# Mortgage Product Substitution and State Anti-Predatory Lending Laws: Better Loans and Better Borrowers?

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# Mortgage Product Substitution and State Anti-Predatory Lending Laws

*Abstract*:
Mounting foreclosures and recent disclosures of abusive lending practices have led many state and federal policy-makers to consider new anti-predatory lending laws. Researchers have examined the impact of such laws on credit flows and the cost of credit, but little attention has been paid to whether and how legal restrictions placed on lenders in the subprime market influence the types of loans borrowers use. Analysis of these issues would be invaluable to legislators as they seek to draft meaningful controls on the mortgage market.

Most state level anti-predatory lending laws are triggered only if a specific loan exceeds Annual Percentage Rate (APR) or points and fees thresholds. By shifting the interest rate risk to borrowers lenders can reduce required yields on loans and avoid "trigger-based" regulations. If trigger-based laws are costly to lenders, we should see an increased use of mortgage products that shift the interest rate risk to the borrower and away from the lender. However, after controlling for time and location, our results provide no evidence that lenders do in fact attempt to avoid anti-predatory lending laws by shifting product terms in this manner.

Many laws also restrict the use of prepayment penalties and balloons. Both of these mortgage terms can be used to make a loan more affordable (lower monthly payments) initially. If they are barred, lenders and borrowers are likely to find substitute mortgage terms that increase affordability so that a borrower can still qualify for a loan. Possible alternative mortgage terms include the use of longer or bigger teasers and non- or negative-amortizing loans.

We find that the largest impacts of anti-predatory lending laws are to reduce the use of prepayment penalties and some types of balloon payments, to increase the use of owner occupied loans and to decrease the use of investor and second home loans.

## Introduction and Motivation

Over the last 10 years more than half the states and several localities in the U.S. have enacted statutes and ordinances designed to regulate abuses in the residential mortgage market. The increased regulation, coupled with the tremendous growth and subsequent collapse of subprime lending, provides at least indirect evidence that existing regulation and oversight of the subprime market was not successful in protecting the financial welfare of borrowers, lenders, or investors. It is well beyond the scope of this paper to determine if any existing regulatory agencies or enforcement authorities could have averted the subprime market collapse in 2007 and 2008. Instead, we limit ourselves to examining the details of the laws that came into effect as the subprime market grew through the early and mid 2000s. In particular, we ask whether these laws were associated with the increased use of more exotic loan types. The introduction of state anti-predatory lending laws provides a natural experiment delineated over time and over space. We take advantage of this experiment to look for evidence that new laws led to a systematic change in the type of mortgage products households used and the types of borrowers who took out loans.

Descriptive statistics indicate that many laws were very effective in reducing the use of prepayment penalties. While most industry observers agree that prepayment penalties are not in themselves a predatory mortgage feature, many state legislatures felt that prepayment penalties coupled with high cost or subprime loans were associated with unacceptable rates of abuse. Therefore, a host of states strongly restricted the availability of prepayment penalties in the subprime market. The laws also tended to restrict the availability of balloon payments, especially those whose payment came due within 10 years.

Since the passage of the first state anti-predatory lending law in North Carolina researchers have been working to understand how anti-predatory lending laws may impact the mortgage market. The first issue that researchers addressed was whether the introduction of these laws made the subprime market diminish in size. Cursory observation of the growth path of subprime indicated indirectly that the typical law did not have much impact on the overall flow of credit. In fact, an early survey of subprime branch managers

by Morgan Stanley (2002) found that expectations of subprime growth in states with tough laws were similar to expectations in less regulated states. Morgan Stanley also reported that respondents found that the increased disclosures associated with new laws helped to boost consumer comfort, leading to an increase in loan volumes. Nonetheless, there is substantial variation in the laws, and the subprime market was relatively diminished in states with the most restrictive laws. Some laws were designed with very few restrictions and were associated with a relative increase in subprime lending, and other states designed laws with stronger restrictions that were associated with a decrease in subprime lending (Ho & Pennington-Cross, 2006; Bostic, et al., 2008; Elliehausen et. al., 2006). Increasing the coverage of a state law, however, helped mitigate the dampening effect of stronger restrictions on subprime loan volumes. (Bostic, et al., 2008).

Another important way that restrictions in a credit market could impact the mortgage market is through the cost of credit. In particular, 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. The evidence indicates that laws that are more restrictive do tend to drive up the cost of borrowing through higher interest rates, but this impact is limited to fixed rate loans. However, the magnitude of this effect is typically fairly small (Pennington-Cross and Ho, 2008; Li and Ernst, 2007).

From the lender perspective the required rate of return on a loan can be linked back to the risks that the borrower will not pay the loan back, the losses on defaulted loans, and the early payment of the loan. More succinctly – risks are either credit or interest rate risk. On a fixed rate loan all the interest rate risk is born by the lender, but on loans where the interest rate adjusts much of the interest rate risk is transferred to the borrower. In general, the less interest rate risk that the lender takes on, the lower the required rate of return for the lender. Therefore, borrowers who take on interest rate risk through an adjustable rate mortgage should have a lower cost of borrowing (holding credit risk constant). A formal

theoretical model and empirical support for the theory can be found in Brueckner (1986), Sa-Aadu and Sirmans (1989), and Pennington-Cross and Ho (2008).

But not all adjustable rate loans are the same. In fact, there is a large array of methods to transfer interest rate risk to the borrower. For example, adjustable rate loan interest rates can reset every month, 6 months, 12 months or even less frequently. The loan can also contain limits on how much the interest rate can go up or down when it resets. Empirical evidence shows that manipulation of these types of characteristics can have large impacts on the risk premium on a loan (Pennington-Cross and Ho, 2008). For example, by shifting from an adjustable rate loan with strong limits on how much the rate can increase versus one with very weak limits on future interest rates, the Annual Percentage Rate (APR) can drop by over 300 basis points.

Anti-predatory lending laws usually only apply if the APR or points and fees are above a trigger. Hence, if it is possible to adjust the APR on an adjustable rate loan by 2 or 3 percentage points by weakening the caps on interest rates, it will be fairly simple to avoid the law's reach for a large number of potential borrowers.

The ability to shift the interest rate risk to the borrower and hence avoid a law will only be important if compliance with the law has some costs. However, compliance may be fairly trivial because lenders can purchase software to screen loans and determine if they comply with the myriad of state and other local restrictions. It is our hypothesis that if regulations restrict the availability of mechanisms that lenders can use to reduce a borrower's monthly payment, lenders will look to an alternative way of reducing that monthly payment. Likely mechanisms include increasing the initial teaser on an adjustable rate loan or lengthening the amortization schedule.

Congress and many states are currently considering various anti-predatory lending bills. In addition, some states with existing anti-predatory lending laws are exploring whether to fine tune their laws through amendments. Knowing whether and how anti-predatory lending laws influence the use of more exotic loan types will be invaluable to policy-makers as they attempt to address abusive lending and mounting foreclosures.

This paper asks a plain question, in light of prior evidence that volume and pricing impacts of the anti-predatory lending laws are fairly moderate: are lenders and borrowers finding substitutes for loans that are now barred by lending laws? More specifically, are they avoiding the laws by writing loans with alternative terms that fall below the triggers of the laws while meeting their own business needs (underwriting and yield requirements)? Or are they simply finding new customers? Indeed, our results indicate that market restrictions may be causing a shift in the type of borrower taking out a subprime loan and the purposes for which the borrower uses the loan.

**A Guide to State Anti-Predatory Lending Laws**

Historically, interest rate caps – also known as usury laws – were a popular way of policing abuses in consumer loans (Peterson, 2004). In recent years, however, as usury laws fell into disfavor, legislators took a new approach to regulating credit. This newer generation of laws eschews interest rate caps in favor of restrictions on certain lending practices and the non-interest terms of loans.

Some states have regulated isolated loan terms as far back as the 1960s. More comprehensive anti-predatory lending laws did not arrive on the scene, however, until the 1990s. Congress led the way by enacting the first modern anti-predatory lending law, the Home Ownership and Equity Protection Act (HOEPA), in 1994. HOEPA, like many of the state anti-predatory lending laws that followed it, singles out "high-cost loans" and strictly limits their terms and practices. For purposes of HOEPA, high-cost loans are defined as loans (12 C.F.R. § 226.32(a)(1), (b)(1)):

> (1) where the annual percentage rate (APR) at consummation exceeds the yield on the comparable Treasury security plus eight percent for first-lien loans or ten percent for junior-lien loans; or
> (2) where the total points and fees exceed the greater of eight percent of the total loan amount or $400 (subject to annual indexing).

These triggers are sufficiently high that HOEPA regulates no more than one percent of subprime home loans (Gramlich, 2007).

Subsequently, a series of states enacted their own comprehensive anti-predatory lending statutes, many of which were patterned after HOEPA.[1] In 1999, North Carolina became the first state to pioneer a state "mini-HOEPA" law. By January 1, 2007, twenty-nine states and the District of Columbia had mini-HOEPA laws[2] and more were on the way.

Because HOEPA applies in all of the states, most state mini-HOEPA laws depart from HOEPA in one way or another. Some mini-HOEPA laws regulate high-cost loans strictly, while others regulate with a light touch. Lower triggers are a feature in many mini-HOEPA laws, but not in all. The enforcement mechanisms in state mini-HOEPA laws also vary in a number of ways. Some state laws restrict enforcement to the government; other state laws also give aggrieved borrowers the right to sue. Among the laws that permit injured borrowers to sue, there are variations as to the proper defendant. Some of these laws only allow borrowers to sue their lender, their broker (if any), and any assignee that is not a holder-in-due course. The more liberal laws also allow borrowers to sue assignees who are holders-in-due course. State laws that authorize borrower lawsuits also differ according to whether they permit double or treble damages or restrict damages to compensatory relief alone.[3]

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[1] Similarly, many states enacted mortgage broker and banker licensing and regulation laws.
[2] Specifically, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio , Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, West Virginia, Wisconsin, Washington, and the District of Columbia.
[3] A handful of cities and counties passed predatory lending ordinances of their own. As a result of state enactments or court decisions, these ordinances either never took effect or only took effect briefly.

Mini-HOEPA laws are not the only type of state anti-predatory lending laws. Some states have older laws that regulate prepayment penalties and/or, sometimes, balloon terms. Of the states with mini-HOEPA laws, thirteen combine an older anti-predatory lending law with a newer mini-HOEPA statute.[4] Other states have an older anti-predatory lending law, but no mini-HOEPA law. By January 1, 2007, only six states – Arizona, Delaware, Montana, North Dakota, Oregon, and South Dakota -- had no laws or regulations regulating prepayment penalties, balloon clauses, or mandatory arbitration clauses in residential mortgages.

**Creating a Legal Index**

Ho and Pennington-Cross (2006) created an index of state laws and municipal ordinances that regulated abusive mortgage lending practices. This index measured the breadth of each law's coverage and the strength of the law's limits or prohibitions on specific lending practices. The information that Ho and Pennington-Cross used to build this index came from a private law firm that had compiled a chart on anti-predatory lending laws. Our index builds on the Ho and Pennington-Cross model by expanding the dimensions of the index and directly evaluating the primary sources of the laws.

We created our index by scoring the laws along ten dimensions as developed in Bostic et al. (2008). Four of these dimensions relate to the types of loans that are covered under the laws (the coverage index), four pertain to the laws' restrictions (the restrictions index), and two reflect features of the laws' enforcement provisions (the enforcement index). Our measures of coverage and restrictions track Ho and Pennington-Cross, but the enforcement index is a new feature. Furthermore, the authors analyzed the actual text of each law in the context of these ten dimensions, resulting in a more nuanced and, we believe, accurate index.

[4] Federal law has preempted portions of these state laws at various times for certain types of lenders and loan products. See Bostic, et al. (2008) for more detail.

The four coverage factors are terms that determine which loans are subject to a state's anti-predatory lending law. Typically, loans that fall within the coverage of the laws are called "high-cost loans." The measures are: (1) the types of loans that the law covers, e.g. whether the law governs open-ended loans; (2) the annual percentage rate (APR) triggers for first lien mortgages; (3) the annual percentage rate (APR) triggers for second lien mortgages; and (4) the points and fee triggers. Laws with triggers that parallel HOEPA have scores of 0 while loans that have broader coverage can receive scores as high as 3 or 4, depending on the factor. For example, if a law uses HOEPA's points and fees triggers, it would receive a score of 0 for points and fees. In contrast, a law that did not have any points and fees trigger would be scored 4 (meaning that all loans are covered regardless of the points and fees). The intermediate scores were assigned based on the size of the points and fees trigger. If a law applied to loans where the points and fees represented 6-8% of the loan amount, the score was a 1 with higher scores given to laws that had lower triggers.

Our restrictions factors were: (1) restrictions on prepayment penalties; (2) limits or bans on loans containing balloon payments; (3) credit counseling provisions; and (4) provisions related to borrowers' access to the courts. Although the various anti-predatory lending laws have a wide menu of restrictions, we selected these four because, after reviewing the statutes, we concluded that they were good proxies for the overall restrictiveness of an anti-predatory lending law. The scores for the restrictions factors are graduated with the most restrictive provisions receiving the highest possible score along each of these dimensions. As an example, a law that did not restrict balloon payments would receive a 0 while a law that banned all balloon payments would be coded 4. The intermediate scores were based on the time period in which balloon payment provisions were allowed, e.g. if the law prohibited balloons in the first ten years of a mortgage, the score would be 2.

With credit counseling and limits on borrowers' access to the courts, we could not rely on numerical provisions, such as percentages or interest rates, to scale the provisions. Instead, we coded the laws based

on our assessment of the possible range and strength of provisions. Thus, laws with no credit counseling requirements received a score of 0 and those with mandatory counseling received the highest score of 2. For the access to the courts factor, the highest score is assigned to laws that prohibit mandatory arbitration while laws that do not restrict arbitration have a score of 0.

The enforcement index measures two features of the laws. The first is the extent to which the owners of mortgage loans can be liable for wrongdoing by loan originators. The second is the methods for enforcing the laws, i.e. who can bring claims under the laws and what type of relief is available. More than 80 percent of the loans potentially covered by these laws are securitized, which means the originators of the loans no longer own the loans. Under the Uniform Commercial Code (UCC), borrowers seeking redress for wrongdoing at loan origination typically can only seek relief from loan originators and not from the current owners of the notes. When the holders of notes are liable even though they are not the loan originators, this is referred to as assignee liability. To the extent that state laws override the UCC to permit borrowers to bring claims against or otherwise obtain relief against the holders of notes, the laws could have an impact on the subprime market. The range of possible scores for assignee liability is 0 to 4. The lowest score is assigned to laws that relieve assignees of liability so long as they did not participate in any wrongdoing and were unaware of any wrongdoing at the time the assignees purchased the loan. The highest score applies to laws that impose liability even on assignees who exercise due diligence. The other enforcement factor—methods for enforcing the laws—has scores ranging from 0 for laws that prohibit lawsuits by anyone other than the state government to 2 for laws that permit consumers to bring lawsuits and recover both compensatory and punitive damages. A more complete description of the index is contained in Table 1.

For each factor, we convert the scores to a 0-1 scale and created indices for coverage, restrictions, and enforcement. To negate the possibility that one index or one factor could be overrepresented, we rescaled

the indices by taking each state's three indices and dividing them by the average score of all states for coverage, restrictions and enforcement. Finally to avoid zeros 1 is added to each index value.

The final step was to combine the three indices for each state. To understand whether interaction of the coverage, restrictions and enforcement factors was important, we create a multiplicative index, by multiplying the three indices for each state ($index^M$). These processes are reflected in Table 2.

**Data**

The data used to examine whether the introduction of an anti-predatory lending law changed the type of loans subprime borrowers used must have substantial detail regarding product types and also should be available over a long time period. The First American Loan Performance Asset Backed Securities (hereafter LP) data meet both of these requirements. The LP data provide a long time series that covers the first mini-HOEPA, which went into effect in 1999, and contains extensive detail on mortgage characteristics such as interest-only, low and no documentation, balloon payments, and teaser strength and length.

However, the LP data are not a perfect data set. While LP claims that the loans cover over 90% of the Asset Backed Securities (ABS) market, which includes both securities marketed as subprime and Alt-A, this coverage has not been consistent through time. In the 1990s the coverage rate was reported by LP to be as low as 40%, increasing steadily until the early 2000s.[5] Therefore, any empirical approach must control for the changing coverage of the LP data. In addition, since the LP data come from security servicer data, this data set does not include the portion of subprime loans that are held in portfolio. Therefore, any systematic difference between loans held in portfolio and those that are securitized may cloud our results.

[5] Company representatives currently claim that market coverage has improved through the purchase of older data making market coverage 85 to 90 percent throughout the 2000s.

The most detailed geographic information provided in the data set is the 5-digit zip code. Since we are interested in geographic variation over time and how that related to anti-predatory law changes, we aggregate the data at the zip code level for the empirical analysis. Table 3 provides the summary statistics of that data for the lower 48 states from January 1999 through July 2007. The data set is an amalgamation of many different types of subprime loans. For example, it includes all different lien positions (ranging from first to fourth), fixed rate, adjustable rate, hybrid rate, interest only, balloon, prepayment penalties, and different types of occupation (owner, investor, and other). Table 3 provides summary statistics calculated at the loan level and before any sampling is done to improve identification issues during estimation. For example, the average loan amount is a little over $175,000, but that number is smaller for fixed rate loans because of the more frequent use of additional liens (e.g., second and third mortgages). Loans with a balloon payment due are the smallest on average and have the highest reported initial interest rate, because of the frequent use of additional liens. The combined Loan-To-Value (LTV) ratio at origination is on average around 80% and the average Fair Isaac or FICO credit score is a little over 645. A minority of loans provide limited or no documentation. These low or no documentation loans are often referred to in the news as "liar loans." Indeed, anecdotal evidence indicates that the reported income on undocumented loans may be substantially above the actual income of the borrower. The majority of interest-only loans provided low or no documentation.

Adjustable rate and hybrid loans have the lowest average credit score of approximately 630. For adjustable rate loans, approximately 74% have a teaser rate (an initial interest rate below the fully adjusted rate[6]) which, on average, is approximately 1.9 percentage points below what the fully adjusted rate would be at the time of origination and expires after 31 months. In addition, almost all the adjustable rate loans were hybrid loans.[7] A hybrid loan acts like a fixed rate loan for a certain amount of time, typically 2 years, and then acts like an adjustable rate loan for the remaining life of the loan. In addition,

[6] The fully adjusted rate is typically calculated by adding the index defined in the loan documents (such as the London Interbank Overnight Rate or LIBOR) to the margin (or spread) defined in the loan documents.
[7] The interest rate on a hybrid loan is fixed initially over a time period that is longer than the reset period.

for the vast majority of adjustable rate loans the lifetime floor for the interest rate is equal to the initial rate. Therefore, payments can only rise and never fall for most subprime adjustable rate loans. Loans with negative amortization are a very small part of the subprime mortgage market.[8]

Figures 1 through 14 provide a graphical presentation of some of the key mortgage characteristics on a map of US counties for the years 1999 and 2006. For example, Figures 1 and 2 report the percent of loans that were Adjustable Rate Mortgages (ARMs) in the years 1999 and 2006. The figures show that ARMs were increasing in popularity everywhere over the 1999-2006 time period, but they were most prevalent in major population centers (West Coast, Florida, Boston to Norfolk along the Atlantic, and Chicago to Minneapolis near Lake Michigan). Figures 3 and 4 provide a similar story, showing the increasing popularity of hybrid loans in the same regions. While the use of low documentation, as shown in Figure 5 and 6, was already established by 1999 in the New York City region, in Florida, and along the California coast, it had spread across most of the nation by 2006. Interest only loans, as shown in Figures 7 and 8, did not become a substantial part of any market until 2006 and primarily were used in California and parts of Arizona, Florida, Minneapolis, and the Washington, DC metropolitan area. The use of balloons, as shown in Figures 9 and 10, also did not become an important part of the market until 2006 and were -most prevalent in expensive locations such as the West Coast, Chicago, Boston, Washington DC and southern Florida. Figures 11 and 12 show that most borrowers had a teaser on their adjustable rate loans in 2006; the size of the teaser was large and spatially invariant.

All of these features (ARM, hybrid, low documentation, interest only, balloons, and teasers) can be used to help get someone into a home when she is having a hard time meeting the traditional underwriting standards, such as requiring the borrower to have enough verifiable income to make loan payments.

[8] Negative amortization allows the borrower to pay no principal and less than the interest due for a set initial period, resulting in a rising mortgage balance over time.

Figures 13 and 14 indicate that the use of prepayment penalties varies substantially along state lines and not by economic or financial demands. For example, the states of North and South Carolina, Georgia, Vermont, New Mexico, Iowa, Illinois, New Jersey and Massachusetts are all clearly identified in the figures as states with fewer prepayment penalties. This spatial variation in the use of prepayment penalties is caused by state level regulations or anti-predatory lending laws, not economic fundamentals (mobility and affordability).

In summary, these statistics indicate that adjustable rate and hybrid loans were first popular in high cost areas such as San Francisco, Washington DC, and New York City, and then became increasingly popular across the US. At the same time other mortgage characteristics, such as low documentation, interest only, and negative amortization, were bundled with the adjustable rate loans. This bundling of alternative mortgage characteristics helped potential homeowners gain access to credit markets, although the meltdown of the subprime mortgage market indicates that borrowers, lenders, and investors must not have fully understood the risks associated with ignoring multiple traditional underwriting standards simultaneously. Over the same time period (1999 through 2006), a growing concern about subprime lending in general, along with the concentration of abuses in the subprime market, led many state legislatures to pass laws that limited the availability of many mortgage features. According to the figures, laws in over 10 states were particularly successful in restricting use of prepayment penalties.

**Empirical Approach and Identification Strategy**

The primary objective of this paper is to determine if the introduction of state anti-predatory lending laws has led to a change in the types of loans subprime borrowers use and the purposes for which those loans are obtained. Using a panel of 5-digit zip code data created from the LP data as described above, we use a differences-in-differences approach which we augment with a geographic based sampling. We test the impact of the law on a series of different mortgage characteristics in separate regressions that use the same control variables and sampling technique.

The existence of different state level legal environments lends itself to empirical study because by moving just a few feet or miles you can cross a state line. Thus, while many important characteristics remain the same, the legal landscape often changes. Holmes (1998) and Pence (2006) take advantage of this spatial discontinuity to help identify the impact of legal restrictions on the labor and housing markets. We can improve on their approach because anti-predatory lending laws have been introduced fairly recently. Therefore, we also control for the passing of time as new legal restrictions are implemented. The locations where the laws are introduced can be thought of as the treatment locations and the locations just across the state border that do not have a law introduced can be thought of as the control locations. The identification strategy is to account for differences in the control and treatment locations and for any differences that occur over time as the law is introduced and comes in effect. This approach could be named differences-in-differences-in-differences.

In particular we use dummy variables to control for location and limit the sample to zip codes whose center is within 10 miles of a control/treatment state border. Each control zip code can only be assigned to the nearest state; therefore, the control sample is defined as zip codes within ten miles of the nearest treatment state border. The treatment sample is defined as all zip codes in the state within 10 miles of a control state without any change in law status for the sample period. This sampling technique helps to control for unobservable characteristics by only including zip codes that are in the same housing and labor markets. Therefore, regardless of which side of the border the house is on, the loan applicant most likely uses the same universe of local and national lenders/brokers to use and experiences the same national and regional economic conditions. The cost associated with this sampling approach is that many observations are dropped from the data and large cities that are not near state borders are not included in the estimation. This will bias the results if the reaction to a state anti-predatory lending law is systematically different in the excluded cities than the included cities and rural areas.

The data are organized into law samples, as explained below. Our sample includes a test of the following 26 jurisdictions that have had a mini-HOEPA law come into effect with reliable data available the year before and after the law comes into effect: California, Colorado, Connecticut, District of Columbia, Florida, Georgia, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nevada, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Utah, and West Virginia. For each of these states, we create a law sample that covers the time period before and after the law comes into effect. We include the zip codes within the state along its borders (the "treatment zip codes") as well as zip codes in neighboring states along the border (the "control zip codes"). However, control zip codes for a neighboring state are only included if its law does not change over the study time period.

For illustration consider the state of California, whose law went into effect on July 1, 2002. First, the sample is limited to zip codes in California and its neighboring states whose center points are within 10 miles of the California state border. The sample is further restricted by excluding all observations 6 months before and after the law comes into effect. The pre-law time period is defined as the monthly zip code observations for the 6 months before the excluded time period. The post-law time period is defined as the next 6 months of observations after the excluded time period. This could be described as a doughnut hole sampling technique. It is designed to remove observations from the data when lenders and borrowers are getting ready for and adjusting to the new law, while still allowing enough observations to provide some precision in the results. Dummy variables are used to identify the pre-law and post-law time periods.

California borders Arizona, Nevada, Oregon, and the Pacific Ocean. Zip codes nearest to the Pacific Ocean are not included in the sample. A bordering state's zip codes are only included if that state did not have a change in anti-predatory lending law status over the pre-law and post-law time periods. In California's case the three bordering states had no change in law status from June 2001 through

December 2002. Therefore, all three bordering state zip codes within 10 miles are included in the California law sample. All these restrictions (time and location) define the California law sample. This process is repeated for the remaining 25 state laws included in the sample.

In the California law sample, the California zip codes can be thought of as treatment locations and the three other states as control locations. To control for unique characteristics of each state a dummy variable or fixed effect is included for each state. This will control for the many factors that make the states different but do not changes over time, similar to the right to work laws studied by Holmes (1998). The location fixed effects in conjunction with pre-law and post-law fixed effects control for the passage of time for the region and the location of each zip code. To identify the impact of the new law in the treatment state we interact the post-law time period dummy with a treatment location dummy. This variable, called *ineffect*, identifies the time and place where the new law is in effect. It is this variable and the measures of law strength that are of primary interest. The regression structure can more formally be written as follows:

$$Mortgage_{it} = \beta^0 + \beta^1 Ineffect_{it} + \sum_j \beta_j^2 Sample_{ji} + \sum_j \beta_j^3 Law_{ji} + \sum_j \sum_k \beta_{jk}^4 NoLaw_{kji} + \sum_j \beta_j^5 Postlaw_{jit} + \varepsilon_{it} \quad (1)$$

Where i, t, j and k index respectively the individual zip codes, the time period, the law samples, and the control locations. *Mortgage* is a variable that represents the prevalence of a specific mortgage characteristic in the zip code. One example would be the percentage of loans in the zip code that have adjustable interest rates. In this case, the model will be estimated in a grouped logit framework. The number of loans with an adjustable rate and the number of all loans would be used to calculate the percentage. Another example would be the average strength of the teaser on adjustable rate loans. The model would then be estimated as an Ordinary Least Squares (OLS) because the variable is not bounded by 0 and 1. *Ineffect* indicates the place and time where the new law is in effect. *Sample* indicates the law sample, which includes both treatment and control variables. North Carolina, the first law to come into

effect, is the excluded law sample. *Law* indicates locations where a law will be in effect. *NoLaw* indicates locations where there is no change in the law over the pre- and post sampling time period for each law sample. For each law sample one *NoLaw* location is excluded from the estimation. *Postlaw* indicates the post-law time period for each law sample. $\varepsilon_{it}$ represents an identically and independently distributed random error term.

**Results**

Tables 4 through 10 provide a summary of the results. Each table includes results for over 20 regressions testing for any changes in any single mortgage characteristic. The laws that come into effect are also described in 7 different ways – one for each table. In the appendix identical results are reported but all zip codes in the control and treatment states are included. The coefficient estimate, the standard error, Wald-chi-square statistic or t-statistic, and an odds ratio or marginal effect are all reported in Table 4. Results can be considered statistically significant if the probability is less than or equal to 0.05 at the 95th percent level. Most of the regressions are estimated using a grouped logit approach because the dependent variable is a limited dependent variable and represents the fraction of loans in the zip code that have that mortgage characteristic. If an odds ratio is reported the model is specified as a grouped logistic and the Wald Chi-square statistic is reported. If the OLS marginal effects are reported the model is estimated using OLS. Odds ratios are simply calculated as $e^{\beta}$ for the estimated coefficient. In Table 4 the odds ratio reflects the increase in the odds of using a particular product type (such as an adjustable rate mortgage) when a law comes into effect. The OLS marginal effects also report the impact on the variable when a law is in effect. For Tables 5 through 10 the odds ratio and OLS marginal effects are scaled by one standard deviation of the law index variable as reported in Table 2.

Table 4 reports the results using the *ineffect* variable. It can be interpreted as the average or typical impact of a law on product use. Tables 5 through 10 test to see if the impact of the law is sensitive to its

component parts. The results are very consistent across the results and different ways of describing the law (see Tables 1 and 2 for details).

Most of the laws are designed to limit the availability of prepayment penalties and balloon payments in a variety of circumstances. The results indicate that the laws have been very successful in doing this. For example, when the typical law comes into effect the odds of a loan having a prepayment penalty decreases by over 50 percent. The impact is about one-half as much for fixed rate loans as compared to adjustable rate loans, but this is not surprising because prepayment penalties are much more prevalent on adjustable rate loans. Tables 5 through 10 show similar results and find that odds ratios decrease more for adjustable rate loans when laws are stronger. For example, a one standard deviation increase in strength usually decreases the odds of using a prepayment penalty by 30 to 40 percent.[9]

The impact of the laws on the use of balloon payments is much more varied. The coefficient estimates on short term balloon payments and balloon loans with adjustable rates are always negative but are very imprecisely measured.[10] However, statistically significant results do indicate that a law reduces the odds of using a loan with a balloon payment due in 10 years by over 60 percent. Increasing the strength of the law strengthens this effect.[11] In total, these results provide evidence that the laws tend to reduce the use of balloons and this impact is strongest for balloon payments due in 10 years.

These results confirm that the laws have been successful in reducing the use of prepayment penalties and some types of balloon payments. Given that the law does reduce the menu of possible loan types, are there other types of loans that are used as potential substitutes? The results find no consistent statistically significant or economically meaningful increased use of adjustable rate, overall balloon payment, interest

[9] These results are very consistent even when the full state sample is used.
[10] The precision is much improved when the full state sample is used instead of the geographic sample, but the weak control variables for these results requires them to be interpreted with skepticism.
[11] The impact of assignee liability is positive but statistically insignificant at the 10 percent level.

only payment, or hybrid loans. The laws are associated with an increase of 2.8 months on average in the length of the teaser time period and no results of economic significance on the size of the teaser.[12] Therefore, we find no evidence supporting the hypothesis that lenders could shift interest rate risk to the borrower to avoid coverage of the law.

In addition, the laws are associated with a modest increase in the level of documentation (6 percent increase in odds) and a modest increase in the use of the loan for owner occupant (11 percent increase in the odds) instead of investor (9 percent decrease in the odds) or second home purposes (9 percent decrease in the odds). From this perspective the typical law is likely fulfilling its intentions by reducing the incidence of a few layers of risk (low documentation and investor and second home purchases).

## Discussion and Conclusion

This research represents an extension of the growing literature seeking to understand how legal structures and restrictions influence the provision of mortgage credit, particularly subprime mortgage credit. Prior research has shown that the existence of laws as well as their scope and restrictiveness influence the flow of subprime credit and to a more limited degree the cost of subprime credit. Very little is known about how lenders and borrowers react to these restrictions as they try to find alternative loan products. The current work takes a first step toward improving our understanding of which loan characteristics and what types of borrowers become more or less common with the enactment of anti-predatory lending laws.

### *National Trends and Product Substitution*

The data show significant variation in the loans that are used, both geographically and over time. We find that over the 1999-2006 time period there is a consistent pattern of product innovation designed to stretch income. This trend began in high cost areas, but by 2006 these products spread into other non-high cost

[12] Many of the teaser size results are statistically significant but the effects are often near just a few basis points.

areas. Thus, the raw data suggest that product substitution is at least initially driven by affordability, but morphs over time into a mechanism to increase the purchasing power for all borrowers and locations.

For example, in 1999 adjustable rate, hybrid, and low documentation loans were more common in high cost markets such as California and the Northeast. In 1999 one can look to issues of affordability as driving these distributions. By 2006 hybrids and adjustable rate loans gained popularity and had spread into the Midwest, including places with a modest cost of living and an ample supply of developable land such as Wisconsin and Illinois.

Another way to increase affordability is to not fully amortize the loan. An interest only loan is an example of a loan that never amortizes[13] and a loan with a balloon payment is an example of a loan that does not fully amortize when the loan comes due. Both of these types of loans represented a fairly limited part of the subprime mortgage market in 1999 but by 2006 they represented a substantial proportion of loans in California and other high cost locations. The layering of these additional features helps to stretch income even further. If not for the collapse of the subprime market, which may be related to the layering of these risk factors, earlier patterns of dispersion would have suggested that interest only loans would gain more popularity in less expensive locations. However, market retrenchment may well stop this process and reverse prior product usage increases.

*Anti-Predatory Lending Laws and Product Substitution*

Over this same time period (1999 - 2006) states were increasingly regulating the provision of mortgage credit through anti-predatory lending laws. A natural question is whether new laws encouraged this shift into more exotic or more affordable loans types or helped to retard the shift. We find strong evidence that many of the laws very effectively reduced the use of prepayment penalties. In fact, the average law

[13] Interest only loans can often include an initial time period of no amortization then switch into a fully amortizing loan at a predetermined date. The time period when amortization begins may be associated with an increase in the monthly payment, much like a hybrid loan with a teaser.

reduced the odds of having a prepayment penalty by over 55 percent. There is consistent but not as strong evidence that the laws also reduced the use of balloon payments, especially 10-year balloons. In addition, laws marginally reduced the use of low documentation and investor purchases. These are all important policy outcomes that indicate that the laws had the intended impact – reducing the use of certain types of loan characteristics. There is no evidence that lenders and borrowers substituted more interest only, balloon, hybrid, or adjustable rate loan features for prepayment penalties or 10-year balloons.

The results also indicate that the type of borrower and the type of loan change when an anti-predatory lending law comes into effect. In particular, the typical law reduces the odds of the loan being made to an investor or for a second home by almost 10 percent while increasing the odds of making the loan for owner occupation by a little over 10%.

Whether the net impact of all these changes in the market place is positive or negative may best be measured by how these loans performed relative to suitable control groups. In addition, the data suggest the possibility of a more focused analysis on the several states that experienced a dramatic decline in the incidence of prepayment penalties from 1999 to 2006, due to the imposition of prepayment restrictions through new anti-predatory lending laws. In the context of substitution, these states offer perhaps the most direct observation and cleanest test of how the loan mix shifts in the wake of legal changes. Future work could explore this possibility further.

**References**

Bostic, Raphael, Kathleen Engel, Patricia McCoy, Anthony Pennington-Cross, and Susan Wachter, 2008, State and Local Anti-predatory Lending Laws: The Effect of Legal Enforcement Mechanisms, *Journal of Economics and Business*, v60, n1-2, 47-66.

Brueckner, Jan, 1986, The Pricing of Interest Rate Caps and Consumer Choice in the Market for Adjustable-Rate Mortgages, *Housing Finance Review* v5, n2, 119-136.

Elliehausen, Gregory, Michael Staten, and Jevgenijs Steinbuks, 2006, The Effects of State Predatory Lending Laws on the Availability of Subprime Mortgage Credit, Credit Research Center Monograph #38, March 2006, http://www.business.gwu.edu/research/centers/fsrp/pdf/M38.pdf.

Gramlich, Edward, 2007, Subprime Mortgages: America's Latest Boom and Bust (Washington, D.C.: The Urban Institute Press.

Ho, Giang, and Anthony Pennington-Cross, 2006, The Impact of Local Predatory Lending Laws on the Flow of Subprime Credit, *Journal of Urban Economics*, v60, n2, 175-212.

Holmes, Thomas, 1998, The Effect of State Policies on the Location of Manufacturing: Evidence from State Borders, *Journal of Political Economy*, v106, n4, 667-705.

Li, Wei, and Keith Ernst, 2007, Do State Predatory Lending Laws Work? A Panel Analysis of Market Reforms, *Housing Policy Debate*, v18, n2, 347-391.

Morgan Stanley, "Channel Check: Surprisingly Strong Subprime Growth, Diversified Financials (August 1, 2002), available at http://butera-andrews.com/legislative-updates/directory/Media/other/MS-SubPrime.pdf.

Pence, Karen, 2006, Foreclosing on Opportunity: State Laws and Mortgage Credit, *Review of Economics and Statistics*, v88, n1, 177-82.

Pennington-Cross, Anthony, and Giang Ho, 2008, Predatory Lending Laws on the Cost of Credit, *Real Estate Economics*, v36, n2, 210-28.

Sa-Aadu, Jay, and C.F. Sirmans, 1989, The Pricing of Adjustable Rate Mortgage Contracts, *Journal of Real Estate Finance and Economics*, v2, n4, 253-266.

**Table 1: Factors for State Anti-Predatory Lending Law Index**

| | |
|---|---|
| *Coverage dimensions* | |
| Loan type | 0 = HOEPA equivalent<br>1 = law does not cover government loans<br>2 = law does not cover reverse and/or open-ended loans<br>3 = law does not cover business and/or construction loans<br>4 = law covers all loans |
| APR trigger for first lien mortgages | 0 = HOEPA equivalent<br>1 = 7-8 % plus the comparable Treasury security yield<br>2 = 6-7 % plus the comparable Treasury security yield<br>3 = no APR trigger |
| APR trigger for subordinate mortgages | 0 = HOEPA equivalent<br>1 = 9-10% plus comparable Treasury security yield<br>2 = 8-9% plus comparable Treasury security yield<br>3 = 6-8% plus comparable Treasury security yield<br>4 = no APR trigger |
| Points and fees trigger | 0 = HOEPA equivalent (8% of loan amount or $400)<br>1 = 6-8 % of the total loan amount<br>2 = 5-6 % of the total loan amount<br>3 = less than 5 % of the total loan amount<br>4 = no points and fees trigger |
| *Restrictions dimensions* | |
| Prepayment penalties | 0 = no prepayment penalty restrictions<br>1 = bans all penalties 60-84 months after origination<br>2 = bans all penalties 36-42 months after origination<br>3 = bans all penalties 24 months after origination<br>4 = bans all prepayment penalties |
| Balloon payments | 0 = no restriction<br>1 = no balloons allowed in first 7 years of loan<br>2 = no balloons allowed in first 10 years of loan<br>3 = no balloons allowed after 10 or more years of loan<br>4 = no balloons allowed |
| Credit counseling requirements | 0 = credit counseling not required<br>1 = credit counseling recommended<br>2 = credit counseling is required |
| Limits on judicial relief/ mandatory arbitration | 0 = does not prohibit restrictions on judicial relief<br>1 = limits restrictions on judicial relief<br>2 = prohibits restrictions on judicial relief |
| *Enforcement mechanisms* | |
| Assignee liability | 0 = no assignee liability for holders in due course<br>1 = only relief against assignees is defensive<br>2 = assignee liability only if no due diligence<br>3 = assignees subject to limited claims and defenses<br>4 = assignees are liable even if they exercise due diligence |
| Enforcement against originators | 0 = state government enforcement only<br>1 = borrower recovery limited to compensatory relief<br>2 = borrower relief compensatory and punitive |

**Table 2: State Anti-Predatory Lending Laws**

| State | Coverage | Restrictions | Enforcement | Index$^{M}$ |
|---|---|---|---|---|
| Alabama | 1.00 | 1.00 | 1.00 | 1.00 |
| Alaska | 1.00 | 1.00 | 1.00 | 1.00 |
| Arizona | 1.00 | 1.00 | 1.00 | 1.00 |
| Arkansas | 2.72 | 3.73 | 3.11 | 31.58 |
| California | 3.15 | 2.36 | 2.41 | 17.95 |
| Colorado | 1.43 | 2.64 | 3.11 | 11.73 |
| Connecticut | 1.86 | 2.91 | 3.11 | 16.85 |
| Delaware | 1.00 | 1.00 | 1.00 | 1.00 |
| District of Columbia | 4.74 | 2.91 | 3.11 | 42.85 |
| Florida | 1.00 | 2.64 | 3.11 | 8.20 |
| Georgia | 2.72 | 4.00 | 3.11 | 33.89 |
| Hawaii | 1.00 | 1.00 | 1.00 | 1.00 |
| Idaho | 1.00 | 1.00 | 1.00 | 1.00 |
| Illinois | 4.74 | 2.91 | 3.46 | 47.69 |
| Indiana | 2.29 | 4.00 | 3.46 | 31.75 |
| Iowa | 1.00 | 1.00 | 1.00 | 1.00 |
| Kansas | 1.00 | 1.00 | 1.00 | 1.00 |
| Kentucky | 1.86 | 3.18 | 3.81 | 22.59 |
| Louisiana | 1.00 | 1.00 | 1.00 | 1.00 |
| Maine | 1.00 | 1.55 | 3.46 | 5.35 |
| Maryland | 2.44 | 1.55 | 2.41 | 9.06 |
| Massachusetts | 3.15 | 4.82 | 3.46 | 52.63 |
| Michigan | 6.17 | 1.82 | 1.00 | 11.22 |
| Minnesota | 7.46 | 1.55 | 1.00 | 11.54 |
| Mississippi | 1.00 | 1.00 | 1.00 | 1.00 |
| Missouri | 1.00 | 1.00 | 1.00 | 1.00 |
| Montana | 1.00 | 1.00 | 1.00 | 1.00 |
| Nebraska | 1.00 | 1.00 | 1.00 | 1.00 |
| Nevada | 1.00 | 1.00 | 3.81 | 3.81 |
| New Hampshire | 1.00 | 1.00 | 1.00 | 1.00 |
| New Jersey | 3.15 | 3.73 | 3.46 | 40.71 |
| New Mexico | 5.17 | 4.27 | 3.46 | 76.42 |
| New York | 3.15 | 2.91 | 2.76 | 25.32 |
| North Carolina | 2.72 | 4.27 | 2.41 | 28.01 |
| North Dakota | 1.00 | 1.00 | 1.00 | 1.00 |
| Ohio | 1.00 | 2.36 | 3.11 | 7.35 |
| Oklahoma | 1.00 | 3.18 | 3.11 | 9.90 |
| Oregon | 1.00 | 1.00 | 1.00 | 1.00 |
| Pennsylvania | 1.00 | 2.36 | 3.11 | 7.35 |
| Rhode Island | 1.00 | 1.00 | 1.00 | 1.00 |
| South Carolina | 1.86 | 3.18 | 2.76 | 16.34 |
| South Dakota | 1.00 | 1.00 | 1.00 | 1.00 |
| Tennessee | 1.00 | 1.00 | 1.00 | 1.00 |
| Texas | 1.86 | 2.36 | 3.11 | 13.69 |
| Utah | 2.72 | 3.18 | 1.00 | 8.67 |
| Vermont | 1.00 | 1.00 | 1.00 | 1.00 |
| Virginia | 1.00 | 1.00 | 1.00 | 1.00 |
| Washington | 1.00 | 1.00 | 1.00 | 1.00 |
| West Virginia | 6.60 | 2.64 | 2.76 | 48.02 |
| Wisconsin | 1.00 | 1.00 | 1.00 | 1.00 |
| Wyoming | 1.00 | 1.00 | 1.00 | 1.00 |
| Average | 2.00 | 2.00 | 2.00 | 13.03 |
| Min | 1.00 | 1.00 | 1.00 | 1.00 |
| Max | 7.46 | 4.82 | 3.81 | 76.42 |
| Standard Deviation | 1.62 | 1.17 | 1.10 | 17.36 |

If all columns are 1 then no mini-HOEPA law is identified.

**Table 3: Summary Statistics**

| Mortgage Information | All Loans | Fixed Rate | Adjustable Rate | Interest Only | Balloon Payment | Hybrid |
|---|---|---|---|---|---|---|
| Loan Amount ($s) | $177,792 | $137,976 | $211,981 | $288,109 | $124,123 | $211,223 |
| Term (months) | 332.3 | 300.4 | 359.7 | 355.6 | 238.9 | 360.4 |
| Initial Interest Rate | 8.13 | 8.64 | 7.69 | 6.66 | 9.56 | 7.71 |
| LTV @ Origination (%) | 81.6 | 83.0 | 80.5 | 78.9 | 89.6 | 80.5 |
| FICO @ Origination | 647.3 | 666.1 | 631.4 | 689.0 | 653.8 | 630.0 |
| Prepay Penalty Flag (% of loans) | 55.7% | 43.9% | 65.9% | 49.5% | 54.5% | 66.3% |
| Prepay Penalty Length (months) | 30.5 | 36.0 | 27.4 | 28.6 | 29.9 | 27.4 |
| Purchase (% of loans) | 45.0% | 43.5% | 46.4% | 60.3% | 59.5% | 46.2% |
| Owner Occupied (% of loans) | 87.5% | 85.8% | 88.9% | 84.3% | 92.4% | 89.2% |
| Investor (% of loans) | 10.6% | 12.3% | 9.2% | 12.4% | 5.8% | 9.0% |
| Full Documentation (% of loans) | 56.6% | 56.3% | 56.9% | 42.5% | 54.3% | 57.4% |
| Low Documentation (% of loans) | 40.5% | 39.7% | 41.2% | 53.8% | 43.3% | 40.7% |
| No Documentation (% of loans) | 1.9% | 2.4% | 1.4% | 3.2% | 1.1% | 1.4% |
| Negative Amortization (% of loans) | 0.44% | | 0.82% | | | 0.51% |
| First Lien (% of loans) | 84.5% | 67.3% | 99.2% | 95.9% | 42.0% | 99.8% |
| FRM all (% of loans) | 46.2% | | | 17.7% | 72.3% | |
| ARM all (% of loans) | 53.8% | | | 82.3% | 27.7% | |
| IO (% of loans) | 17.0% | 6.5% | 25.9% | | 0.0% | 25.2% |
| IO ARM (% of loans) | 14.0% | | 25.9% | 82.3% | 0.0% | 25.2% |
| Balloon (% of loans) | 11.7% | 18.4% | 6.1% | 0.0% | | 6.2% |
| Balloon ARM (% of Balloon loans) | 27.7% | | | | 27.7% | |
| Margin (ARM loans in percentage points) | 2.9 | | 5.4 | | | 5.5 |
| Teaser Flag (% of ARM loans) | 74% | | 74% | | | 74% |
| Teaser Size (ARM loans in percentage points) | 1.9 | | 1.9 | | | 2.0 |
| Teaser Length (ARM loans in months) | 30.5 | | 30.5 | | | 31.2 |
| Hybrid Flag (% of ARM loans) | 97.0% | | 97.0% | | | 100.0% |
| Rate Floor = Initial Rate (% of ARM loans with Teasers) | 94.9% | | 94.9% | | | 95.0% |

These statistics represent values calculated using loan level data for the lower 48 states. January 1999 through July 2007.

**Table 4: In Effect Results**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio* | *OLS Marginal Effects* |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | -0.03 | 0.02 | 3.2 | 0.07 | 0.97 | . |
| Balloon Payment | 0.02 | 0.04 | 0.4 | 0.55 | 1.02 | . |
| Interest Only Payment | -0.03 | 0.06 | 0.3 | 0.56 | 0.97 | . |
| Hybrid Rate | -0.01 | 0.08 | 0.0 | 0.90 | 0.99 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -10.35 | 57.93 | 0.0 | 0.86 | 0.00 | . |
| 7-Year Balloons | -10.48 | 71.18 | 0.0 | 0.88 | 0.00 | . |
| 10-Year Balloons | -1.06 | 0.40 | 6.9 | 0.01 | 0.35 | . |
| 15 to 30-Year Balloons | 0.04 | 0.04 | 0.8 | 0.38 | 1.04 | . |
| ARM Balloons | -8.34 | 32.38 | 0.1 | 0.80 | 0.00 | . |
| **Documentation** | | | | | | |
| Full Documentation | 0.06 | 0.02 | 11.4 | 0.00 | 1.06 | . |
| Low Documentation | -0.04 | 0.02 | 4.4 | 0.04 | 0.96 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | 1.40 | 0.83 | 2.8 | 0.09 | 4.06 | . |
| **Occupancy** | | | | | | |
| Owner | 0.10 | 0.03 | 16.3 | <.0001 | 1.11 | . |
| Second Home | -0.10 | 0.10 | 0.9 | 0.33 | 0.91 | . |
| Investor | -0.10 | 0.03 | 14.1 | 0.00 | 0.91 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.85 | 0.02 | 1772.3 | <.0001 | 0.43 | . |
| Fixed Rate Loans | -0.29 | 0.03 | 84.8 | <.0001 | 0.75 | . |
| Adjustable Rate Loans | -0.86 | 0.02 | 1351.8 | <.0001 | 0.42 | . |
| Hybrid Rate Loans | -0.85 | 0.02 | 1307.4 | <.0001 | 0.43 | . |
| **Teasers** | | | | | | |
| Teaser Length | 2.83 | 0.19 | 15.0 | <.0001 | . | 2.83 |
| ARM Teaser Size | 0.01 | 0.01 | 1.5 | 0.14 | . | 0.01 |
| Hybrid Teaser Size | 0.00 | 0.01 | -0.3 | 0.75 | . | 0.00 |
| IO ARM Teaser Size | 0.01 | 0.01 | 2.8 | 0.01 | . | 0.01 |

Each row represents the results for a separate regression using indicated sample and Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in a ordinary least squares specification and the t-statistic is reported. OLS marginal effects and the odds ratio report the effect of a change from 0 to 1 (or the law coming into effect) on the dependent or LHS variable.

**Table 5: Multiplicative Index Results**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | 0.00 | 0.00 | 1.9 | 0.17 | 0.99 | . |
| Balloon Payment | 0.00 | 0.00 | 0.0 | 0.96 | 1.00 | . |
| Interest Only Payment | 0.00 | 0.00 | 0.0 | 1.00 | 1.00 | . |
| Hybrid Rate | 0.00 | 0.00 | 0.4 | 0.52 | 1.02 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -0.28 | 1.75 | 0.0 | 0.87 | 0.01 | . |
| 7-Year Balloons | -0.83 | 3.72 | 0.0 | 0.82 | 0.00 | . |
| 10-Year Balloons | -0.04 | 0.01 | 6.0 | 0.01 | 0.54 | . |
| 15 to 30-Year Balloons | 0.00 | 0.00 | 0.9 | 0.36 | 0.98 | . |
| ARM Balloons | -0.69 | 1.36 | 0.3 | 0.61 | 0.00 | . |
| **Documentation** | | | | | | |
| Full Documentation | 0.00 | 0.00 | 11.6 | 0.00 | 1.03 | . |
| Low Documentation | 0.00 | 0.00 | 3.1 | 0.08 | 0.99 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | 0.03 | 0.02 | 2.9 | 0.09 | 1.73 | . |
| **Occupancy** | | | | | | |
| Owner | 0.00 | 0.00 | 13.3 | 0.00 | 1.04 | . |
| Second Home | 0.00 | 0.00 | 2.0 | 0.16 | 0.93 | . |
| Investor | 0.00 | 0.00 | 10.6 | 0.00 | 0.96 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.03 | 0.00 | 2933.7 | <.0001 | 0.60 | . |
| Fixed Rate Loans | -0.01 | 0.00 | 245.8 | <.0001 | 0.77 | . |
| Adjustable Rate Loans | -0.03 | 0.00 | 1972.7 | <.0001 | 0.63 | . |
| Hybrid Rate Loans | -0.03 | 0.00 | 1905.8 | <.0001 | 0.63 | . |
| **Teasers** | | | | | | |
| Teaser Length | 0.11 | 0.01 | 19.7 | <.0001 | . | 1.93 |
| ARM Teaser Size | 0.00 | 0.00 | 2.9 | 0.00 | . | 0.01 |
| Hybrid Teaser Size | 0.00 | 0.00 | 0.8 | 0.40 | . | 0.00 |
| IO ARM Teaser Size | 0.00 | 0.00 | 5.1 | <.0001 | . | 0.01 |

Each row represents the results for a separate regression using indicated sample and Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.

* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (17.36) on the dependent or LHS variable.

**Table 6: Coverage Index Results**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | -0.01 | 0.01 | 1.1 | 0.29 | 0.99 | . |
| Balloon Payment | -0.01 | 0.01 | 0.5 | 0.47 | 0.99 | . |
| Interest Only Payment | -0.01 | 0.02 | 0.1 | 0.74 | 0.99 | . |
| Hybrid Rate | 0.01 | 0.02 | 0.2 | 0.65 | 1.02 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -3.01 | 17.89 | 0.0 | 0.87 | 0.01 | . |
| 7-Year Balloons | -3.93 | 29.20 | 0.0 | 0.89 | 0.00 | . |
| 10-Year Balloons | -0.45 | 0.16 | 7.9 | 0.00 | 0.48 | . |
| 15 to 30-Year Balloons | -0.02 | 0.01 | 2.4 | 0.13 | 0.97 | . |
| ARM Balloons | -5.70 | 13.72 | 0.2 | 0.68 | 0.00 | . |
| **Documentation** | | | | | | |
| Full Documentation | 0.02 | 0.01 | 11.0 | 0.00 | 1.03 | . |
| Low Documentation | -0.01 | 0.01 | 3.6 | 0.06 | 0.98 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | 0.44 | 0.26 | 2.8 | 0.09 | 2.05 | . |
| **Occupancy** | | | | | | |
| Owner | 0.03 | 0.01 | 15.1 | <.0001 | 1.05 | . |
| Second Home | -0.04 | 0.03 | 1.5 | 0.23 | 0.94 | . |
| Investor | -0.03 | 0.01 | 13.0 | 0.00 | 0.96 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.25 | 0.01 | 1762.2 | <.0001 | 0.67 | . |
| Fixed Rate Loans | -0.10 | 0.01 | 110.9 | <.0001 | 0.85 | . |
| Adjustable Rate Loans | -0.23 | 0.01 | 1291.6 | <.0001 | 0.68 | . |
| Hybrid Rate Loans | -0.23 | 0.01 | 1246.0 | <.0001 | 0.69 | . |
| **Teasers** | | | | | | |
| Teaser Length | 0.68 | 0.05 | 13.1 | <.0001 | . | 1.11 |
| ARM Teaser Size | 0.01 | 0.00 | 2.6 | 0.01 | . | 0.01 |
| Hybrid Teaser Size | 0.00 | 0.00 | 0.6 | 0.57 | . | 0.00 |
| IO ARM Teaser Size | 0.00 | 0.00 | 3.3 | 0.00 | . | 0.01 |

Each row represents the results for a separate regression using indicated sample and or Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.

* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (1.62) on the dependent or LHS variable.

**Table 7: Restrictions Index Results**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | -0.01 | 0.00 | 3.9 | 0.05 | 0.99 | . |
| Balloon Payment | 0.02 | 0.01 | 2.0 | 0.15 | 1.02 | . |
| Interest Only Payment | 0.00 | 0.01 | 0.1 | 0.77 | 1.00 | . |
| Hybrid Rate | 0.00 | 0.02 | 0.0 | 0.90 | 1.00 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -3.40 | 18.47 | 0.0 | 0.85 | 0.02 | . |
| 7-Year Balloons | -5.10 | 26.64 | 0.0 | 0.85 | 0.00 | . |
| 10-Year Balloons | -0.31 | 0.11 | 7.7 | 0.01 | 0.69 | . |
| 15 to 30-Year Balloons | 0.02 | 0.01 | 2.2 | 0.14 | 1.02 | . |
| ARM Balloons | -2.91 | 10.38 | 0.1 | 0.78 | 0.03 | . |
| **Documentation** | | | | | | |
| Full Documentation | 0.02 | 0.01 | 13.3 | 0.00 | 1.02 | . |
| Low Documentation | -0.01 | 0.01 | 4.7 | 0.03 | 0.99 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | 0.35 | 0.20 | 2.9 | 0.09 | 1.50 | . |
| **Occupancy** | | | | | | |
| Owner | 0.03 | 0.01 | 13.8 | 0.00 | 1.03 | . |
| Second Home | -0.03 | 0.03 | 1.1 | 0.30 | 0.96 | . |
| Investor | -0.03 | 0.01 | 11.5 | 0.00 | 0.97 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.31 | 0.01 | 2718.9 | <.0001 | 0.69 | . |
| Fixed Rate Loans | -0.13 | 0.01 | 181.0 | <.0001 | 0.86 | . |
| Adjustable Rate Loans | -0.28 | 0.01 | 1787.8 | <.0001 | 0.72 | . |
| Hybrid Rate Loans | -0.28 | 0.01 | 1733.7 | <.0001 | 0.72 | . |
| **Teasers** | | | | | | |
| Teaser Length | 1.03 | 0.06 | 18.0 | <.0001 | . | 1.20 |
| ARM Teaser Size | 0.00 | 0.00 | 1.8 | 0.08 | . | 0.01 |
| Hybrid Teaser Size | 0.00 | 0.00 | 0.0 | 1.00 | . | 0.00 |
| IO ARM Teaser Size | 0.01 | 0.00 | 3.5 | 0.00 | . | 0.01 |

Each row represents the results for a separate regression using indicated sample and Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.

* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (1.17) on the dependent or LHS variable.

**Table 8: Enforcement Index Results**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | -0.01 | 0.01 | 2.9 | 0.09 | 0.99 | . |
| Balloon Payment | 0.01 | 0.01 | 0.6 | 0.44 | 1.01 | . |
| Interest Only Payment | -0.01 | 0.02 | 0.1 | 0.72 | 0.99 | . |
| Hybrid Rate | 0.00 | 0.03 | 0.0 | 0.85 | 1.01 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -3.30 | 18.89 | 0.0 | 0.86 | 0.03 | . |
| 7-Year Balloons | -4.07 | 25.43 | 0.0 | 0.87 | 0.01 | . |
| 10-Year Balloons | -0.24 | 0.13 | 3.2 | 0.07 | 0.77 | . |
| 15 to 30-Year Balloons | 0.01 | 0.01 | 1.0 | 0.33 | 1.01 | . |
| ARM Balloons | -3.13 | 10.98 | 0.1 | 0.78 | 0.03 | . |
| **Documentation** | | | | | | |
| Full Documentation | 0.02 | 0.01 | 9.7 | 0.00 | 1.02 | . |
| Low Documentation | -0.01 | 0.01 | 3.0 | 0.08 | 0.99 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | 0.40 | 0.24 | 2.8 | 0.09 | 1.56 | . |
| **Occupancy** | | | | | | |
| Owner | 0.03 | 0.01 | 14.6 | 0.00 | 1.03 | . |
| Second Home | -0.03 | 0.03 | 1.0 | 0.31 | 0.96 | . |
| Investor | -0.03 | 0.01 | 12.0 | 0.00 | 0.97 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.28 | 0.01 | 1982.8 | <.0001 | 0.74 | . |
| Fixed Rate Loans | -0.10 | 0.01 | 104.1 | <.0001 | 0.90 | . |
| Adjustable Rate Loans | -0.27 | 0.01 | 1476.2 | <.0001 | 0.74 | . |
| Hybrid Rate Loans | -0.27 | 0.01 | 1423.7 | <.0001 | 0.74 | . |
| **Teasers** | | | | | | |
| Teaser Length | 1.03 | 0.06 | 17.5 | <.0001 | . | 1.14 |
| ARM Teaser Size | 0.00 | 0.00 | 1.5 | 0.13 | . | 0.00 |
| Hybrid Teaser Size | 0.00 | 0.00 | -0.2 | 0.84 | . | 0.00 |
| IO ARM Teaser Size | 0.01 | 0.00 | 3.5 | 0.00 | . | 0.01 |

Each row represents the results for a separate regression using indicated sample and Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.

* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (1.1) on the dependent or LHS variable.

**Table 9: Remedies Index Results**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | -0.03 | 0.02 | 3.6 | 0.06 | 0.98 | . |
| Balloon Payment | 0.02 | 0.04 | 0.3 | 0.57 | 1.01 | . |
| Interest Only Payment | -0.04 | 0.06 | 0.4 | 0.51 | 0.98 | . |
| Hybrid Rate | 0.04 | 0.09 | 0.2 | 0.68 | 1.02 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -10.42 | 59.85 | 0.0 | 0.86 | 0.01 | . |
| 7-Year Balloons | -10.64 | 77.25 | 0.0 | 0.89 | 0.01 | . |
| 10-Year Balloons | -1.03 | 0.41 | 6.2 | 0.01 | 0.60 | . |
| 15 to 30-Year Balloons | 0.04 | 0.04 | 0.9 | 0.34 | 1.02 | . |
| ARM Balloons | -12.86 | 39.24 | 0.1 | 0.74 | 0.00 | . |
| **Documentation** | | | | | | |
| Full Documentation | 0.07 | 0.02 | 12.4 | 0.00 | 1.03 | . |
| Low Documentation | -0.04 | 0.02 | 4.4 | 0.03 | 0.98 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | 1.40 | 0.83 | 2.8 | 0.09 | 1.99 | . |
| **Occupancy** | | | | | | |
| Owner | 0.10 | 0.03 | 14.5 | 0.00 | 1.05 | . |
| Second Home | -0.14 | 0.10 | 1.9 | 0.17 | 0.93 | . |
| Investor | -0.09 | 0.03 | 11.6 | 0.00 | 0.96 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.97 | 0.02 | 2080.2 | <.0001 | 0.62 | . |
| Fixed Rate Loans | -0.36 | 0.03 | 116.6 | <.0001 | 0.84 | . |
| Adjustable Rate Loans | -0.96 | 0.02 | 1527.2 | <.0001 | 0.63 | . |
| Hybrid Rate Loans | -0.95 | 0.02 | 1471.4 | <.0001 | 0.63 | . |
| **Teasers** | | | | | | |
| Teaser Length | 3.47 | 0.20 | 17.3 | <.0001 | . | 1.70 |
| ARM Teaser Size | 0.01 | 0.01 | 1.3 | 0.20 | . | 0.01 |
| Hybrid Teaser Size | 0.00 | 0.01 | -0.3 | 0.74 | . | 0.00 |
| IO ARM Teaser Size | 0.02 | 0.01 | 3.0 | 0.00 | . | 0.01 |

Remedies ranges from 0 to 1. Each row represents the results for a separate regression using indicated sample and Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.
* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (0.49) on the dependent or LHS variable.

**Table 10: Assignee Liability Index Results**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | -0.03 | 0.02 | 1.5 | 0.21 | 0.99 | . |
| Balloon Payment | 0.07 | 0.06 | 1.2 | 0.27 | 1.02 | . |
| Interest Only Payment | 0.02 | 0.08 | 0.1 | 0.76 | 1.01 | . |
| Hybrid Rate | 0.02 | 0.13 | 0.0 | 0.86 | 1.01 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -13.97 | 86.02 | 0.0 | 0.87 | 0.01 | . |
| 7-Year Balloons | -12.86 | 110.90 | 0.0 | 0.91 | 0.01 | . |
| 10-Year Balloons | 1.10 | 0.73 | 2.3 | 0.13 | 1.48 | . |
| 15 to 30-Year Balloons | 0.06 | 0.06 | 0.9 | 0.35 | 1.02 | . |
| ARM Balloons | -8.03 | 43.67 | 0.0 | 0.85 | 0.06 | . |
| **Documentation** | | | | | | |
| Full Documentation | 0.05 | 0.03 | 4.2 | 0.04 | 1.02 | . |
| Low Documentation | -0.02 | 0.03 | 0.6 | 0.45 | 0.99 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | 1.87 | 1.11 | 2.8 | 0.09 | 1.96 | . |
| **Occupancy** | | | | | | |
| Owner | 0.12 | 0.04 | 11.6 | 0.00 | 1.04 | . |
| Second Home | -0.06 | 0.15 | 0.2 | 0.68 | 0.98 | . |
| Investor | -0.11 | 0.04 | 9.6 | 0.00 | 0.96 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -1.19 | 0.03 | 1677.2 | <.0001 | 0.65 | . |
| Fixed Rate Loans | -0.42 | 0.05 | 85.4 | <.0001 | 0.86 | . |
| Adjustable Rate Loans | -1.20 | 0.03 | 1331.3 | <.0001 | 0.65 | . |
| Hybrid Rate Loans | -1.19 | 0.03 | 1284.4 | <.0001 | 0.65 | . |
| **Teasers** | | | | | | |
| Teaser Length | -1.24 | 0.33 | -3.8 | 0.00 | . | -0.45 |
| ARM Teaser Size | 0.02 | 0.01 | 1.7 | 0.08 | . | 0.01 |
| Hybrid Teaser Size | 0.00 | 0.01 | 0.1 | 0.90 | . | 0.00 |
| IO ARM Teaser Size | 0.03 | 0.01 | 4.3 | <.0001 | . | 0.01 |

Assignee Liability ranges from 0 to 1. Each row represents the results for a separate regression using indicated sample and left hand side variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.
* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (0.36) on the dependent or Left Hand Side (LHS) variable.

Figure 1: 1999 - Percent of All Loans –Adjustable Rate

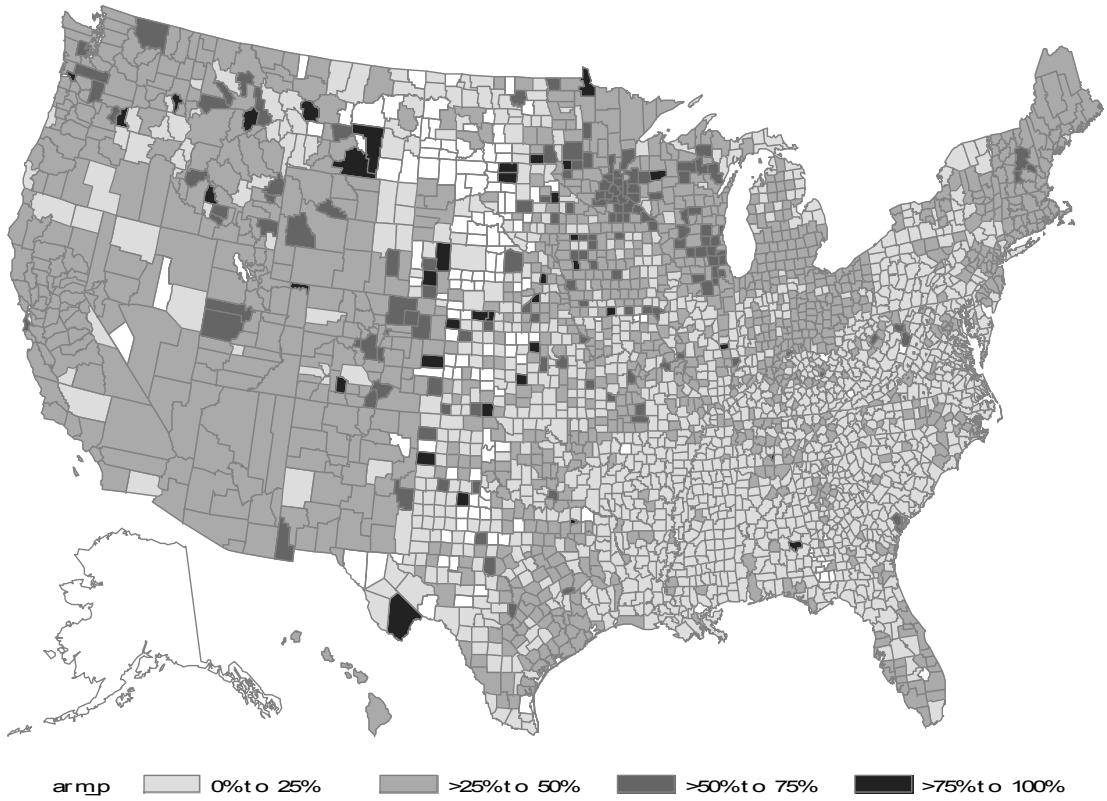



Figure 2: 2006 - Percent of All Loans – Adjustable Rate

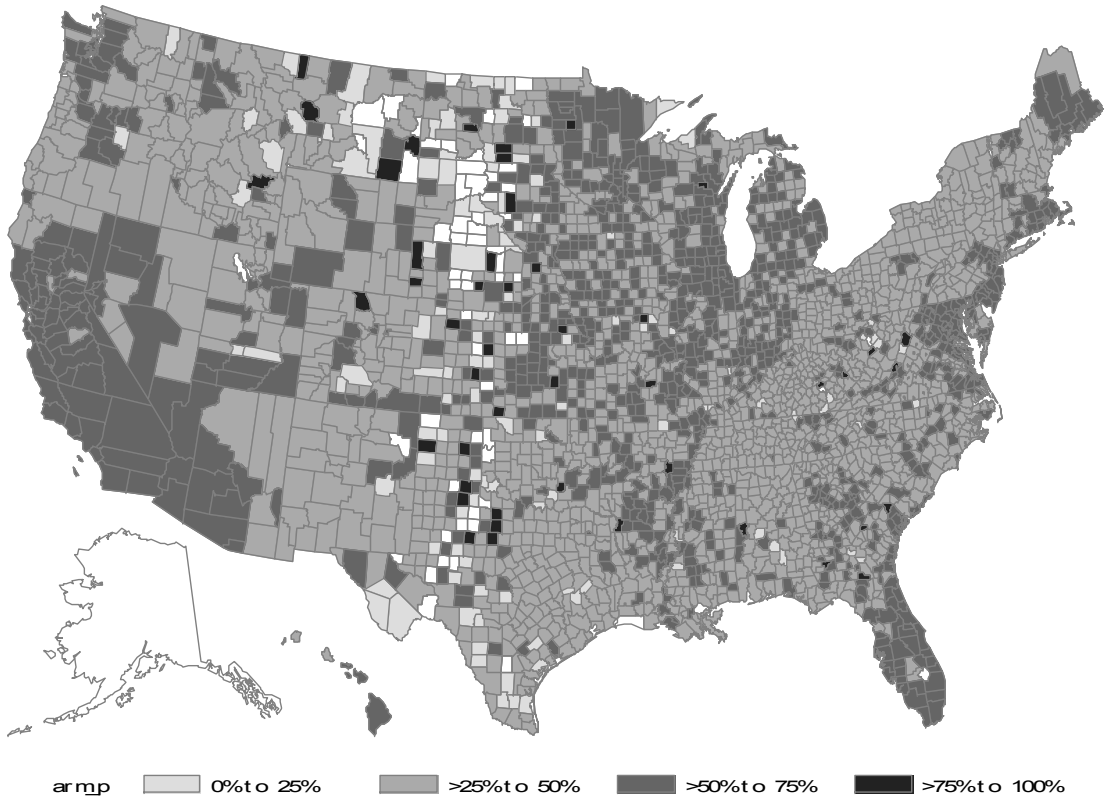


Figure 3: 1999 - Percent of All Loans – Hybrid Rate

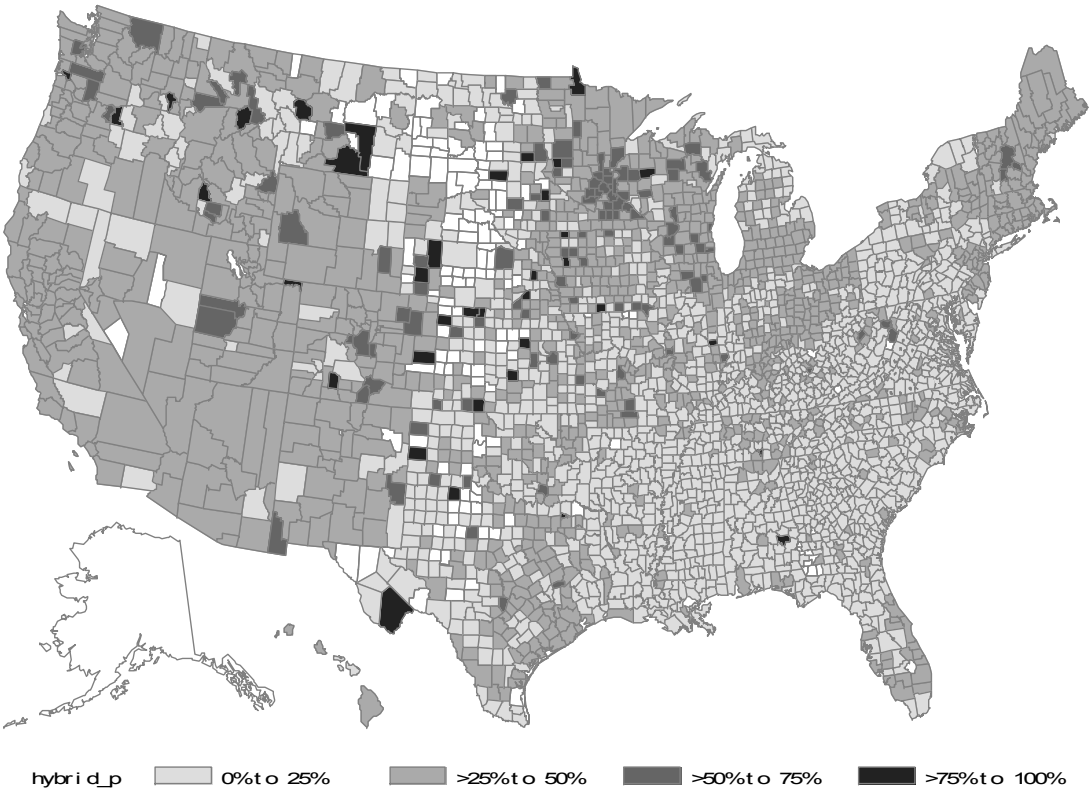



Figure 4: 2006 - Percent of All Loans – Hybrid Rate

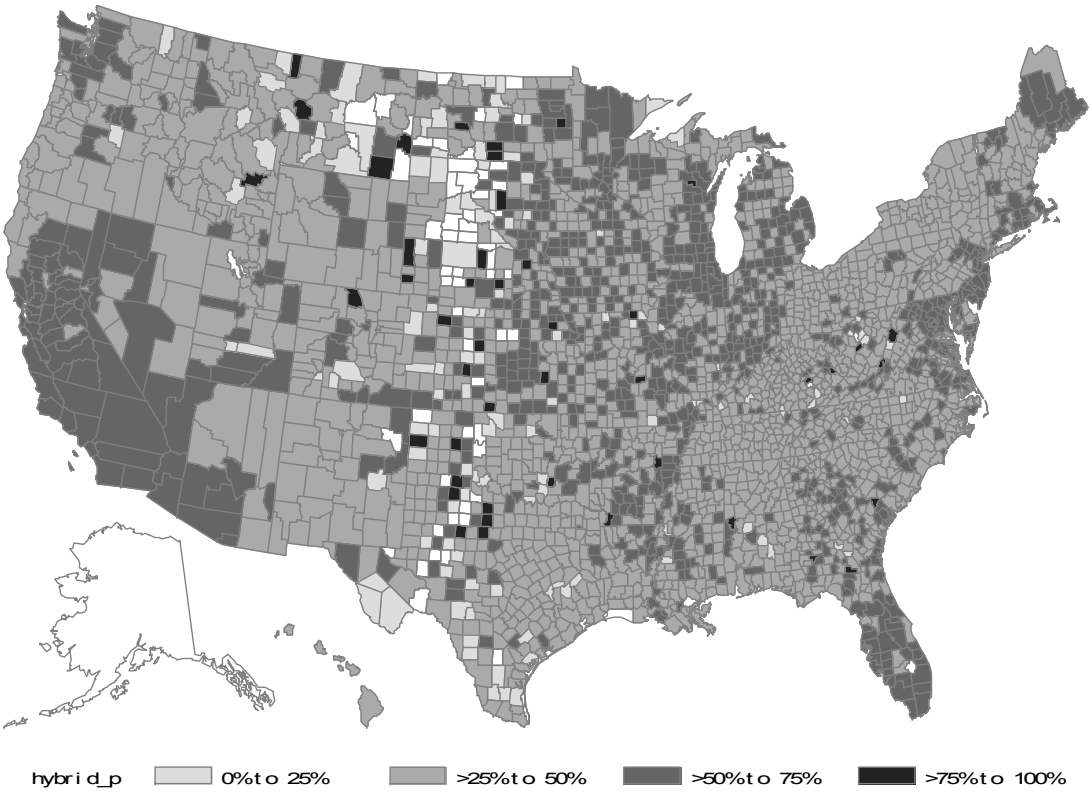


Figure 5: 1999 - Percent of All Loans – Low Documentation

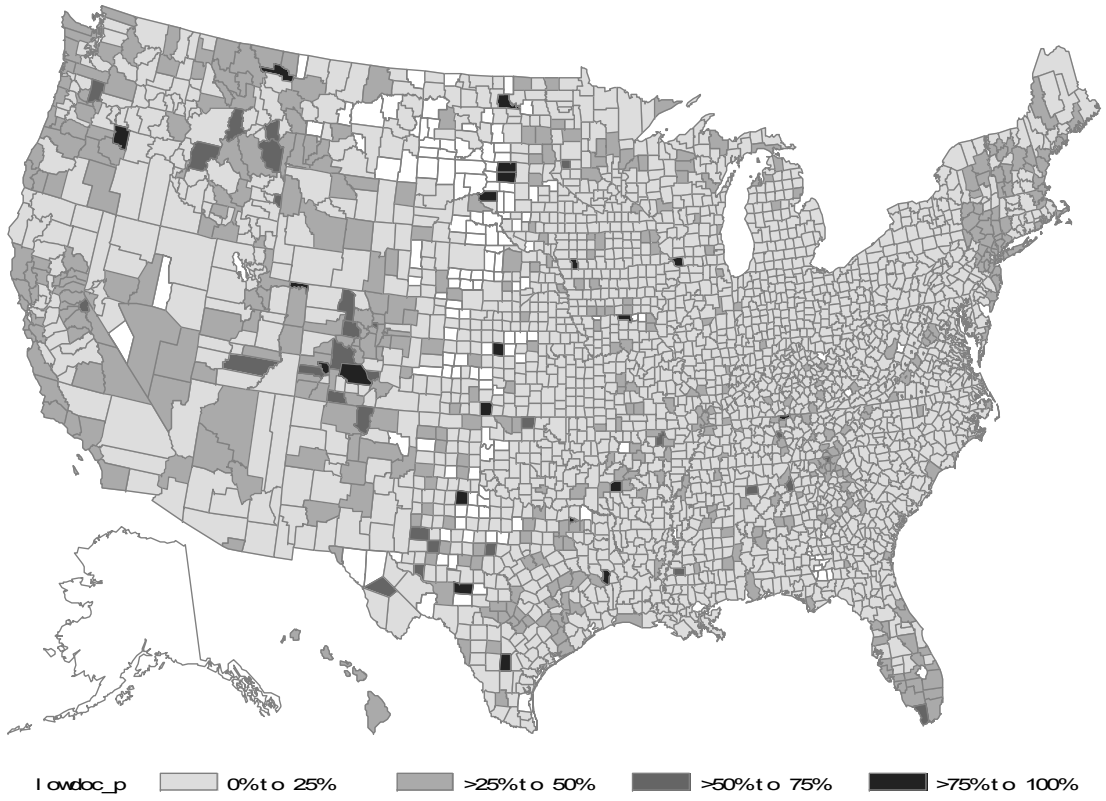



Figure 6: 2006 - Percent of All Loans – Low Documentation

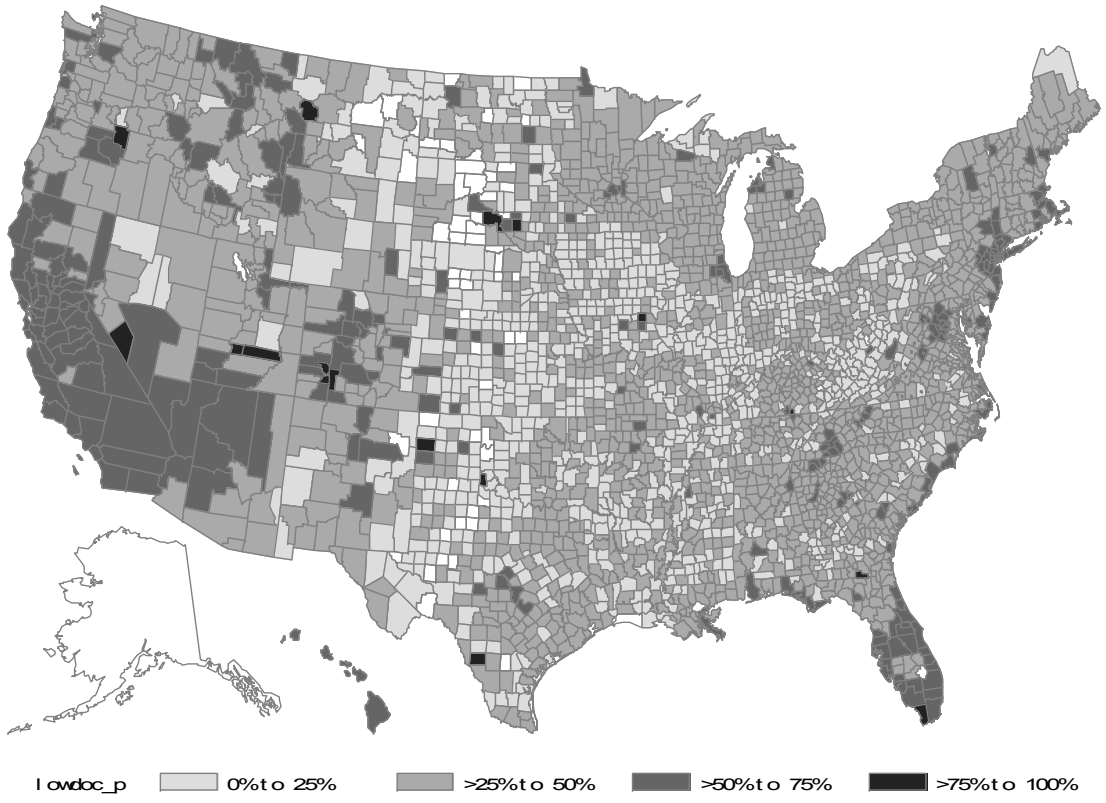


Figure 7: 1999 - Percent of All Loans – Interest Only

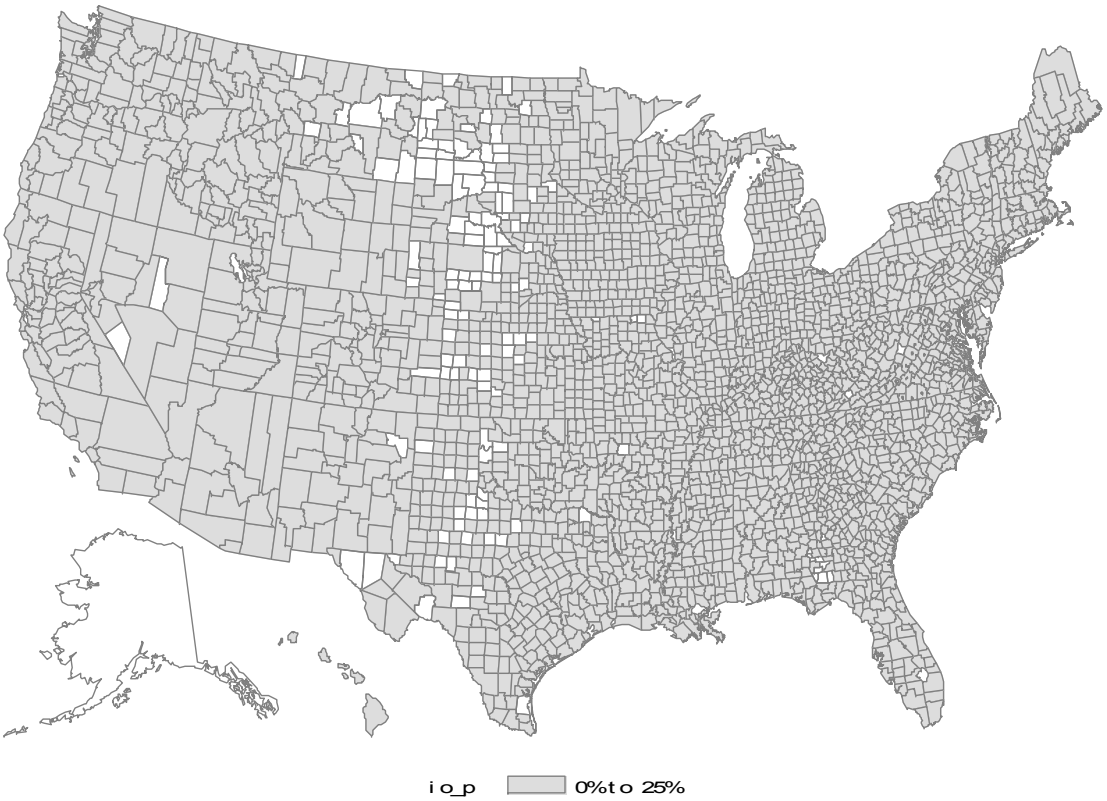



Figure 8: 2006 - Percent of All Loans – Interest Only

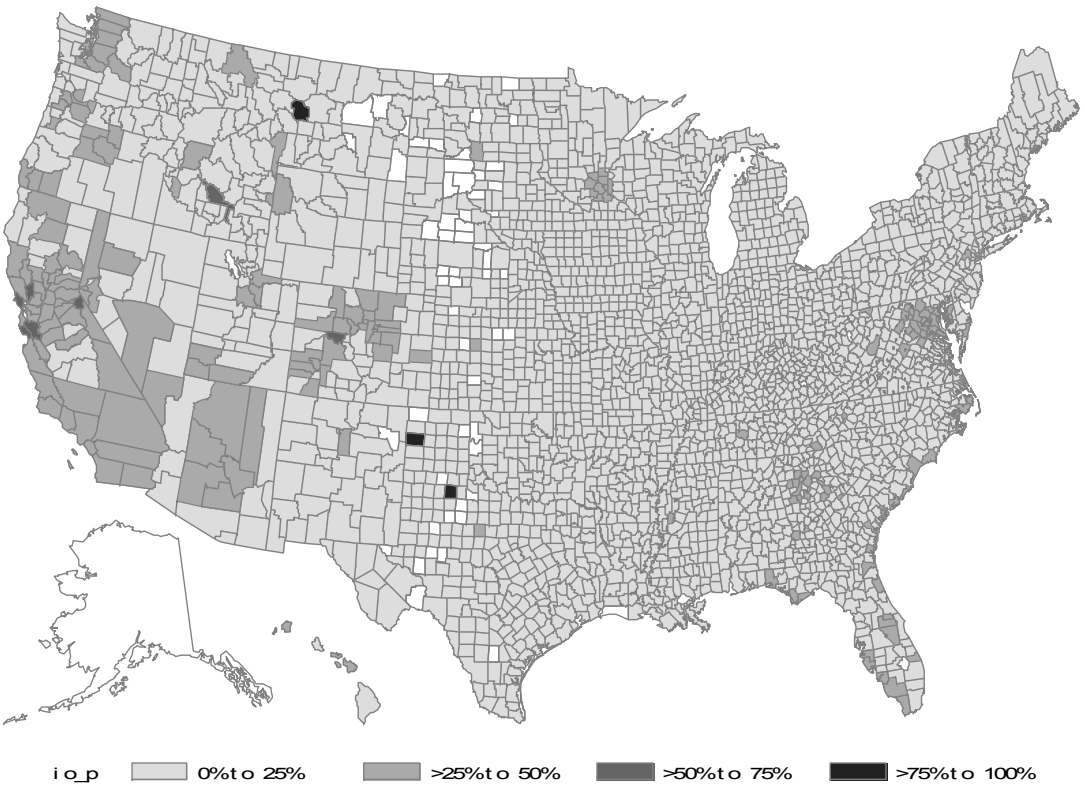


Figure 9: 1999 - Percent of All Loans – Balloon

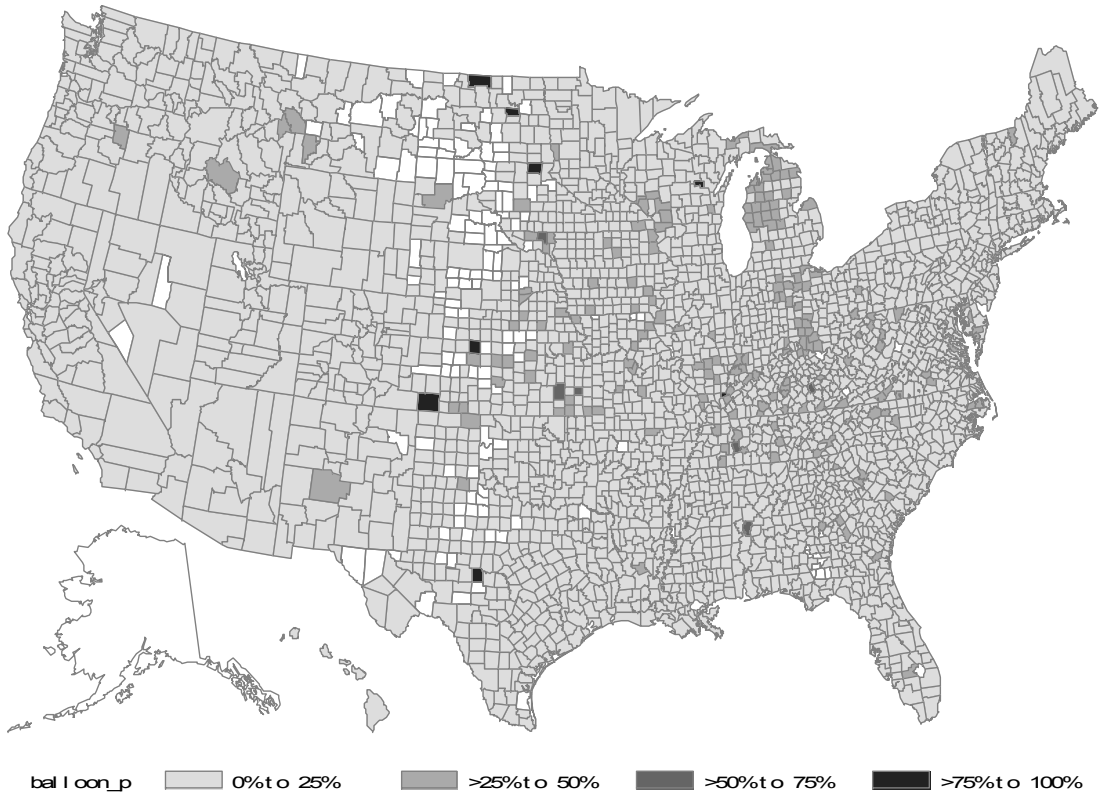



Figure 10: 2006 - Percent of All Loans – Balloon

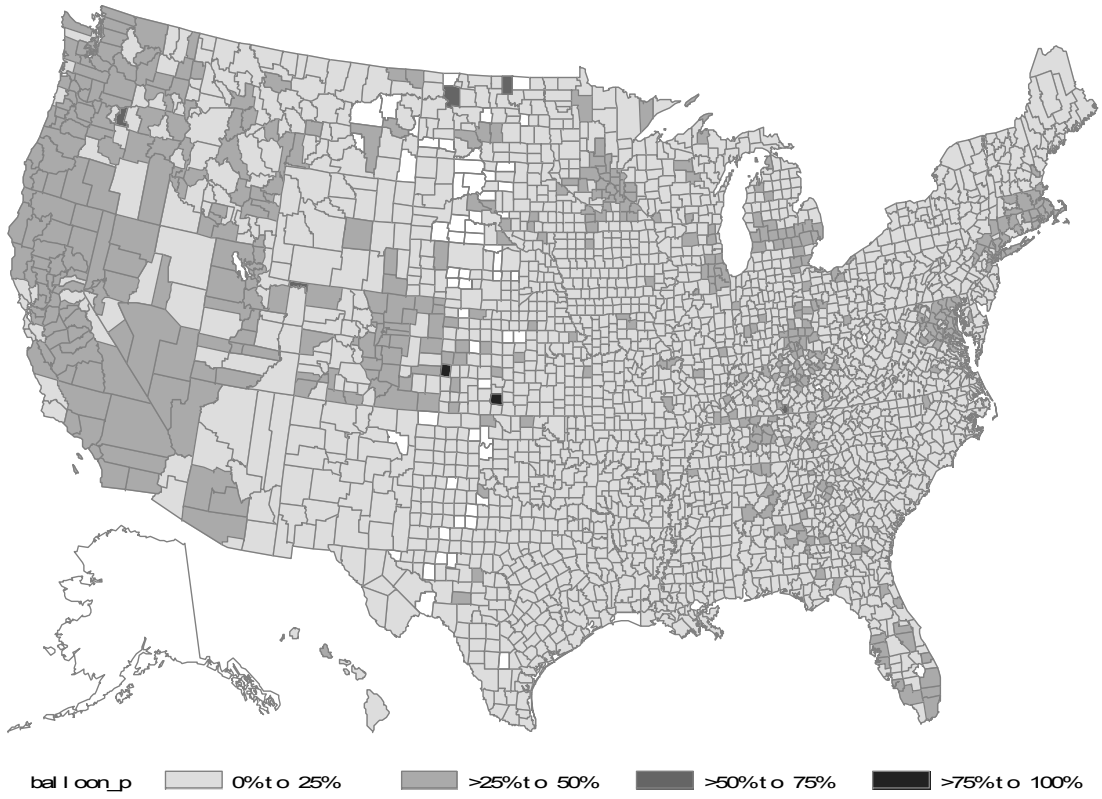


Figure 11: 2006 – Percent of Adjustable Rate Loans with a Teaser

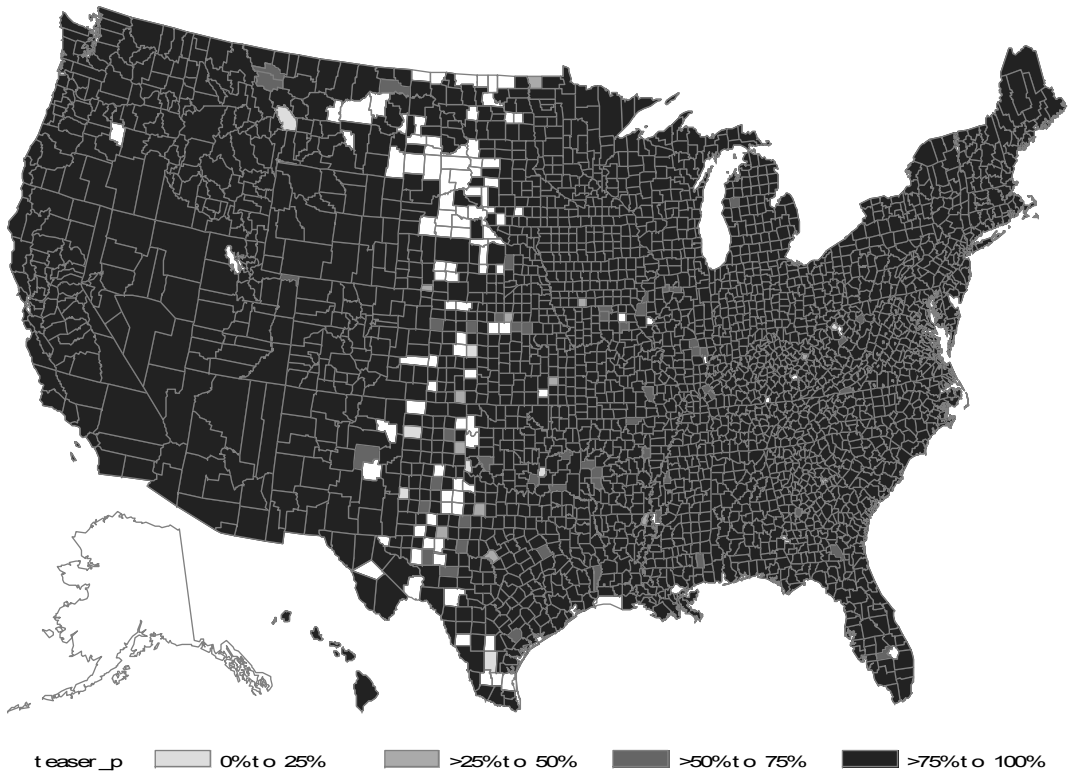



Figure 12: 2006 – Average Teaser Size (fully adjusted rate - initial rate) on Adjustable Rate Loans

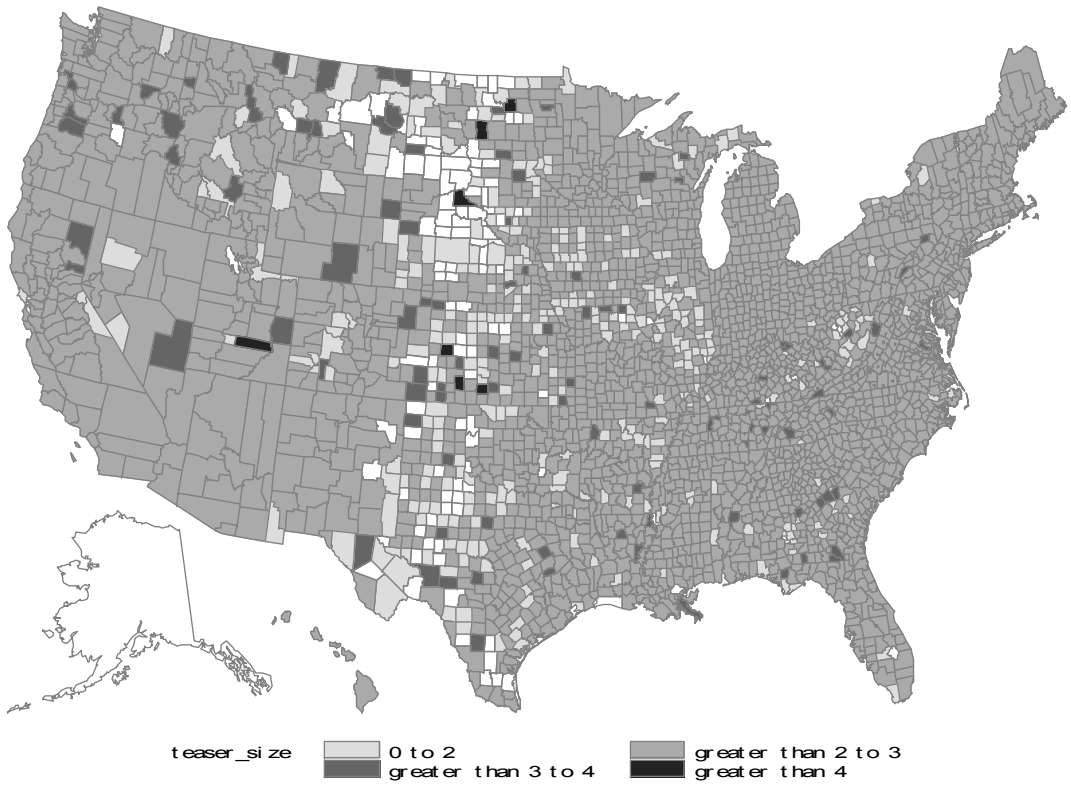


Figure 13: 2000 - Percent of All Loans – Prepayment Penalty

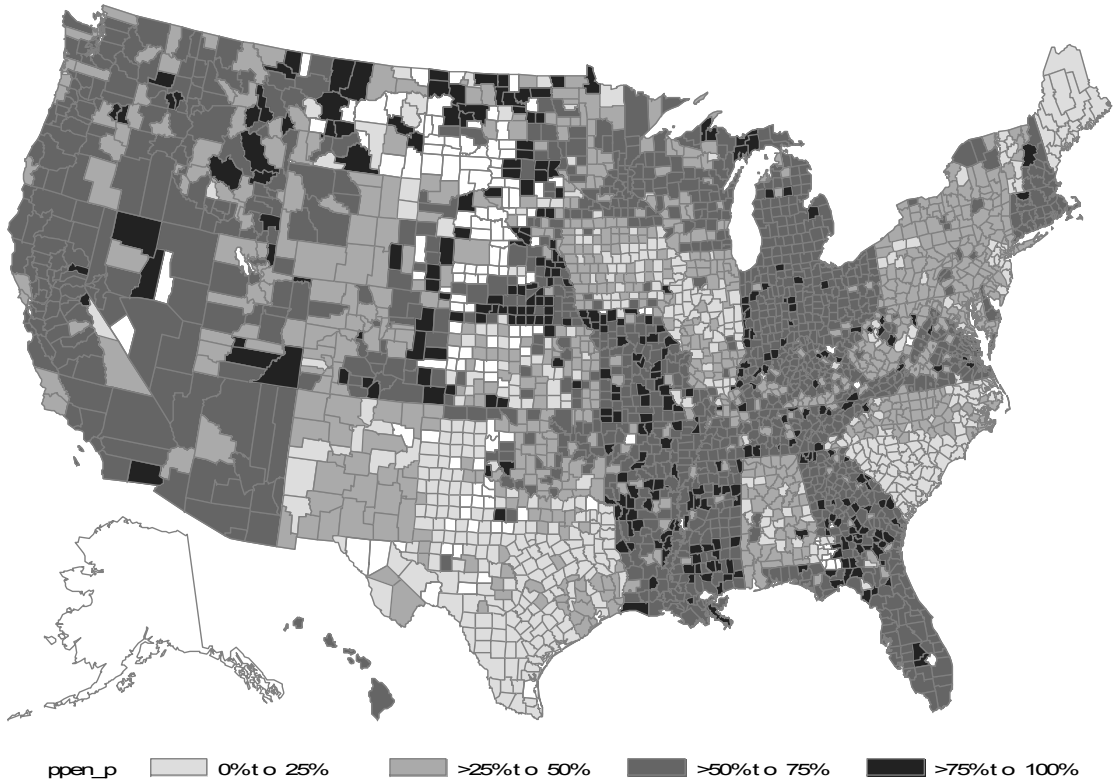
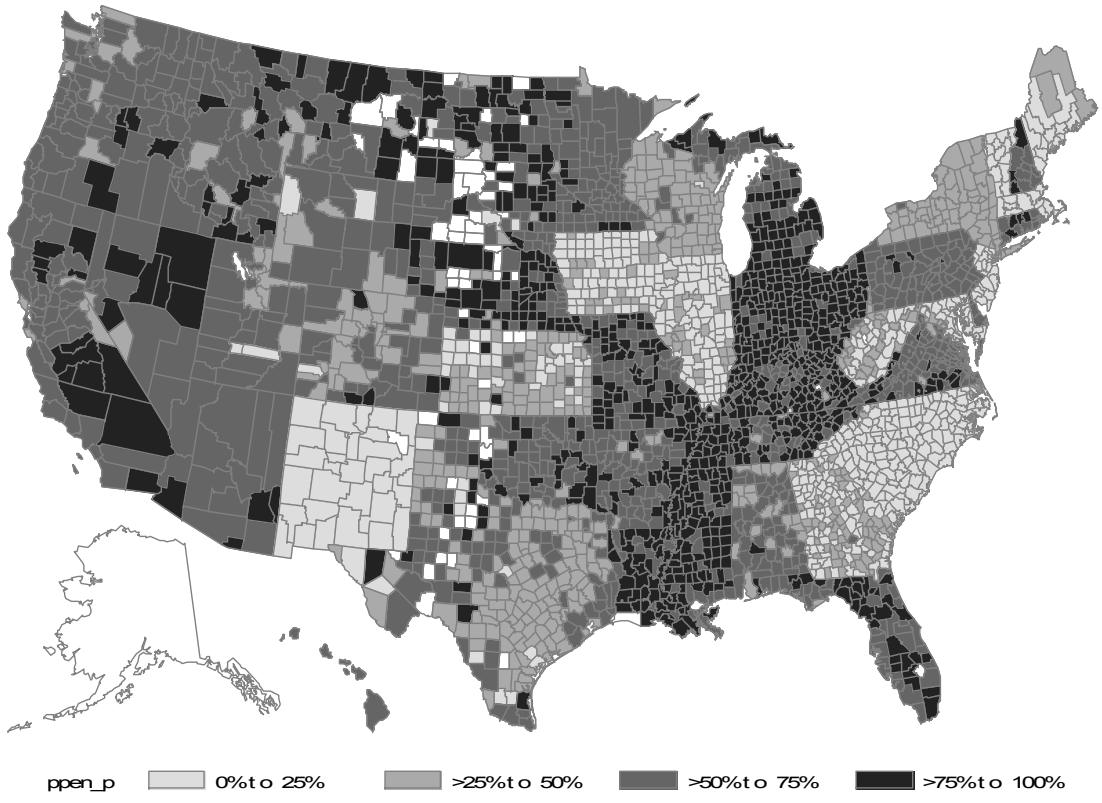



Figure 14: 2006 - Percent of All Loans – Prepayment Penalty



**Appendix: Results using all zip-codes in each state (treatment and neighboring states)**

**In Effect Results – Full State Sample**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio* | *OLS Marginal Effects* |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | -0.03 | 0.01 | 21.8 | <.0001 | 0.97 | . |
| Balloon Payment | -0.05 | 0.01 | 17.6 | <.0001 | 0.95 | . |
| Interest Only Payment | 0.06 | 0.02 | 11.0 | 0.00 | 1.07 | . |
| Hybrid Rate | -0.09 | 0.03 | 12.3 | 0.00 | 0.91 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -1.55 | 0.45 | 11.7 | 0.00 | 0.21 | . |
| 7-Year Balloons | -3.86 | 1.02 | 14.4 | 0.00 | 0.02 | . |
| 10-Year Balloons | -0.80 | 0.15 | 29.2 | <.0001 | 0.45 | . |
| 15 to 30-Year Balloons | -0.06 | 0.01 | 24.8 | <.0001 | 0.94 | . |
| ARM Balloons | -11.31 | 55.92 | 0.0 | 0.84 | 0.00 | . |
| **Documentation** | | | | | | |
| Full Documentation | -0.01 | 0.01 | 1.4 | 0.23 | 0.99 | . |
| Low Documentation | 0.01 | 0.01 | 1.5 | 0.22 | 1.01 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | -0.10 | 0.34 | 0.1 | 0.76 | 0.90 | . |
| **Occupancy** | | | | | | |
| Owner | 0.05 | 0.01 | 26.0 | <.0001 | 1.05 | . |
| Second Home | -0.19 | 0.03 | 42.8 | <.0001 | 0.83 | . |
| Investor | -0.03 | 0.01 | 12.0 | 0.00 | 0.97 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.35 | 0.01 | 2835.9 | <.0001 | 0.71 | . |
| Fixed Rate Loans | -0.04 | 0.01 | 21.5 | <.0001 | 0.96 | . |
| Adjustable Rate Loans | -0.26 | 0.01 | 1123.1 | <.0001 | 0.77 | . |
| Hybrid Rate Loans | -0.27 | 0.01 | 1114.8 | <.0001 | 0.77 | . |
| **Teasers** | | | | | | |
| Teaser Length | 0.41 | 0.08 | 5.1 | <.0001 | . | 0.41 |
| ARM Teaser Size | -0.02 | 0.00 | -5.8 | <.0001 | . | -0.02 |
| Hybrid Teaser Size | -0.03 | 0.00 | -8.1 | <.0001 | . | -0.03 |
| IO ARM Teaser Size | 0.04 | 0.00 | 21.4 | <.0001 | . | 0.04 |

Each row represents the results for a separate regression using indicated sample and Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in a ordinary least squares specification and the t-statistic is reported. OLS marginal effects and the odds ratio report the effect of a change from 0 to 1 (or the law coming into effect) on the dependent or LHS variable.

**Multiplicative Index Results – Full State Sample**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | 0.00 | 0.00 | 0.0 | 0.86 | 1.00 | . |
| Balloon Payment | 0.00 | 0.00 | 69.4 | <.0001 | 0.93 | . |
| Interest Only Payment | 0.00 | 0.00 | 5.2 | 0.02 | 1.02 | . |
| Hybrid Rate | 0.00 | 0.00 | 22.6 | <.0001 | 0.93 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -0.06 | 0.02 | 13.4 | 0.00 | 0.33 | . |
| 7-Year Balloons | -0.20 | 0.10 | 4.3 | 0.04 | 0.03 | . |
| 10-Year Balloons | -0.04 | 0.01 | 30.2 | <.0001 | 0.54 | . |
| 15 to 30-Year Balloons | 0.00 | 0.00 | 96.7 | <.0001 | 0.92 | . |
| ARM Balloons | -0.87 | 2.60 | 0.1 | 0.74 | 0.00 | . |
| **Documentation** | | | | | | |
| Full Documentation | 0.00 | 0.00 | 2.5 | 0.12 | 1.01 | . |
| Low Documentation | 0.00 | 0.00 | 0.1 | 0.82 | 1.00 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | 0.00 | 0.01 | 0.3 | 0.59 | 1.09 | . |
| **Occupancy** | | | | | | |
| Owner | 0.00 | 0.00 | 77.5 | <.0001 | 1.05 | . |
| Second Home | 0.00 | 0.00 | 18.9 | <.0001 | 0.93 | . |
| Investor | 0.00 | 0.00 | 59.6 | <.0001 | 0.96 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.02 | 0.00 | 11965.0 | <.0001 | 0.65 | . |
| Fixed Rate Loans | -0.01 | 0.00 | 787.6 | <.0001 | 0.83 | . |
| Adjustable Rate Loans | -0.02 | 0.00 | 4507.0 | <.0001 | 0.73 | . |
| Hybrid Rate Loans | -0.02 | 0.00 | 4379.1 | <.0001 | 0.73 | . |
| **Teasers** | | | | | | |
| Teaser Length | 0.02 | 0.00 | 6.6 | <.0001 | . | 0.35 |
| ARM Teaser Size | 0.00 | 0.00 | 0.3 | 0.77 | . | 0.00 |
| Hybrid Teaser Size | 0.00 | 0.00 | -5.9 | <.0001 | . | -0.01 |
| IO ARM Teaser Size | 0.00 | 0.00 | 30.0 | <.0001 | . | 0.03 |

Each row represents the results for a separate regression using indicated sample and Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.

* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (17.36) on the dependent or LHS variable.

**Coverage Index Results – Full State Sample**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | 0.00 | 0.00 | 0.6 | 0.44 | 1.00 | . |
| Balloon Payment | -0.02 | 0.00 | 26.7 | <.0001 | 0.97 | . |
| Interest Only Payment | 0.01 | 0.01 | 4.6 | 0.03 | 1.02 | . |
| Hybrid Rate | -0.03 | 0.01 | 10.0 | 0.00 | 0.96 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -0.57 | 0.15 | 14.0 | 0.00 | 0.40 | . |
| 7-Year Balloons | -1.65 | 0.67 | 6.0 | 0.01 | 0.07 | . |
| 10-Year Balloons | -0.10 | 0.04 | 8.8 | 0.00 | 0.85 | . |
| 15 to 30-Year Balloons | -0.03 | 0.00 | 44.4 | <.0001 | 0.96 | . |
| ARM Balloons | -6.85 | 24.97 | 0.1 | 0.78 | 0.00 | . |
| **Documentation** | | | | | | |
| Full Documentation | 0.00 | 0.00 | 0.9 | 0.33 | 1.00 | . |
| Low Documentation | 0.00 | 0.00 | 0.5 | 0.47 | 1.00 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | -0.02 | 0.12 | 0.0 | 0.86 | 0.97 | . |
| **Occupancy** | | | | | | |
| Owner | 0.02 | 0.00 | 45.0 | <.0001 | 1.03 | . |
| Second Home | -0.05 | 0.01 | 28.9 | <.0001 | 0.92 | . |
| Investor | -0.02 | 0.00 | 29.1 | <.0001 | 0.97 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.12 | 0.00 | 3594.8 | <.0001 | 0.82 | . |
| Fixed Rate Loans | -0.04 | 0.00 | 130.3 | <.0001 | 0.94 | . |
| Adjustable Rate Loans | -0.08 | 0.00 | 1155.0 | <.0001 | 0.88 | . |
| Hybrid Rate Loans | -0.08 | 0.00 | 1130.5 | <.0001 | 0.88 | . |
| **Teasers** | | | | | | |
| Teaser Length | 0.33 | 0.02 | 14.0 | <.0001 | . | 0.53 |
| ARM Teaser Size | 0.00 | 0.00 | -0.1 | 0.95 | . | 0.00 |
| Hybrid Teaser Size | -0.01 | 0.00 | -5.5 | <.0001 | . | -0.01 |
| IO ARM Teaser Size | 0.01 | 0.00 | 23.1 | <.0001 | . | 0.02 |

Each row represents the results for a separate regression using indicated sample and or Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.

* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (1.62) on the dependent or LHS variable.

**Restrictions Index Results – Full State Sample**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | -0.01 | 0.00 | 33.7 | <.0001 | 0.99 | . |
| Balloon Payment | -0.02 | 0.00 | 33.4 | <.0001 | 0.97 | . |
| Interest Only Payment | 0.01 | 0.01 | 6.2 | 0.01 | 1.02 | . |
| Hybrid Rate | -0.04 | 0.01 | 20.0 | <.0001 | 0.96 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -0.51 | 0.16 | 10.4 | 0.00 | 0.55 | . |
| 7-Year Balloons | -1.33 | 0.40 | 11.3 | 0.00 | 0.21 | . |
| 10-Year Balloons | -0.30 | 0.05 | 37.9 | <.0001 | 0.70 | . |
| 15 to 30-Year Balloons | -0.03 | 0.00 | 48.1 | <.0001 | 0.96 | . |
| ARM Balloons | -4.52 | 18.65 | 0.1 | 0.81 | 0.01 | . |
| **Documentation** | | | | | | |
| Full Documentation | 0.00 | 0.00 | 0.6 | 0.46 | 1.00 | . |
| Low Documentation | 0.00 | 0.00 | 0.0 | 0.95 | 1.00 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | 0.02 | 0.09 | 0.1 | 0.79 | 1.03 | . |
| **Occupancy** | | | | | | |
| Owner | 0.02 | 0.00 | 35.3 | <.0001 | 1.02 | . |
| Second Home | -0.05 | 0.01 | 32.8 | <.0001 | 0.94 | . |
| Investor | -0.01 | 0.00 | 19.1 | <.0001 | 0.99 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.18 | 0.00 | 7498.0 | <.0001 | 0.81 | . |
| Fixed Rate Loans | -0.05 | 0.00 | 218.2 | <.0001 | 0.95 | . |
| Adjustable Rate Loans | -0.13 | 0.00 | 2839.6 | <.0001 | 0.85 | . |
| Hybrid Rate Loans | -0.14 | 0.00 | 2785.2 | <.0001 | 0.85 | . |
| **Teasers** | | | | | | |
| Teaser Length | 0.10 | 0.03 | 3.5 | 0.00 | . | 0.11 |
| ARM Teaser Size | 0.00 | 0.00 | -4.5 | <.0001 | . | 0.00 |
| Hybrid Teaser Size | -0.01 | 0.00 | -7.7 | <.0001 | . | -0.01 |
| IO ARM Teaser Size | 0.01 | 0.00 | 24.5 | <.0001 | . | 0.02 |

Each row represents the results for a separate regression using indicated sample and Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.

* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (1.17) on the dependent or LHS variable.

**Enforcement Index Results – Full State Sample**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | 0.00 | 0.00 | 5.5 | 0.02 | 0.99 | . |
| Balloon Payment | -0.02 | 0.00 | 20.8 | <.0001 | 0.98 | . |
| Interest Only Payment | 0.03 | 0.01 | 17.6 | <.0001 | 1.03 | . |
| Hybrid Rate | -0.04 | 0.01 | 17.6 | <.0001 | 0.96 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -0.53 | 0.15 | 13.5 | 0.00 | 0.56 | . |
| 7-Year Balloons | -1.34 | 0.36 | 13.8 | 0.00 | 0.23 | . |
| 10-Year Balloons | -0.32 | 0.06 | 27.6 | <.0001 | 0.71 | . |
| 15 to 30-Year Balloons | -0.02 | 0.00 | 30.4 | <.0001 | 0.97 | . |
| ARM Balloons | -7.06 | 24.25 | 0.1 | 0.77 | 0.00 | . |
| **Documentation** | | | | | | |
| Full Documentation | 0.00 | 0.00 | 3.5 | 0.06 | 1.00 | . |
| Low Documentation | 0.01 | 0.00 | 6.6 | 0.01 | 1.01 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | 0.00 | 0.10 | 0.0 | 0.98 | 1.00 | . |
| **Occupancy** | | | | | | |
| Owner | 0.02 | 0.00 | 31.5 | <.0001 | 1.02 | . |
| Second Home | -0.06 | 0.01 | 35.6 | <.0001 | 0.94 | . |
| Investor | -0.01 | 0.00 | 18.9 | <.0001 | 0.99 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.14 | 0.00 | 4058.2 | <.0001 | 0.86 | . |
| Fixed Rate Loans | -0.03 | 0.00 | 66.5 | <.0001 | 0.97 | . |
| Adjustable Rate Loans | -0.10 | 0.00 | 1524.1 | <.0001 | 0.89 | . |
| Hybrid Rate Loans | -0.10 | 0.00 | 1511.2 | <.0001 | 0.89 | . |
| **Teasers** | | | | | | |
| Teaser Length | 0.06 | 0.03 | 2.3 | 0.02 | . | 0.07 |
| ARM Teaser Size | -0.01 | 0.00 | -6.1 | <.0001 | . | -0.01 |
| Hybrid Teaser Size | -0.01 | 0.00 | -8.2 | <.0001 | . | -0.01 |
| IO ARM Teaser Size | 0.01 | 0.00 | 23.6 | <.0001 | . | 0.02 |

Each row represents the results for a separate regression using indicated sample and Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.

* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (1.1) on the dependent or LHS variable.

**Remedies Index Results – Full State Sample**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | -0.02 | 0.01 | 10.6 | 0.00 | 0.99 | . |
| Balloon Payment | -0.07 | 0.01 | 27.3 | <.0001 | 0.97 | . |
| Interest Only Payment | 0.08 | 0.02 | 15.7 | <.0001 | 1.04 | . |
| Hybrid Rate | -0.10 | 0.03 | 11.9 | 0.00 | 0.95 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -1.57 | 0.47 | 11.1 | 0.00 | 0.46 | . |
| 7-Year Balloons | -4.67 | 1.50 | 9.7 | 0.00 | 0.10 | . |
| 10-Year Balloons | -1.15 | 0.18 | 40.7 | <.0001 | 0.57 | . |
| 15 to 30-Year Balloons | -0.10 | 0.01 | 48.6 | <.0001 | 0.95 | . |
| ARM Balloons | -15.05 | 68.85 | 0.0 | 0.83 | 0.00 | . |
| **Documentation** | | | | | | |
| Full Documentation | -0.01 | 0.01 | 3.0 | 0.09 | 0.99 | . |
| Low Documentation | 0.01 | 0.01 | 4.1 | 0.04 | 1.01 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | -0.08 | 0.36 | 0.0 | 0.83 | 0.96 | . |
| **Occupancy** | | | | | | |
| Owner | 0.05 | 0.01 | 23.1 | <.0001 | 1.02 | . |
| Second Home | -0.18 | 0.03 | 36.1 | <.0001 | 0.91 | . |
| Investor | -0.04 | 0.01 | 13.3 | 0.00 | 0.98 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.44 | 0.01 | 3992.9 | <.0001 | 0.81 | . |
| Fixed Rate Loans | -0.08 | 0.01 | 56.1 | <.0001 | 0.96 | . |
| Adjustable Rate Loans | -0.34 | 0.01 | 1591.3 | <.0001 | 0.84 | . |
| Hybrid Rate Loans | -0.35 | 0.01 | 1572.0 | <.0001 | 0.84 | . |
| **Teasers** | | | | | | |
| Teaser Length | 0.02 | 0.09 | 0.2 | 0.81 | . | 0.01 |
| ARM Teaser Size | -0.02 | 0.00 | -7.4 | <.0001 | . | -0.01 |
| Hybrid Teaser Size | -0.03 | 0.00 | -8.1 | <.0001 | . | -0.02 |
| IO ARM Teaser Size | 0.05 | 0.00 | 22.5 | <.0001 | . | 0.02 |

Remedies ranges from 0 to 1. Each row represents the results for a separate regression using indicated sample and Left Hand Side (LHS) variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.
* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (0.49) on the dependent or LHS variable.

**Assignee Liability Index Results – Full State Sample**

| *LHS Variable* | *Estimate* | *StdErr* | *Wald Chi-Square or t-stat* | *Pr > Chi-Square* | *Odds Ratio** | *OLS Marginal Effects** |
|---|---|---|---|---|---|---|
| **Basic Product Type** | | | | | | |
| Adjustable Rate | 0.02 | 0.01 | 4.3 | 0.04 | 1.01 | . |
| Balloon Payment | -0.06 | 0.02 | 8.4 | 0.00 | 0.98 | . |
| Interest Only Payment | 0.15 | 0.03 | 25.9 | <.0001 | 1.05 | . |
| Hybrid Rate | -0.26 | 0.05 | 31.4 | <.0001 | 0.91 | . |
| **Balloons** | | | | | | |
| 5-Year Balloons | -3.34 | 0.86 | 15.2 | <.0001 | 0.30 | . |
| 7-Year Balloons | -4.09 | 1.33 | 9.5 | 0.00 | 0.23 | . |
| 10-Year Balloons | 0.51 | 0.37 | 1.9 | 0.17 | 1.20 | . |
| 15 to 30-Year Balloons | -0.06 | 0.02 | 6.3 | 0.01 | 0.98 | . |
| ARM Balloons | -9.11 | 77.27 | 0.0 | 0.91 | 0.04 | . |
| **Documentation** | | | | | | |
| Full Documentation | -0.03 | 0.01 | 6.7 | 0.01 | 0.99 | . |
| Low Documentation | 0.05 | 0.01 | 21.2 | <.0001 | 1.02 | . |
| **Negative Amortization** | | | | | | |
| Negative Amortization | 0.26 | 0.49 | 0.3 | 0.60 | 1.10 | . |
| **Occupancy** | | | | | | |
| Owner | 0.10 | 0.01 | 44.7 | <.0001 | 1.04 | . |
| Second Home | -0.20 | 0.05 | 19.0 | <.0001 | 0.93 | . |
| Investor | -0.09 | 0.02 | 34.3 | <.0001 | 0.97 | . |
| **Prepayment Penalties** | | | | | | |
| All Loans | -0.73 | 0.01 | 4438.0 | <.0001 | 0.77 | . |
| Fixed Rate Loans | -0.20 | 0.02 | 145.5 | <.0001 | 0.93 | . |
| Adjustable Rate Loans | -0.48 | 0.01 | 1472.4 | <.0001 | 0.84 | . |
| Hybrid Rate Loans | -0.48 | 0.01 | 1465.8 | <.0001 | 0.84 | . |
| **Teasers** | | | | | | |
| Teaser Length | -0.14 | 0.12 | -1.1 | 0.27 | . | -0.05 |
| ARM Teaser Size | -0.02 | 0.00 | -3.5 | 0.00 | . | -0.01 |
| Hybrid Teaser Size | -0.04 | 0.01 | -7.4 | <.0001 | . | -0.02 |
| IO ARM Teaser Size | 0.08 | 0.00 | 24.3 | <.0001 | . | 0.03 |

Assignee Liability ranges from 0 to 1. Each row represents the results for a separate regression using indicated sample and left hand side variable. If odds ratio is reported the results are estimated in a grouped logit specification. If odds ratio is not reported the results are estimated in an Ordinary Least Squares (OLS) specification and the t-statistic is reported.
* OLS marginal effects and the odds ratio report the effect of a change from a one standard deviation increase in the index (0.36) on the dependent or Left Hand Side (LHS) variable.