.408
<i>Ineffectb</i>	-0.1061	0.000	0.0320	0.000	-0.0071	0.559
<i>ineffect</i>	-0.0481	0.000	-0.1760	0.000	-0.0852	0.000

Note: *ineffect* identifies whether a state has the APL law (not including those with marginal protection). *ineffectb* is an alternative specification of state anti-predatory lending law variable, including both laws with substantial protection and those with marginal protection. *repaymentability* represents the requirement of a verification of the ability to pay in APLs. *prepay1-prepay4* represent different levels of restriction on prepayment penalties in state laws, ranging from a partial restriction (*prepay1*) to a complete ban (*prepay4*). *pointstrigger* represents whether corresponding state law triggers are lower than the federal HOEPA thresholds for points and fees. Other control variables are the same as those in Table 5. Coefficients are in bold if they are significant at 0.01 level.

*Center for Community Capital
The University of North Carolina at Chapel Hill
1700 Martin Luther King Blvd
Campus Box 3452, Suite 129
Chapel Hill NC 27599-3452
(877) 783-2359
(919) 843-2140
communitycapital@unc.edu
www.ccc.unc.edu*



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ARTS & SCIENCES