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Abstract
Various states and other local jurisdictions have enacted laws intending to reduce predatory and abusive lending in the subprime mortgage market. These laws have created substantial geographic variation in the regulation of mortgage credit. This paper examines whether these laws are associated with a higher or lower cost of credit. Empirical results indicate that the laws are associated with at most a modest increase in cost. However, the impact depends on the product type. In particular, loans with fixed (adjustable) rates are associated a modest increase (decrease) in cost.

JEL Classifications: G21, C25

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Predatory Lending Laws and the Cost of Credit

Introduction

Predatory lending laws are today's usury laws. The laws focus on the high cost or subprime segment of the mortgage market and typically restrict certain types of loans such as loans with prepayment penalties and balloon payments. Those borrowers who are still able to still get a loan when a law is in place may be required to pay for at least part of the regulatory costs associated with complying or violating the laws (assuming compliance is nontrivial).

This paper tests to see whether the existence of a predatory lending law is associated with higher Annual Percentage Rates (APRs) -- which represent the full cost of borrowing, including upfront points and fees -- or with higher periodic interest rates. In addition, a law index is used to measure the relative strength of each law and test whether stronger laws, in terms of restrictions and coverage, differentially impact the cost of credit.

The introduction of predatory lending laws at the state, county, and city levels has provided substantial geographic variation in the regulation of high-cost mortgage credit. We largely focus on the impact of state laws because they have been the most durable in the face of legal challenges mounted by lending associations and other forms of government. Because state boundaries reflect political and not economic regions, we compare mortgage market conditions in states with a law in effect[1] with those in neighboring states currently without a predatory lending law. However, instead of examining whole states or regions, we focus on multi-state metropolitan and micropolitan

areas that cross state boundaries with variations in the laws. This geographic-based sampling is used to help identify the impact of the predatory lending law on the cost of subprime credit by examining mortgages in similar labor and housing markets.

Subprime and Predatory Lending

The subprime mortgage market provides the opportunity of homeownership and access to credit to those who are not eligible to take part in the prime or conventional market. Therefore, the subprime market completes the mortgage market and can enhance welfare (Chinloy and MacDonald, 2005). Predatory lending depends on the inability of the borrower to understand the loan terms and the obligations associated with them. For example, interviews held by HUD, the Treasury, and the Federal Reserve Board indicate that some, perhaps many, borrowers using high-cost loans may not have understood the terms of the loans, leading to extremely high interest rates and upfront fees (HUD-Treasury, 2000 and Federal Reserve, 2002).

In 2002, partly in response to these hearings, the Federal Reserve Board of Governors strengthened the existing Home Ownership and Equity Protection Act (HOEPA) as articulated in Regulation Z. HOEPA defines a class of loans that are given special consideration because they are more likely to have predatory features and require additional disclosures. HOEPA-covered loans (loans where HOEPA applies) include only closed-end home equity loans that meet APR and upfront finance fee triggers. Home purchase loans and other types of lending backed by a home, such as lines of credit, are not covered by HOEPA.

However, rising foreclosure rates, the continuing market penetration of subprime lenders, and the geographic concentration of subprime lending in low-income and minority neighborhoods have lead to concerns in many communities that HOEPA did not do enough to restrict loans likely to contain predatory features. By the end of 2004 at least 23 states had passed predatory lending laws that are currently in effect; including Arkansas, California, Colorado, Connecticut, Florida, Georgia, Illinois, Kentucky, Maine, Maryland, Massachusetts, Nevada, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Utah, and Wisconsin.

These laws follow the structure of HOEPA by defining a class of loans likely to be associated with predation and then restrict certain practices for covered loans. Ho and Pennington-cross (2005) detail in Appendix A each of the predatory lending laws. An index is created to measure the strength of each law. The index can be broken down into a coverage component and a restrictions component. The coverage category includes measures of loan purpose, APR first lien, APR higher liens, and points and fees. In general, if the law does not increase the coverage beyond HOEPA it is assigned zero points. Higher points are assigned if the coverage is more general. The restrictions index includes measures of prepayment penalty restrictions, balloon restrictions, counseling requirements, and restrictions on mandatory arbitration. If the law does not require any restrictions on covered loans, then zero points are assigned. Higher points indicate more restrictions. The index is scaled so that each of the eight subcomponents is on average equal to one.[2] Therefore, as shown in Table 1, by design the average index has the value of 8. However, there is wide variation from a low of just less than 1.5 for the laws in

Maine and Nevada to over 17 for the law in Illinois. There is also substantial variation in the extent of restriction and coverage. In addition, the restrictions and coverage components are not strongly correlated.

Literature Review

There is a growing literature relating local and state predatory lending laws to conditions in the subprime mortgage market. Primarily the literature has focused on case studies on a law-by-law basis. Overall there is strong evidence that the introduction of the first state level predatory lending law in North Carolina did reduce the number of applications and originations of subprime loans (Ernst, Farris, and Stein, 2002; Quercia, Stegman, and Davis, 2003; Harvey and Nigro, 2004; and Elliehausen and Staten, 2004) and the laws passed in Chicago and Philadelphia, which are no longer in effect, also had a similar impact (Harvey and Nigro, 2003). However, the impacts found in these studies have turned out not to be the typical market response to the introduction of predatory lending laws. In particular, the laws can have no impact, decrease, and even increase the number of applications and originations for subprime loans (Ho and Pennington-Cross, 2006). One explanation for the increased application rate after a law is passed is that potential applicants may feel more comfortable applying for a subprime loan if a lending law covers their application.[3] As a result, the subprime market can actually grow after a law has been enacted. In contrast, laws that reduce applications and originations have stronger restrictions. Stronger laws are also associated with lower rejection rates on subprime applications.

In contrast to the growing literature on the flow (applications and originations) of subprime credit much less is known about the impact of the laws on the pricing or cost of credit. Pricing in the subprime market is not as transparent or homogeneous as in the prime market (Chomsisengphet and Pennington-cross, 2006; and White, 2004) making identifying the impact of predatory lending laws on the cost of credit more difficult. In addition, the growing dominance of adjustable rate loans in the subprime market (using LoanPerformance data adjustable rate mortgages have grown from 40 percent of the market in 2000 to over 65 percent in 2005) requires careful consideration of the detailed characteristics of a loan (for example, margin, teaser, cap and floor, and index). In addition, there is some evidence that subprime borrowers tend to pay much higher fees during origination and underwriting (Stein, 2001) making it important to measure the full cost of borrowing in addition to the initial or periodic interest rate on the loan.

Li and Ernst (2005) examine the impact of various state predatory lending laws on the spread between prevailing risk free rates and the periodic or initial interest rate on subprime loans. The data set represents securitized subprime loans, which may include A- and Alt-A loans, leased from LoanPerformance as represented in their Asset Backed Securities data sets. This data set provides extensive detail on product types, but does not provide full coverage of the subprime market. All of the U.S. is included in the sample and 34 dummy variables are used to characterize the different nuances of the lending laws. The results do not provide any consistent evidence that state predatory lending laws have a recognizable impact on periodic interest rates. Some coefficients have negative signs; others have positive signs and over one half of coefficient estimates are

insignificant. Given the number of loans used to conduct the analysis (ranging from over 100,000 to over 450,000), the results should be very precise. Therefore, to date there is no consistent evidence (that the authors are aware of) that local and state predatory lending laws are associated with a consistent change in the cost of credit in the mortgage market.

Motivation – Cost of Credit

If lenders incur higher cost due to the introduction of predatory lending laws, then these costs might be passed on to consumers in the form of higher fees and higher interest rates on the loans. Lenders must report to local authorities the nature and extent of high-cost (covered) loans they originate and make sure that they are not violating any of the predatory laws. This may be fairly simple to do for a local lender, but for a national lender it is necessary to monitor all state and local lending laws that are pending and in effect, as well as any legal challenges and changes to these laws.

If the laws create a regulatory burden on lenders and this burden or cost is passed on to consumers, then borrower cost should be higher in locations with the law in effect. In addition, the laws could differentially impact periodic interest rates, initial points and fees, and product types.

Since adjustable rates are the dominate form of lending in the subprime market it is important to consider differences between the pricing of fixed rate and adjustable rate mortgages. Consider a two-period model following the work of Bruekner (1986) and Sa-Aadu and Sirmans (1989).[4] The two-period model allows a simple illustration of the role

of uncertainty in the pricing of mortgages and the impact of changing interest rates. The rate on a mortgage in the first time period, t=0 (the initial rate), is defined as

$$r_0 = i_0 + s; \quad (1)$$

r_0, the interest rate in the first time period, is defined as the sum of the initial rate on an index (i_0) plus the spread (s) over the index. The spread is constant over the life of the loan but the index can change in the second period (i_1) for adjustable rate loans. In typical parlance, the spread is often called the margin on an adjustable rate loan. The index represents the cost of funds to the lender in the two time periods, t=0 and t=1. The spread compensates the lender for the risk associated with the loan. These risks include interest rate and credit risks.

Loans can also include a discount (δ) in the first time period below the fully indexed rate in the first period (r_0). Borrowers may also pay additional fees upfront (f) to reduce the interest rate, which are often referred to as points paid. Therefore, the initial rate can be represented as

$$r_0 = i_0 + s - \delta + f \quad (2)$$

The initial rate is defined as the sum of the index, the spread, and upfront fees less the discount. This representation provides the cost of credit in the first time period; however, upfront fees are not included when calculating the fully amortizing payment. Therefore, a mortgage can be structured with the same expected return that includes various levels of initial rates depending on the spread, discount, and upfront fees. In general, holding returns constant higher fees and a higher spread or a lower discount should be associated with lower initial rates.

In the second time period, t=1, the rate on the mortgage is uncertain for an adjustable rate mortgage and depends on the index value (i_1), the margin or spread (s), the fully adjusted rate (i_1+s), and any limits placed on i_1+s as defined by the cap (c). Therefore, the rate of return in the second period can take on two forms depending on whether the cap is binding or not.

$$i_1 + s > r_0 + c, \text{then } r_1 = r_0 + c,$$

$$i_1 + s < r_0 + c, \text{then } r_1 = i_1 + s \ . \tag{3}$$

In the second period the rate on the mortgage (r_1), or return to the lender, is the initial rate (r_0) plus the cap (c) if the cap is binding and the fully indexed rate (i_1+s) if the cap is not binding. Therefore, the cap can be designed to shift all the interest rate risk to the borrower or the lender. In the limit the cap can be designed so that it is never binding ($c=\infty$) and all the interest rate risk is transferred to the borrower or so that it is always binding (c=0). When c=0 it is equivalent to a fixed rate mortgage. Therefore, a fixed rate mortgage can be viewed as a subset or special case for adjustable rate mortgages where the cap is always binding.

The index for the second period can be viewed as a random variable and the expected return for the second period is as follows:

$$E(r_1) = s + \int_0^{r+c} i_1 f(i_1) di_1 + \int_{r_0+c}^{\infty} (r_0 + c) f(i_1) di_1, \tag{4}$$

where $f(i_1)$ is the probability density function for interest rates in the second time period. The cap impacts the expected return and the extent that the cap matters depends on the

distribution of interest rates in the second time period $f(i_1)di$. Since the spread is used to compensate for other costs, the more volatile interest rates, or the index, the larger the margin will need to be to compensate for the lender taking on interest rate risk. The expected return can also be modified to include a measure of credit risk, which is assumed to occur only when the value of the mortgage is higher than the value of the property, by adding $\int_0^B \frac{B-V}{B} g(V)dV$ to the expected return. B is the outstanding balance on the loan; V is the value of the mortgage; and $g(V)$ is the probability density function for V. Since default is a cost, the required rate of return in the second period will be higher and the spread can be used to increase the return to compensate for the credit risk. For a fixed rate loan the expected return in the second time period is the initial interest rate ($r_0 = i_0 + s$) plus the measure of credit risk ($\int_0^B \frac{B-V}{B} g(V)dV$).

This two-period model primarily shows that the spread on a loan is a complicated mixture of many characteristics, including the variance of future rates, credit risks (property values), upfront fees, discounts, and caps. In particular, the spread is used to compensate the lender for all costs except for the cost of funds. Fixed rate loans should require a higher margin to compensate for the lender being exposed to all of the interest rate risk and adjustable rate loans can be viewed as being in a continuum from full lender exposure to interest rate risk to no lender exposure to interest rate risk depending on the cap. In addition, any costs associated with complying with local laws and regulations should be associated with a higher spread to maintain the required rate of return.

Annual Percentage Rates (APR)

This section examines the impact of a predatory lending law on the APR of a high cost loan. In particular, for the calendar year 2004, HMDA provides the spread between the APR on high cost mortgages and the yield on Treasury bills of comparable maturity (*S*). The spread is only reported if it is above 3 percent for first-lien loans or 5 percent for subordinate liens.

To aid identification, a geographic-based sampling approach is used. In particular, only loans in metropolitan and micropolitan areas (MSAs) that cross state borders where at least one state has a law in effect are included. Table 2 provides a list of the 35 micropolitan and metropolitan areas included in the estimation. All loans that meet the loan type and location criteria are included. A variable called *Ineffect* indicates that the loan is located in a location where a predatory lending law is currently in effect. Only locations where the law is in effect before the beginning of 2004 are included. Therefore, if there is a regulatory cost passed on to the consumer, it should be reflected in a positive coefficient estimate for *Ineffect*.

In a reduced form specification, individual loan observations are used to explain how the spread (*S*) is related to mortgage, borrower, and location characteristics as available in HMDA:

$$S_j = \alpha_c + \alpha_p P_j + \alpha_m M_j + \alpha_b B_j + \alpha_l L_j + \varepsilon_j, \quad (5)$$

where *j* indexes the individual loan originations, *S* is the spread as defined above, *P* indicates whether a loan is in a location with a predatory lending law in effect, *M*

represents mortgage characteristics, B represents borrower characteristics, L represents locations characteristics, and ε represents an identically and independently distributed random error term.

Table 3 provides a description of the variables used in the estimation as well as their summary statistics. The average spread is 4.78 percentage points above the comparable term T-bill and 44 percent of the sample is in locations with a law. Figure 1 shows the distribution of APR spread by lien status for the estimation sample and indicates that second-lien and higher-lien loans have higher spreads. The figure also provides an indication of what proportion of loans would be covered by the predatory lending laws using the APR trigger only. The APR trigger typically varies from 6 to 10 percent depending on the state and the lien category. For example, under the Maryland law, which has a first-lien APR trigger of 7 percent and a second-lien trigger of 9 percent, approximately 2 percent of first-lien loans and 3 percent of second-lien loans would be covered using HMDA national distributions.

Mortgage characteristics are controlled by including dummy variables for loan size, lien position, and loan purpose (home improvement, investor, and refinance). The reference loan is a purchase, owner-occupied, first-lien, medium-sized loan. It is expected that purchase, owner-occupied, first-lien loans have a lower risk profile and should have a lower APR. In addition, due to fixed costs associated with underwriting, larger loans are likely to have lower APRs also (Passmore, Sherlund, and Burgess, 2005). Borrower characteristics include borrower ethnicity and a proxy for borrower credit scores. Higher

credit scores should be associated with lower APRs, while nonwhite borrowers, due to missing variables such as wealth and health status, will likely be associated with higher APRs. The average Fair Isaac FICO score for the census tract of the property is calculated from 2004 originated subprime loans using the Loanperformance Asset Backed Securities (ABS) data set. Metro- and micropolitan area (MSA) dummies are included to control for location-specific unobserved characteristics and there are no priors regarding their sign or magnitude. The summary statistics indicate that the high cost HMDA loans come from locations with relatively low credit scores (FICO=641) and a substantial fraction of nonwhite borrowers.[5]

Using ordinary least squares, three different specifications are tested. Model 1 includes an indicator that the loan is in a location with a law, while models 2 and 3 include two different versions of the law index. In addition, for identification purposes the specification in model 1 requires that the MSA includes locations without a law and at most one location with a law in effect (single-law MSAs). When the law index is introduced, variation in the index allows identification in areas with two or more different laws (multi-law MSAs). MSAs without any laws are excluded from all samples. Therefore, models 2 and 3 have a larger number of observed loans (over 95,000 in model 1 and over 199,000 in models 2 and 3).

In general the results in Table 4 indicate that predatory lending laws have only a modest impact on the cost of credit. Model 1 indicates that loans originated in locations with a predatory lending law paid 11.7 basis points less than a comparable loan in locations

without a law. Model 2 indicates that stronger laws are also associated with lower spreads. For example, a strong law such as Washington, D.C.'s law is associated with a 15 basis point reduction in the APR spread. Model 3 indicates that the reduction in the spread is associated more strongly with the extent of coverage than the extent of restrictions the law imposes. In general, this set of results provide no support for the notion that predatory lending laws impose a regulatory burden that will be passed on to the consumer through higher interest rates or upfront fees.

The mortgage, borrower, and location controls largely meet expectations. For example, smaller loans have higher spreads likely indicating the role of fixed underwriting costs.[6] In addition, spreads are higher for home improvement loans, refinances, and secondary liens. However, there does not seem to be a premium associated with investor loans. In terms of locations and borrower characteristics, nonwhite households are associated with higher spreads and Hispanic borrowers are not associated with any detectable difference in spreads. As indicated earlier, if nonwhite borrowers are associated with unobserved characteristics that would increase the cost of borrowing, then this may be reflected in the nonwhite coefficient estimate. The proxy for credit score, the subprime FICO tract level average, is also associated with lower spreads. The location-specific dummy variables are both positive and negative and are significant a little over one-half of the time. These results indicate that interest rate premiums for subprime loans may reflect perceptions of the risks associated with each location and the legal environment (Ambrose and Buttimer, 2005).

Differences-in-Differences and Interest Rates

While the HMDA specification allows for the study of the full cost of borrowing, as measured by the APR, it does not include important variables used in the pricing and underwriting of subprime loans such as credit scores and down payments (Chomsisengphet and Pennington-Cross, 2006). HMDA also does not permit the identification of adjustable and fixed rate loan types. To alleviate these issues, data from LoanPerformance on securitized subprime is used in this section. The data include individual loan down payment, FICO score at origination, great detail about the loan type, and adjustable rate details such as the margin and caps on periodic interest rate adjustments. However, the APR is not reported and there is no information on the upfront fees and points paid. [7]

To remove some unobserved heterogeneity, we limit the sample to 30-year fixed and adjustable (hybrid) rate single-family property loans. We also limit our attention to the dominate type of adjustable rate mortgage in subprime, the 2/28 adjustable rate mortgage (2/28 arm), which is a hybrid loan whose rate is fixed for the first 2 years and adjustable for the next 28 years.[8] Adjustments to the periodic interest rate are indexed to the six-month London Interbank Offered Rate (LIBOR). However, the 2/28 arm still has substantial heterogeneity in terms of adjustment caps, teasers, and other factors that will need to be controlled for to create an accurate loan level measure of the interest rate cost.

As with HMDA only metropolitan and micropolitan areas with variations in laws are included in the sample. However, the LoanPerformance data are available through time.

Time variation can be used to improve identification of the impact of the law coming into effect. We sample loans before and after the law comes into effect. In particular, only loan originations from 6 to 18 months before and 6 to 18 months after the law becomes effective are included in the sample. This "donut" hole sampling approach makes sure that any temporary adjustments to the law are not included in coefficient estimates.

The key variable of interest is *Ineffect*. This variable indicates that a loan is in a location when and where a predatory lending law is effective, or "in effect". It is defined as zero before the law is effective regardless of law status. *Ineffect* is constructed by interacting the variable *Law*, which indicates locations where the law will eventually be in effect, and *Postlaw*, which indicates the time period after a law has become in effect. Therefore, *Law* identifies the treatment location and *Postlaw* identifies the time period the treatment is in effect. There are no priors regarding the coefficients on *Law* or *Postlaw*, because they will capture prevailing market conditions that are not controlled for by other variables. Dummy variables are included for each MSA and interacted with both *Postlaw* and *Law*. Therefore, location and time-specific effects for each MSA are controlled for by this set of variables. The remaining variation associated with the time period when the law is in effect in the location with a law (*Ineffect*) is interpreted as the impact of the law on the spread. This type of dummy structure is commonly referred to as a differences-in-differences estimation due to the time and location control variables. In addition, the geographic sampling strategy aids identification of the laws' impact.

Specification

Two main features used to determine interest rates are credit history and down payments (or the Loan-To-Value, LTV, ratio). It is important to consider whether these variables could be endogenous and jointly determined with the interest or spread on the mortgage. We use the Fair Isaac's FICO score to proxy for credit history. FICO scores are used by prominent lenders such as Countrywide and IndyMac Bank as part of their pricing and interest rate matrices. If the applicant and the lender can negotiate and the borrower has the ability to adjust their credit score, then FICO should be considered an endogenous variable. However, FICO scores reflect a long history of past payments and are difficult to improve in the short run.[9] Therefore, we treat FICO as an exogenous variable.

We also use the LTV of the loan at origination because it also plays an important role in the pricing matrices. Larger down payments (smaller LTVs) are used by lenders to help compensate for other risk factors such as weak credit history. Therefore, for borrowers who are not wealth constrained, the down payment can be used to adjust to the prevailing interest rates and thus LTVs and interest rates may be jointly determined. For example, Ling and McGill (1998) show that the demand for mortgage debt is affected by borrower income, wealth, and other factors. Ambrose, LaCour-Little, and Sanders (2004) use borrower income and age to proxy for wealth to identify the LTV equation in a similar mortgage spread analysis, which focused on the impact of Fannie Mae and Freddie Mac on the cost of credit. Unfortunately, our data set does not include borrower income or age, but we can use the average 2000 Census data on zip code average income and age as proxies for wealth.[10] In addition, they also include a measure of prevailing interest rates

to proxy for debt servicing cost. We estimate the following system of equations using two-stage least squares in SAS version 9.1 for Windows:

$$ltv_j = \beta_c + \beta_f F_j + \beta_r r_j^{mkt} + \beta_i I_j + \beta_a A_j + \beta_t T_j + \beta_l L_j + \varepsilon_j^l \quad (6)$$

$$S_j = \alpha_c + \alpha_p P_j + \alpha_m M_j + \alpha_b B_j + \alpha_l L_j + \varepsilon_j^s . \quad (7)$$

In the first equation, *ltv* is the loan-to-value ratio indexed over *j* mortgages, *F* is the Fair Isaac's credit score, r^{mkt} is the prevailing prime mortgage rate in the month of origination, *I* is the zip code average income, *A* is the zip code average age, *T* is a vector of year dummies from 1998 through 2005, and *L* is a vector of MSA dummies. In the second equation, *S* is the interest rate spread (interest rate less 10 year Treasury yield or LIBOR depending on rate type), and *P*, *M*, *B*, *L* represent predatory lending laws, and mortgage, borrower, and location characteristics. ε^l and ε^s represent identically and independently distributed random error terms. To identify the impact of the law, *P* includes the previously discussed series of MSA dummies and *PostLaw* and *Law* interacted with the MSA dummies. Vectors *M* and *B* also include the previously discussed $\hat{ltv}$ or the predicted loan-to-value ratio from the first stage and *FICO,* the borrower's Fair Isaac credit score, as well as detailed information on loan type.

Table 5 provides definitions of the variables used and Table 6 provides summary statistics for the estimation samples. The system of equations is estimated separately for fixed and adjustable rate mortgages. For fixed rate loans the spread is the difference between the interest rate on the loan and the yield on 10-year treasury bills (*spread_frm*). For adjustable rate loans the spread is defined as the margin on the loan or the difference

between the fully index rate and the index (*spread_arm*). The data set is limited to 30-year term loans and the adjustable rate loans are limited to the dominate type which are the 2/28 arms indexed to the six month LIBOR, with rate adjusted every six months (after being fixed the first two years).[11]

In general, subprime lenders charge more for lower credit scores and higher LTVs; therefore spreads should be higher for loans with higher LTVs and lower FICO scores.[12] Loans for which the borrower provides little documentation (*low doc*) or no documentation (*no doc*) are likely to pay a premium to compensate for inaccurate, unstable, or illegal income and wealth sources. As in the HMDA specification, loan size dummy variables are included in the analysis to capture the impact of fixed costs of origination and servicing being spread across larger loans. Therefore, we expect that larger loans should pay lower spreads. The lien position should also impact the price of credit. First-lien loans have first rights to any recoveries on defaulted loans and, therefore, higher lien loans (*subliens*) should have a higher spread due to elevated default risk (loss severity). Dummies indicating whether the loan is for purchase, refinance with additional cash taken (*refi_cashout*), and refinance without taking additional cash out (*refi_nocash*) may also affect the interest rate. Loans that are purchased for investment opportunities (*investor*) or other purposes (*other_purpose*) are also likely to pay a premium. Some of the loans also have private mortgage insurance (*pmi*).[13] *Pmi* insures the lender against losses incurred in the event that the borrower defaults on the loan. The borrower, not the lender, pays for this insurance. Therefore, a borrower who uses PMI

should also be compensated by the lender with lower interest rates or fees, holding all other variables constant.

As previously discussed, adjustable rate loans often have caps placed on the extent that the interest rate can change over time. In particular, we include measures of the caps for the first adjustable time period and all subsequent time periods as percentages of the initial interest rate on the mortgage. Since the rate on a 2/28 arm is fixed for the first 2 years, if interest rates go up it could require a large interest rate adjustment to reach the fully indexed rate (index plus margin). Therefore, most loans impose looser caps in the first adjustment than in subsequent periods. For example, the first period cap, *fcap*, is 30 percent (not percentage points) on average, while the subsequent periodic cap, *pcap*, is 14 percent on average. Adjustable rate loans also can include teasers that initially set the interest rate below the fully indexed rate. The average teaser is 32 basis points. In addition, the inclusion of caps means that lenders are subject to interest rate risks. The two-period model theory indicates that, if the index on an adjustable rate loan is more volatile, the margin should be higher to compensate the lender. We include a measure of index volatility in the adjustable rate loan model, namely, variance in the six-month LIBOR (*libor_var*).

Ambrose and Sanders (2005) show that interest rates can also be affected by other important market factors. In particular, they examine the impact of the difference between the "AAA" bond index and the "Baa" bond index to proxy for the cost of borrowing as well as a measure of the yield curve. In addition, consistent with the two-

period model used above and from the options pricing framework, the volatility of house prices and interest rates are central to the value of a mortgage and hence its pricing and mortgage interest rates. To control for these and other unobserved factors, time dummies are included that are specific to each metropolitan area for the one-year sample before and after the law comes into effect. Therefore, these dummies will represent all national and micropolitan area and metropolitan area level factors that could affect interest rates in the mortgage market and spreads associated specifically with subprime lending.

Results

Table 6 indicates that the primary difference between adjustable and fixed rate loans is that adjustable rate loans are all first liens, they tend to be a little larger, and the borrower's credit score tends to be lower (597 vs. 662).

Details on the results of the first stage or LTV results are presented in Appendix B. The results largely meet expectations. Tables 7 and 8 report the results for the second stage or the spread results for both the fixed rate and adjustable rate specifications (equation 7) in which the predicted LTV ($\hat{ltv}$) is used. The results differ from those found using HMDA and the results for fixed rate loans differ from those for adjustable rate loans. For example, the impact of the typical law, as specified in model 1, on fixed rate mortgages is an increase in the spread by 14.5 basis points. In addition, stronger laws are associated with larger increases in the spreads. Laws with more restrictions are associated with higher spreads and laws with more coverage are associated with lower spreads. Therefore, while the impact of predatory lending laws on spreads for fixed rate loans is positive (the opposite of that found using the HMDA data), it is fairly modest. This is

consistent with the notion that lender compliance cost is fairly minimal for most lenders. In contrast, the impact of the laws on adjustable rate spreads is negative, significant, and consistent with the results from HMDA. For example, the typical law reduces the adjustable rate spread by 6.8 basis points. Stronger laws are associated with larger decreases. These decreases are associated with the extent of market coverage rather than the extent of restrictions in the law.[14]

Control variables for location (MSA dummies), law status (*law**MSA dummies), and time for each MSA (*postlaw** MSA dummies) are not reported because we have no priors regarding significance or sign. As expected coefficient estimates vary substantially from -1.42 to 1.83 with about two thirds being significant. Borrower and mortgage characteristics also perform as expected. For example, higher credit scores are associated with lower spreads for both adjustable and fixed rate loans. In fact, many of the coefficients for adjustable and fixed rate loans provide similar findings. For example, small loans and loans without PMI tend to have higher spreads. In addition, investment loans tend to carry a premium as do loans with low documentation. However, some variables have different signs and levels of significance. In general, results will reflect the underwriting standards as they are applied to different product types. For example, there should be no inherent difference between an identical refinanced loan and a for-purchase loan; however, refinance loans that do not take any cash out are associated with lowers spreads for both adjustable and fixed rate loans. Therefore, this result likely reflects unobserved factors associated with refinances that tend to make them less risky than for-purchase loans.

Mortgage characteristics for adjustable rate loans perform as expected. For example, as predicted by the two-period model used to motivate differences between fixed and adjustable rate loans, loans with larger teasers pay a higher spread than loans without teasers. In addition, loans with broad caps (less likely to be binding) on interest rate adjustments pay a lower spread because the borrower is assuming more of the interest rate risk. However, inconsistent with the theory, but consistent with prior empirical estimates, the variance of the index is associated with lower spreads (Sprecher and Willman, 1998).

In summary, the results showed a modest positive and negative impact of predatory lending laws on interest spreads for fixed rate and adjustable rate loans, respectively. These results may reflect the ability of lenders to adjust the terms of adjustable rate loans more than on fixed rate loans in order to comply with the requirements of a predatory lending law. Since the law triggers apply to the APR on adjustable rate loans, which assumes constant future interest rates, one method to avoid a predatory lending law is to adjust the caps on interest rate adjustments. For example, a 10 percent increase in the first-period adjustment cap and periodic cap reduces the margin (fully adjusted interest rate) by over a full percentage point. Therefore, lenders may loosen of caps in locations with a law coming into effect. We calculated the percentage change in the cap strength over the pre-law to post-law period for both control and treatment locations and found that both (first and periodic) cap measures have increased (loosened) substantially more in locations with a law in effect. For example, the first-period (periodic) cap increased by

17 (6.5) percent in locations without a law, compared with 42.5 (16.9) percent in locations with a law coming into effect.

As a result, it is possible to shift a significant proportion of borrowers so that the predatory lending law does not apply (not covered). Take, for example, the laws in Illinois and Washington D.C., both of which have a first-lien APR trigger of 6 percent. These laws, using the HMDA national distributions in Figure 1, cover about 5.5 percent of loans, using only the APR trigger. Assuming a one-percentage-point change in the margin roughly corresponds to the same change in the APR, adjusting the caps by 10 percent in these locations can have the effect of shifting about two thirds of previously covered loans out of the laws' coverage. As a result, these borrowers will be facing more volatility in interest rates and payments in the future. While this may not be a concern in a "down rate" environment, if interest rates increase substantially these borrowers will experience larger payment shocks than they would have with more stringent caps in place.

Summary & Conclusion

Since 1999, state and local predatory lending laws have spread to a geographically and demographically divergent collection of locations, including the states Maine, Maryland, and Nevada, among many others. The laws tend to follow the structure of federal regulations as articulated by HOEPA; however, the local nature of the regulation has lead to spatially differentiated predatory lending laws, which have become today's usury laws. This paper examines whether these laws are associated with increases or decreases in the cost of credit. Evidence that the cost of credit increases when a law is enacted is

consistent with a regulatory compliance cost being passed onto the consumer. In contrast, evidence that the cost of credit decreases when a law is introduced provides additional support for beliefs that (1) predation has been a substantial problem in the subprime mortgage market and/or (2) lenders and borrower have been able to find alternative types of loans not covered by the law.

The results of this paper provide two different and potentially contradictory results. For example, in preliminary evidence using HMDA data, the APR (includes the periodic interest rate and upfront points and fees) spread is negatively associated with the introduction of a predatory lending law. That is, the cost of credit is lower when there is a law after controlling for borrower, location, and some loan type characteristics. However, this data set suffers because it cannot control for crucial parts of the subprime (risk-based pricing) underwriting paradigm. For example, the endogenously determined down payment and the credit score of the borrower are not available. HMDA also cannot distinguish between adjustable and fixed rate loan types and provides no detail on the unique characteristics of adjustable rate loans, such as teasers, caps on interest rate adjustments, and the margin (the premium paid above the index when the rate is fully adjusted). In addition, to date HMDA can provide only a cross-sectional view of the year 2004.

An alternative set of results, using a different data set that provides great detail about loan type, has substantially different results. This data set provides a time series at the loan level that allows for a more complete differences-in-differences specification that can

control for location and the time period before and after the law is approved and put into effect. However, this data set does not provide any information on upfront fees and points. In a cross-sectional estimation designed to mimic HMDA (no distinction made on rate adjustment type), the results for the interest rate spread were very similar to the results for the APR spread when using HMDA. However, when a more complete model is formulated, the results indicate that the impact of the law depends on product type. In particular, modest regulatory costs, as measured by the interest rate spread, seem to be passed to consumers using fixed rate subprime loans. In contrast, the laws had a small negative impact on the interest rate spread of adjustable rate loans.

One interpretation of this result is that it is relatively easy for adjustable rate loans to find a substitute loan type that can evade coverage of the law while maintaining the same expected return for the lender. For example, one way to avoid being subject to a law is to reduce the APR below a predetermined threshold. This can be done, while holding constant lender expected rates of return, by shifting the interest rate risk from the lender to the borrower by adjusting interest rate caps. For example, results indicate that by increasing the initial period and periodic interest rate adjustment caps by 10 percent, the interest rate on a loan should drop by over 1 percentage point. This type of adjustment is not possible for fixed rate loans without changing the expected rate of return.

In summary the results indicate that state and local predatory lending laws have at most a modest regulatory cost, which is passed on to consumers. However, this cost is only directly observable for fixed rate loans because it is straightforward on adjustable rate

loans to evade law coverage by manipulating interest rate adjustment caps or other features. In addition, while the 2004 release of HMDA may seem like a good source of information on borrower cost, any results are likely biased as a result of missing variables and misspecification.

End Notes

[1] Laws are first enacted by the local legislature and become effective typically at a later date. It is not until the law becomes in effect that lenders are required to follow the new rules and restrictions.

[2] More details on the scaling and creation of the index are available in Ho and Pennington-Cross (2006). Before scaling of the index, points are assigned to each law using the following scheme: **Coverage**: *Loan Purpose* (HOEPA equivalent=0, all loans except no government loans=1, all loans except no reverse or open loans=2, all loans except no reverse, business, or construction loans=3, and all loans with no exceptions=4), *APR Trigger 1st Lien* (8%, HOEPA equivalent=0, 7%=1, 6%=2, and no trigger=3), *APR Trigger Higher Liens* (10%, HOEPA equivalent=0, 9%=1, 8%=2, 7%=3, and no trigger=4), *Points and Fees Trigger* (8%, HOEPA equivalent=0, 6%-7%=1, 5%=2, <5%=3, and no trigger=4). **Restrictions** : *Prepayment Penalty Prohibitions* (No restriction=0, prohibition or percent limits after 60 months=1, prohibition or percent limits after 36 months=2, prohibition or percent limits after 24 months=3, and no penalties allowed=4), *Balloon Prohibitions* (No restriction=0, no balloon if term<7 years (all term restrictions)=1, no balloon in first 10 years of mortgage=2, no balloon in first 10 years of mortgage and Cleveland=3, and no balloons allowed=4), *Counseling Requirements* (Not required=0, and required=1), *Mandatory Arbitration Limiting Judicial Relief* (Allowed=0, partially restricted=1, and prohibited=2).

[3] An alternative explanation is that lenders respond by increasing the promotion or supply of subprime credit after a law is passed because any uncertainty about the legality of the loans has been removed.

[4] An alternative approach is to follow options pricing theory (for example, Buser et al. (1985), Hendershott and Shilling (1985), Kau et al. (1990)).

[5] Specification tests including borrower income were insignificant and are not reported.

[6] Loans that do not meet the Fannie Mae and Freddie Mac loan limit (conventional conforming loan limit) are not included in the sample. In addition, concerns that loan size is an endogenous variable are mitigated by including only very gross loan size dummies and are not the focus of this paper. Passmore, Sherlund, and Burgess (2005) follow a similar strategy and include only a dummy for small loans.

[7] To test whether the same results would be found if upfront fees and points are excluded from the spread, a model is run using the interest rate spread as the dependent variable using 2005 loan originations data from LoanPerformance Asset Backed Securities (ABS). The findings were very similar to those found using HMDA and the APR and are available in Appendix A. For example, the impact of the typical law was a reduction in the spread by 8.9 basis points, while the HMDA APR results found a 11.7 basis point reduction in the spread. In addition, we attempted to match HMDA to the LoanPerformance data set to obtain APR information. Our overall 1-to-1 matching rate is 15 percent, given that we require perfect matching on location, loan amount, lien status, loan purpose, property type, and occupancy status. We estimate a similar specification, using all available loan information to explain APR spread. We find that the models generally have poor fit, weak precision, and some non-sensible coefficient estimates. We conclude that our matching is largely inaccurate and therefore do not report the results.

[8] Over the period 1998-2005 2/28 arm make up approximately 75 percent of the adjustable rate market (calculated from the LoanPerformance database).

[9] In contrast, credit scores can be dramatically affected by new *derogatory* information such as a charge-off or bankruptcy.

[10] The U.S. Census reports zip code tabulation areas, which were matched to the five-digit postal zip codes provided in the loan-level data.

[11] Over 98 percent of the 2/28 adjustable rate loans in our sample have these features.

[12] Additional specification tests were conducted by interacting FICO with LTV to test for evidence that the marginal cost of providing a smaller down payment increases for borrowers with lower credit scores. Evidence was found of this effect for fixed rate loans, but not for adjustable rate loans. All other coefficient estimates were not materially affected by including FICO and LTV interactions.

[13] In the prime mortgage market Fannie Mae and Freddie Mac require that loans with less than a 20 percent down payment also have PMI. As a result, PMI and LTV are almost perfectly collinear. This relationship does not hold in subprime. Many loans with little or even no equity do not have PMI, but are charged directly through upfront fees and the periodic interest rate for the increased credit risk.

[14] Indicating the importance of controlling for the unique features associated with adjustable rate loans, additional specification tests that did not include measures of adjustment rate caps lead to larger and more negative coefficient estimates for *Ineffect*.

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Table 1: The Law Index

State	Full Index	Coverage Index	Restrictions Index
Arkansas	10.06	2.73	7.33
California	7.07	5.09	1.98
Chicago, IL	12.64	10.20	2.43
Cleveland, OH	15.19	4.35	10.84
Colorado	16.19	12.87	3.31
Connecticut	6.92	2.73	4.20
Cook County, IL	12.64	10.20	2.43
Florida	1.98	0.00	1.98
Georgia	14.88	4.13	10.76
Illinois	17.16	8.73	8.43
Indiana	7.55	2.36	5.19
Kentucky	4.95	0.74	4.22
Maine	1.47	1.47	0.00
Maryland	10.51	5.84	4.67
Massachusetts	9.68	4.13	5.55
Nevada	1.47	1.47	0.00
New Jersey	6.27	3.13	3.14
New Mexico	12.91	6.28	6.63
New York	6.82	4.13	2.69
North Carolina	5.07	1.11	3.96
Ohio	2.38	1.47	0.90
Oklahoma	4.59	0.74	3.85
Pennsylvania	2.92	1.47	1.44
South Carolina	8.83	2.36	6.47
Texas	3.79	0.74	3.06
Utah	2.55	1.47	1.08
Washington, DC	14.89	10.50	4.39
Wisconsin	2.63	1.55	1.08
Average	8.00	4.00	4.00
Standard Deviation	4.98	3.52	2.87

Table 2: List of Metropolitan and Micropolitan Statistical Areas

Variable name	Metropolitan and Micropolitan Statistical Areas
ar1	Fayetteville - Springdale - Rogers AR-MO
ar2	Memphis TN-MS-AR
dc	Washington - Arlington - Alexandria DC-VA-WV
ga1	Chattanooga TN-GA
ga2	Columbus GA-AL
il1	Burlington IA-IL
il2	Cape Girardeau - Jackson MO-IL
il3	Davenport - Moline - Rock Island IA-IL
il4	Quincy IL-MO
il5	St Louis MO-IL
in	South Bend - Mishawaka IN-MI
ky1	Clarksville TN-KY
ky2	Huntington - Ashland WV-KY
ky3	Union City TN-KY
ma1	Boston - Cambridge - Quincy MA-NH
ma2	Providence - New Bedford - Fall River RI-MA
md1	Cumberland MD-WV
md2	Hagerstown - Martinsburg MD-WV
nc	Virginia Beach - Norfolk - Newport News VA-NC
oh1	Parkersburg - Marietta WV-OH
oh2	Point Pleasant WV-OH
oh3	Weirton - Steubenville WV-OH
oh4	Wheeling WV-OH
pa	Philadelphia - Camden - Wilmington PA-DE
ut	Logan UT-ID
wi1	Duluth MN-WI
wi2	Iron Mountain MI-WI
wi3	La Crosse WI-MN
wi4	Marinette WI-MI
wi5	Minneapolis - St Paul - Bloomington MN-WI
njpa	Allentown - Bethlehem - Easton PA-NJ
nynjpa	New York - Northern New Jersey - Long Island NY-NJ-PA
ohky	Cincinnati - Middletown OH-KY
ohpa	Youngstown OH-PA
txar	Texarkana TX-AR

Notes: Cross-sectional (HMDA) estimation excludes laws that are passed in 2004 (IL, IN, UT, WI). Multiple-law MSAs are used in law index models (models 2 and 3). Panel estimation (LoanPerformance) only includes single-law MSAs.

Table 3: Definition and Descriptive Statistics of HMDA Variables

Variable	Definition	Mean	Std. dev.
Dependent variable			
spread	Annual Percentage Rate (APR) minus yield on Treasury securities of comparable maturity (%).	4.727	1.720
Identification			
ineffect	Dummy indicates loan is in location with a predatory lending law in effect. Loans in locations without a law in effect are the reference group.	0.732	0.443
Mortgage			
small_loan	Dummy indicates loan amounts in the lower quartile of observed loan amounts. The two middle quartiles is the reference group.	0.219	0.413
large_loan	Dummy indicates loan amounts in the upper quartile of observed loan amounts. The two middle quartiles is the reference group.	0.293	0.455
home_improv	Dummy indicates loan is contracted for home improvement purpose. Home purchase is the reference group.	0.074	0.261
refi	Dummy indicates loan is contracted for refinancing purpose. Home purchase is the reference group.	0.567	0.495
investor	Dummy indicates nonowner-occupancy status. Owner occupied is the reference group.	0.087	0.283
sublien	Dummy indicates loan is secured by a subordinate lien. First lien is the reference group.	0.219	0.414
Location/Borrower			
fico_tract	Average FICO score of Census tract, calculated from LoanPerformance ABS database.	639.5	17.4
hispanic	Dummy indicates borrower is of Hispanic or Latino ethnicity. The reference group is non-Hispanic.	0.142	0.349
nonwhite	Dummy indicates borrower is of a race other than white. The reference group is white.	0.342	0.474

Notes: These statistics are for the full sample including all multiple-law MSAs.

Table 4: Impact of Predatory Lending Laws on APR

Variable	Model 1		Model 2		Model 3	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
intercept	4.485**	0.192	4.328**	0.126	4.334**	0.126
Identification						
ineffect	-0.117**	0.012	--	--	--	--
law_index	--	--	-0.010**	0.001	--	--
coverage	--	--	--	--	-0.012**	0.003
restrictions	--	--	--	--	-0.007*	0.003
Mortgage						
small_loan	0.462**	0.013	0.459**	0.009	0.459**	0.009
large_loan	-0.140**	0.011	-0.102**	0.007	-0.101**	0.007
home_improv	0.713**	0.016	0.573**	0.011	0.573**	0.011
refi	0.229**	0.009	0.174**	0.006	0.175**	0.006
investor	-0.015	0.015	-0.005	0.010	-0.005	0.010
sublien	2.581**	0.014	2.567**	0.009	2.567**	0.009
Location/Borrower						
fico_tract	-0.081**	0.029	-0.052**	0.019	-0.053**	0.019
hispanic	-0.009	0.015	-0.005	0.009	-0.005	0.009
nonwhite	0.137**	0.010	0.114**	0.006	0.115**	0.006
ar1	0.136**	0.031	0.115**	0.028	0.105**	0.031
ar2	0.183**	0.018	0.169**	0.017	0.169**	0.017
dc	-0.104**	0.017	-0.123**	0.015	-0.121**	0.015
ga1	0.158**	0.026	0.165**	0.024	0.161**	0.024
ga2	0.555**	0.037	0.587**	0.035	0.574**	0.039
ky1	-0.029	0.041	-0.054	0.039	-0.056	0.039
ky2	0.132**	0.047	0.099*	0.043	0.095*	0.043
ky3	0.311**	0.097	0.321**	0.092	0.320**	0.092
ma1	-0.061**	0.020	-0.108**	0.017	-0.111**	0.017
ma2	-0.154**	0.020	-0.188**	0.018	-0.189**	0.018
md1	0.190**	0.067	0.165**	0.063	0.166**	0.063
md2	-0.035	0.037	-0.049	0.034	-0.047	0.034
oh1	0.092	0.055	0.060	0.052	0.060	0.052
oh2	0.233	0.121	0.191	0.114	0.192	0.114
oh3	0.093	0.061	0.029	0.057	0.030	0.057
oh4	0.077	0.060	0.037	0.056	0.038	0.056
pa	0.032	0.019	-0.010	0.015	-0.010	0.015
njpa	--	--	0.030	0.024	0.030	0.024
nynjpa	--	--	-0.057**	0.014	-0.055**	0.015
ohky	--	--	-0.005	0.017	-0.006	0.017
ohpa	--	--	0.044	0.025	0.045	0.025
txar	--	--	0.018	0.053	0.010	0.053
Adjusted R-squared	0.486		0.505		0.505	
Number of loans	95,633		199,030		199,030	

Notes: Estimated using Ordinary Least Squares (OLS); HMDA 2004 cross section; Dependent variable is spread between APR and T-bill rate of comparable maturity; *fico_tract* is expressed in 100's; ** indicates significance at 99% level and * indicates significance at 95% level.

Table 5: Definition of LoanPerformance Variables

Variable	Definition
Dependent variables	
spread_frm	Spread on fixed rate loans: interest rate minus yield on 10-year T-bill (%)
spread_arm	Spread on adjustable rate loans: margin = fully indexed rate - 6-month LIBOR (%).
Identification	
law	Dummy indicates location with a predatory lending law.
postlaw	Dummy indicates post-legislation time period.
ineffect	Interaction of *law* and *postlaw* indicating property is in a location with a law currently effective.
Borrower/Mortgage	
fico	Borrower's Fair Isaac credit score.
ltv	Loan-to-value ratio.
small_loan	Dummy indicates loan amounts in the lower quartile of observed loan amounts. The two middle quartiles are the reference group.
large_loan	Dummy indicates loan amounts in the upper quartile of observed loan amounts. The two middle quartiles are the reference group.
pmi	Dummy indicates loan has private mortgage insurance.
lowdoc	Dummy indicates borrower provides low document Full document is the reference group.
nodoc	Dummy indicates borrower provides no document Full document is the reference group.
sublien	Dummy indicates loan is secured by a subordinate lien First lien is the reference group.
refi_cashout	Dummy indicates loan is contracted for refinancing purpose, with cash out Purchase is the reference group.
refi_nocash	Dummy indicates loan is contracted for refinancing purpose, no cash out Purchase is the reference group.
other_purpose	Dummy indicates loan is contracted for another purpose Purchase is the reference group.
investor	Dummy indicates nonowner-occupancy status Owner occupied is the reference group.
ARM only	
teaser	Spread between initial interest rate and fully indexed rate.
fcap	First period cap as percentage of initial interest rate.
pcap	Periodic cap as percentage of initial interest rate.
libor_var	Std. dev. in the index (6-month LIBOR) over the previous 6 months.

Table 6: Descriptive Statistics of LoanPerformance Variables

Variable	FRM sample		ARM sample	
	Mean	Std. dev.	Mean	Std. dev.
Dependent variables				
spread_frm	4.000	2.189	--	--
spread_arm	--	--	6.247	1.059
Identification				
law	0.341	0.474	0.281	0.450
postlaw	0.548	0.498	0.672	0.469
ineffect	0.193	0.395	0.206	0.405
Borrower/Mortgage				
fico	662.1	69.2	596.6	57.4
ltv	83.1	18.6	81.8	11.5
small_loan	0.346	0.476	0.112	0.316
large_loan	0.180	0.384	0.215	0.411
pmi	0.237	0.425	0.272	0.445
lowdoc	0.266	0.442	0.276	0.447
nodoc	0.023	0.150	0.006	0.075
sublien	0.230	0.421	0.000	0.000
refi_cashout	0.562	0.496	0.549	0.498
refi_nocash	0.147	0.354	0.116	0.321
other_purpose	0.001	0.036	0.001	0.024
investor	0.118	0.322	0.073	0.260
ARM only				
teaser	--	--	0.324	1.518
fcap	--	--	0.300	0.119
pcap	--	--	0.140	0.042
libor_var	--	--	0.243	0.154
Sample size	66,208		57,569	

Table 7: Impact of Predatory Lending Laws on Fixed Rate Mortgages

Variable	Model 1		Model 2		Model 4	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
intercept	8.396**	0.167	8.395**	0.167	8.410**	0.167
Identification						
ineffect	0.145**	0.034	--	--	--	--
law_index	--	--	0.009**	0.003	--	--
coverage	--	--	--	--	-0.034**	0.011
restrictions	--	--	--	--	0.052**	0.011
Borrower/Mortgage						
fico	-0.011**	0.000	-0.011**	0.000	-0.011**	0.000
$\hat{ltv}$	0.022**	0.002	0.022**	0.002	0.022**	0.002
small_loan	0.503**	0.016	0.503**	0.016	0.503**	0.016
large_loan	-0.126**	0.017	-0.125**	0.017	-0.127**	0.017
pmi	-0.038**	0.014	-0.038**	0.014	-0.038**	0.014
lowdoc	0.137**	0.013	0.137**	0.013	0.136**	0.013
nodoc	0.527**	0.037	0.527**	0.037	0.528**	0.037
sublien	2.617**	0.019	2.617**	0.019	2.617**	0.019
refi_cashout	0.013	0.013	0.013	0.013	0.014	0.013
refi_nocash	-0.587**	0.018	-0.587**	0.018	-0.586**	0.018
other_purpose	-0.182	0.151	-0.181	0.151	-0.183	0.151
investor	0.217**	0.018	0.217**	0.018	0.218**	0.018
Adjusted R-squared	0.592		0.592		0.593	
Number of loans	66,208		66,208		66,208	

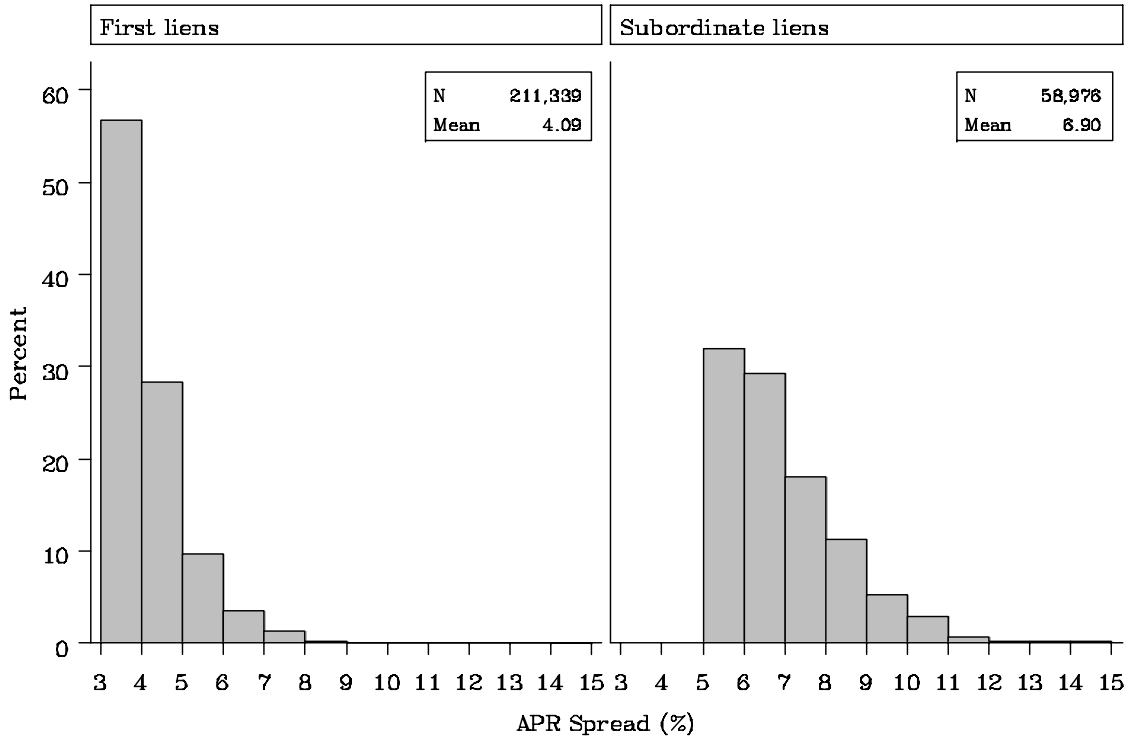
Notes: Second-stage results of Two Stage Least Squares (2SLS), LP panel 1998-2005; Dependent variable is *spread* between interest rate and 10-year T-bill; *fico* and *ltv* are expressed in 10's; $\hat{ltv}$ is predicted value of ltv from first stage; Coefficients for *msa*, *law* and *postlaw* dummies are not reported; ** indicates significance at 99% level, * indicates significance at 95% level.

Table 8: Impact of Predatory Lending Laws on Adjustable Rate Mortgages

Variable	Model 1		Model 2		Model 3	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
intercept	10.338**	0.196	10.340**	0.196	10.347**	0.196
Identification						
ineffect	-0.068**	0.024	--	--	--	--
law_index	--	--	-0.006**	0.002	--	--
coverage	--	--	--	--	-0.024**	0.009
restrictions	--	--	--	--	0.014	0.009
Borrower/Mortgage						
teaser	0.587**	0.003	0.587**	0.003	0.587**	0.003
fcap	-2.287**	0.033	-2.287**	0.033	-2.287**	0.033
pcap	-8.025**	0.090	-8.024**	0.090	-8.027**	0.090
libor_var	-0.353**	0.028	-0.353**	0.028	-0.353**	0.028
fico	-0.005**	0.000	-0.005**	0.000	-0.005**	0.000
$\hat{ltv}$	-0.011**	0.004	-0.011**	0.004	-0.011**	0.004
small_loan	0.247**	0.012	0.247**	0.012	0.246**	0.012
large_loan	-0.122**	0.009	-0.122**	0.009	-0.122**	0.009
pmi	-0.057**	0.008	-0.057**	0.008	-0.056**	0.008
lowdoc	0.101**	0.008	0.101**	0.008	0.101**	0.008
nodoc	-0.327**	0.045	-0.327**	0.045	-0.327**	0.045
refi_cashout	-0.183**	0.008	-0.183**	0.008	-0.183**	0.008
refi_nocash	-0.183**	0.012	-0.183**	0.012	-0.183**	0.012
other_purpose	0.453**	0.140	0.453**	0.140	0.453**	0.140
investor	0.110**	0.014	0.110**	0.014	0.110**	0.014
Adjusted R-squared	0.466		0.466		0.466	
Number of loans	57,569		57,569		57,569	

Notes: Second-stage results of 2SLS, LP panel 1998-2005; Dependent variable is *spread* between fully indexed rate and 6-month LIBOR (margin); *fico* and *ltv* are expressed in 10's; $\hat{ltv}$ is predicted value of *ltv* from first stage; Coefficients for *msa*, *law* and *postlaw* dummies are not reported; ** indicates significance at 99% level, * indicates significance at 95% level.

Figure 1: Distribution of APR Spread – HMDA 2004



Appendix

Table A1: Interest Rate Spread Results, 2004 Cross Section, LoanPerformance Data

Variable	Model 1		Model 2		Model 3	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
intercept	6.309**	0.184	6.227**	0.108	6.161**	0.109
Identification						
law	-0.089**	0.014	--	--	--	--
law_index	--	--	0.001	0.001	--	--
coverage	--	--	--	--	-0.026**	0.003
restrictions	--	--	--	--	0.030**	0.004
Borrower/Mortgage						
fico	-0.011**	0.000	-0.011**	0.000	-0.011**	0.000
$\hat{ltv}$	0.041**	0.003	0.040**	0.001	0.041**	0.001
small_loan	0.280**	0.015	0.211**	0.011	0.211**	0.011
large_loan	-0.080**	0.013	-0.069**	0.009	-0.066**	0.009
pmi	0.290**	0.012	0.242**	0.008	0.242**	0.008
lowdoc	0.045**	0.011	0.049**	0.007	0.049**	0.007
nodoc	-0.588**	0.034	-0.562**	0.022	-0.562**	0.022
sublien	3.439**	0.030	3.517**	0.021	3.516**	0.021
refi_cashout	-0.225**	0.012	-0.258**	0.008	-0.256**	0.008
refi_nocash	-0.339**	0.019	-0.385**	0.013	-0.385**	0.013
other_purpose	1.644**	0.216	1.024**	0.145	1.020**	0.145
investor	0.002	0.017	0.048**	0.012	0.053**	0.012
Location						
ar1	-0.080	0.047	-0.178**	0.046	-0.312**	0.049
ar2	0.028	0.024	0.055*	0.023	0.051*	0.023
dc	-0.115**	0.027	-0.142**	0.021	-0.107**	0.021
ga1	0.000	0.032	-0.009	0.032	-0.066*	0.032
ga2	0.091	0.048	0.035	0.048	-0.121*	0.051
ky1	-0.213**	0.057	-0.203**	0.056	-0.222**	0.056
ky2	0.055	0.072	0.056	0.071	0.000	0.071
ky3	0.020	0.192	0.069	0.191	0.054	0.192
ma1	-0.147**	0.033	-0.243**	0.025	-0.274**	0.026
ma2	-0.244**	0.029	-0.263**	0.024	-0.266**	0.024
md1	0.069	0.094	0.028	0.093	0.052	0.093
md2	-0.044	0.045	-0.103*	0.044	-0.083	0.044
oh1	0.005	0.106	0.023	0.105	0.030	0.106
oh2	0.138	0.202	0.100	0.201	0.115	0.202
oh3	0.030	0.089	0.027	0.088	0.037	0.088
oh4	0.087	0.084	0.100	0.083	0.107	0.083
pa	-0.131**	0.023	-0.157**	0.018	-0.154**	0.019
njpa	--	--	-0.177**	0.030	-0.176**	0.030
nynjpa	--	--	-0.141**	0.022	-0.111**	0.022
ohky	--	--	-0.148**	0.023	-0.158**	0.023
ohpa	--	--	-0.117**	0.033	-0.106**	0.034
txar	--	--	0.132	0.088	0.051	0.089
Adjusted R-squared	0.407		0.387		0.385	
Number of loans	63,774		141,714		141,714	

Notes: See Table 5 for variable definitions. Second-stage results of 2SLS results reported using LoanPerformance data for loans originated in 2004. The dependent variable is spread between interest rate and T-bill rate of comparable maturity regardless of product type. *fico* and *ltv* are expressed in 10's; $\hat{ltv}$ is the predicted value of LTV from first stage which is not reported. ** indicates significance at 99% level and * indicates significance at 95% level.

Table A2: First Stage Estimation of Loan-to-Value Ratio (ltv)

Variable	FRM sample		ARM sample	
	Coeff.	Std. Err.	Coeff.	Std. Err.
intercept	60.558**	3.585	48.954**	2.353
Borrower/Market				
fico	0.029**	0.001	0.053**	0.001
frm_30	0.911**	0.257	-0.069	0.184
income	0.365**	0.015	0.107**	0.012
incomesq	-0.003**	0.000	-0.001**	0.000
age	0.358*	0.179	0.302**	0.114
agesq	-0.013**	0.002	-0.007**	0.002
Time				
y98	-0.630	0.775	-4.146**	1.393
y99	3.320**	0.707	-2.038**	0.598
y00	4.180**	0.676	-2.698**	0.478
y01	3.643**	0.463	-1.264**	0.318
y02	2.457**	0.342	-1.779**	0.196
y03	-0.468	0.269	-1.353**	0.145
y04	0.260	0.292	-0.523**	0.141
Location				
ar1	-7.579**	0.788	1.913**	0.739
ar2	-6.674**	0.532	3.043**	0.611
dc	-14.916**	0.524	-3.621**	0.608
ga1	-6.039**	0.622	2.248**	0.678
ga2	-3.969**	0.759	3.051**	0.834
il1	2.762	2.397	0.831	1.192
il2	-8.338**	1.459	3.237**	1.007
il3	-2.759**	0.765	1.945**	0.672
il4	-3.671	3.323	4.507*	1.894
il5	-7.110**	0.522	0.968	0.599
in	-4.509**	0.679	1.680**	0.651
ky1	-5.054**	0.871	1.818*	0.827
ky2	-4.554**	1.102	2.544**	0.871
ky3	-1.654	2.357	2.743	1.780
ma1	-19.681**	0.483	-7.893**	0.587
ma2	-10.395**	0.536	-3.111**	0.610
md1	0.059	1.526	1.141	1.517
md2	-3.641**	0.893	0.337	0.890
oh1	-4.893**	1.411	3.296*	1.421
oh2	-1.955	3.215	1.144	2.684
oh3	-1.877	1.332	1.688	1.113
oh4	-3.002*	1.438	1.342	1.239
pa	-11.108**	0.466	-1.075	0.591
ut	-10.130**	1.212	-2.011*	0.966
wi1	-7.939**	0.835	-0.533	0.711
wi2	0.003	3.899	2.697	1.693
wi3	-1.848	1.544	0.674	1.028
wi4	-5.840**	1.609	-0.773	0.941
wi5	-13.159**	0.527	-2.207**	0.602
Adjusted R-squared	0.098		0.173	
Number of loans	66,208		57,569	

Notes: *nc* is the excluded msa; ** indicates significance at 99% level, * indicates significance at 95% level.

Table A2 provides the first-stage results used to calculate the predicted *ltv* for models 1, 2, and 3 for both the adjustable and fixed rate loans as reported in Tables 7 and 8. The results substantially meet prior expectations. For example, the proxies for wealth indicate that older borrowers and borrowers with more income are able to support smaller down payments. However, the relationships are both nonlinear. The smallest down payments are made by borrowers making approximately $61,000 and borrowers almost 54 years old. Also consistent with subprime underwriting requirements, borrowers with worse credit history tend to provide larger down payments to compensate for the increased credit risk associated with lower credit scores. Consistent with Ambrose, LaCour-Little, and Sanders (2004) the market interest rate is negatively associated with down payments for fixed rate loans. The time dummy variables control for changing macroeconomic conditions that could impact subprime interest rates and MSA dummies also proxy for other missing variables such as the affordability of housing. Therefore, we have no strong priors on the sign or magnitude of these variables.