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# The Impact of Local Predatory Lending Laws on the Flow of Subprime Credit\*

By Giang Ho and Anthony Pennington-Cross

*Local authorities in North Carolina, and subsequently in at least 23 other states, have enacted laws intending to reduce predatory and abusive lending. While there is substantial variation in the laws, they typically extend the coverage of the Federal Home Ownership and Equity Protection Act (HOEPA) by including home purchase and open-end mortgage credit, by lowering annual percentage rate (APR) and fees and points triggers, and by prohibiting or restricting the use of balloon payments and prepayment penalties. Empirical results show that the typical local predatory lending law tends to reduce rejections, while having little impact on the flow (application and origination) of credit. However, the strength of the law, measured by the extent of market coverage and the extent of prohibitions, can have strong impacts on both the flow of credit and rejections.*

## 1. Introduction

The current mortgage market consists primarily of two segments—the prime market and the subprime market. The prime market extends credit to the majority of households. The subprime market provides more expensive credit to households who do not qualify for a prime mortgage. These households tend to be less financially secure and located in low-income areas and areas with a concentration of minorities. The combination of higher borrower costs and higher rates of delinquency and foreclosure have led to public policy concerns over fairness and accessibility of credit.

Subprime lending represents an opportunity for the mortgage market to extend the possibility of home ownership beyond traditional barriers. These barriers have existed because the prime segment of the mortgage market uses lending standards (credit scores, documented employment history, income, and wealth, among other factors) to accept or reject loan applicants. Applicants that are rejected or expect to be rejected can look to the more expensive subprime market. In this fashion the subprime market completes the mortgage market and can be welfare enhancing (Chinloy and MacDonald [4]) because it provides the opportunity of home ownership to a larger portion of the population.

Over the past ten years subprime lending has grown rapidly—from \$65 billion to \$332 billion of originations from 1995 through 2003 (Inside Mortgage Finance [16]).<sup>1</sup> According to the Mortgage Bankers Association of America, the rate that loans were in foreclosure from the first

quarter of 1998 to the third quarter of 2004 rose by more than 400 percent for subprime loans while declining by approximately 25 percent for prime loans. In addition, during the same time period anecdotal evidence of predatory lending in the subprime market was gaining more public and regulatory attention.<sup>2</sup> Therefore, the welfare benefit associated with increased access to credit is believed to have been reduced by some unscrupulous lending in the subprime mortgage market.

In response to public concerns of predation in the subprime mortgage market, federal regulations generated under the Home Ownership and Equity Protection Act (HOEPA) restrict some types of high-cost lending. Many states, cities, and counties have used HOEPA as a template and have extended the restrictions on credit to an even broader class of mortgages. These restrictions include limits on allowable prepayment penalties and balloon payments, prohibitions of joint financing of various insurance products (credit, life, unemployment, etc.), and requirements that borrowers participate in loan counseling.

By introducing geographically defined predatory lending laws, policymakers have conducted a natural experiment with well defined control and treatment groups. Since state boundaries reflect political and not economic regions, we can compare mortgage market conditions in states with a law in effect<sup>3</sup> (the treatment group) to those in neighboring states currently without a predatory lending law (the control group). However, instead of examining whole states we focus on households that are geographically close to each other (border counties) and as a result are in similar labor and housing markets.

Data at the individual loan level are used to identify the impact of local predatory lending laws on subprime applications, originations, and rejections. We create an index that measures the strength of the local laws. This index measures the increase in market coverage and the extent that certain lending practices and mortgage types are restricted. We find that the strength of the law can have strong impacts on both the flow of credit and rejections. In fact, variation in the law design can create substantial heterogeneity in the response of the mortgage market to local predatory lending laws, and therefore the findings of previous research on the North Carolina law cannot be generalized to other states.

This paper provides at least three contributions to the literature: (i) a wide variety of local predatory lending laws are characterized, (ii) the question of whether the market response in North Carolina (reduce flow of credit) was typical or atypical is examined, and (iii) the importance of the strength of the law on the flow of credit is examined.

## **2. Potential Impacts of Predatory Lending Laws**

Assume that a predatory lending law is introduced that imposes restrictions on subprime mortgage lenders in terms of allowable loan types, required lending practices, and information disclosures. By reducing the menu of available loan types some borrowers will have a more difficult time qualifying for a loan. In particular, prepayment penalties and balloons mitigate the debt to income requirement by reducing debt servicing (lower periodic interest payments and a slower amortization schedule). Therefore, if profitable and complying substitutes for these loan characteristics cannot be identified, fewer loans will be originated and lending standards will be tighter.

In addition, if a law cannot perfectly identify predatory loans the law will also restrict some legitimate lending. While beyond the scope of this paper, in order to determine if the law will have a net positive impact requires weighing the benefits of stopping predation versus the cost of denying access to legitimate high cost credit.

The impact of the law that requires tighter lending standards on the number of applications is a little more indirect. If households apply for a loan regardless of the probability of the application being accepted, a tightening of lending standards will have no impact on application rates. In contrast, if there is an application cost (time or money) potential applicants should be deterred from applying when the chance of being accepted is low.<sup>4</sup> Therefore, we should expect that a tightening of subprime lending standards would be associated with a reduction in the number of subprime applications. In addition, the impact of the law on the rejection rate is indeterminate and will depend on the shape of the application function (probability of applying) and its responsiveness to changing lending standards.<sup>5</sup>

However, in a market with some dishonest loans, all borrowers must exert extra effort and time to screen the lender and loan documents to sort the honest from the dishonest loan offers. This effort represents extra costs (transaction costs) for the borrowers (Akerlof [1]) and as a result the uncertainty in loan quality can deter potential applicants from applying. If the introduction of the predatory lending law removes or heavily regulates dishonest loans there could be a reduction in the fear of being taken advantage of and a lessening in the need to expend effort sorting honest loans from dishonest loans. Therefore, in markets where potential applicants are deterred from applying due to fears of predation, the impact of a predatory lending law could be neutral or could even increase the rate of subprime application and origination.

## **3. Literature on Predatory Lending Laws**

Research on predatory lending laws has been primarily focused on the impact of the

North Carolina law and found that the law significantly reduced the flow of credit. Various methods and data sets have been used for analysis. Each data source has its different set of strengths and weaknesses. For example, Quercia, Stegman, and Davis [20,21] and Elliehausen and Staten [6] use data sources (proprietary loan information<sup>6</sup> and asset backed securities information<sup>7</sup>) that provide a rich set of information on product types. However, these data sources only cover certain segments of the subprime mortgage market. Therefore, while these data may be useful for understanding changes in product types and interest rates they are less useful in helping to understand the impact of the predatory lending laws on the subprime market as a whole and the volume of credit in particular. In contrast, research by Ernst, Farris, and Stein [7] and Harvey and Nigro [11,12] use data from the Home Mortgage Disclosure Act (HMDA) which provides extensive market coverage, but has little information on product types. Despite the lack of detailed loan information, for the purpose of volume comparisons as conducted in this paper HMDA is the preferred source because of its better market coverage.

In addition, prior studies compare mortgage market conditions in North Carolina to neighboring states, regions (groups of states), or all of the US and conclude that differences in mortgage types or volume of credit is due to the predatory lending law. However, the use of large geographic areas may make it difficult to separate out the impact of the law versus unobserved regional shifts. Therefore, it is preferable to limit the sample to locations that have more similar labor and housing markets.

#### **4. National Lending Restrictions—Home Ownership and Equity Protection Act (HOEPA)**

State and local predatory lending laws typically follow the structure of national predatory lending regulations as defined by HOEPA. Therefore, before proceeding to the discussion of local predatory laws it is instructive to examine HOEPA first. HOEPA and the regulations promulgated under it define a class of loans that are given special consideration.<sup>8</sup> HOEPA-covered loans (loans where HOEPA applies) include only closed-end<sup>9</sup> home equity loans that meet annual percentage rate (APR) and 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. In the 2002 version, HOEPA protections were triggered in one of two ways:

- (i) if the loan's APR exceeded the rate for Treasury securities of comparable maturity by 8 percentage points or more on the first lien and 10 percentage points or higher on subordinate liens, or

- (ii) if finance charges, including points and fees paid at closing for optional insurance programs and other debt protection programs, were greater than 8 percent of the loan amount or a fixed \$480 amount indexed annually to the consumer price index.

For HOEPA-covered loans, creditors were not allowed to provide short-term balloon notes, impose prepayment penalties greater than five years, use non-amortizing schedules, make no-documentation loans, refinance loans into another HOEPA loan in the first 12 months, or impose higher interest rate upon default. In addition, creditors were not allowed to habitually engage in lending that did not take into account the ability of the consumer to repay the loan.

## **5. Regional Restrictions—State and Local Predatory Lending Laws**

A number of states and local municipalities have sought to impose restrictions on predatory lending that reach further than HOEPA and Regulation Z. Ho and Pennington-Cross [13] provide a detailed description of each law in their Appendix A.<sup>10</sup>

Beginning with North Carolina in 1999, at least 23 states have passed predatory lending laws that were in effect by the end of 2004. North Carolina—the first state to enact predatory lending restrictions—extended HOEPA to include both closed-end and open-end mortgages that satisfy the conventional conforming loan limit (loans small enough to be purchased by Fannie Mae and Freddie Mac and therefore not considered part of the jumbo market). While the North Carolina law did not adjust the APR triggers, the points and fees triggers were reduced from the HOEPA 8 percent to 5 percent for loans under \$20,000. For loans \$20,000 or larger, the same 8 percent trigger is used or \$1000, whichever is smaller. The North Carolina law also prohibits prepayment penalties and balloon payments for most covered loans. However the law does extend HOEPA restrictions by prohibiting the financing of credit life, disability, unemployment, or other life and insurance premiums into the mortgage.

While most states followed the North Carolina example by expanding the coverage and restrictions associated with HOEPA, there is substantial variation in the laws. In an attempt to quantify the differences in the local laws, we created an index. The higher the index, the stronger the law is. In addition, the index can be broken down into two components. The first component reflects the extent that the law extends market coverage beyond HOEPA. The second component reflects the extent that the law restricts or requires specific practices on covered loans. Table 1 summarizes the construction of the law index. The full index is the sum of all the assigned points as defined in Table 1 and the coverage and restrictions indexes are the sum of points assigned in each subcategory.

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 coverage beyond HOEPA it is assigned zero points. Higher points are assigned if the coverage is broader. In each category the highest points are assigned when all loans are covered. For example, points assigned for loan purpose range from zero to four and the highest point total (four) indicates that the law covers all loan purposes. The points assigned for extending first lien APR trigger ranges from zero to three depending on how low the trigger is. For example, 7 percent triggers are assigned one point while 6 percent triggers are assigned two points. In addition, laws that do not have a first lien trigger are assigned three points. A similar scheme is used to assigned points for higher lien triggers and the points and fees triggers. In general, if the law includes multiple triggers within a category the most stringent trigger is used to assign the points.<sup>11</sup>

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 then zero points are assigned. Higher points indicate more restrictions. For example, laws that do not restrict prepayment penalties are assigned zero points, while laws that prohibit all prepayment penalties are assigned four points. Laws that prohibit or restrict the practice more quickly are assigned higher points. For balloon restriction, the points vary from zero for no restrictions to four when the law prohibits all balloons.<sup>12</sup> The last two restrictions measure whether the law requires counseling before the loan is originated or restricts fully or partially mandatory arbitration clauses.

Table 2 reports the calculated full (law) index, the coverage index, and the restrictions index for each law identified as being in effect by the end of 2004. The average law index is 10.16, varying from 4 in Florida, Maine, and Nevada to 17 in New Mexico and Cleveland. The coverage index and the restrictions index have a mean just over 5. The coverage and restrictions indexes are only modestly correlated at 0.19. This indicates that, while laws that increase coverage more also tend to increase the restrictions more, the relationship is very noisy. Therefore, there are laws that increase coverage without increasing restrictions (Nevada) and other states that extend restrictions more than coverage (Florida).

Scaled indexes are created and reported in Table 3. This is necessary because the magnitude of each subcomponent of the index implicitly weights the index so that it represents some subcomponents more than others. To help correct for this, each subcomponent number is scaled so that the maximum value equals one (actual/max). It is then divided by the category mean value  $[(\text{actual}/\text{max})/\text{mean}(\text{actual}/\text{max})]$  so that each category has a mean of one. Therefore, the scaled index equally reflects each subcomponent in terms of marginal impacts

and the level of the index. Since eight categories are used to create the law index the mean value of the index is by design eight. Zero also retains the appealing intuition of reflecting no increase in law strength beyond HOEPA. The scaled law index varies from 17.16 to 1.47 and the scaled and original law index are highly correlated (0.87).

## **6. Data Design, Identification, and Probit Estimation**

To see whether the experience in North Carolina as examined in prior literature is typical for all local predatory lending laws, we provide a more complete analysis using a pooled sample of local laws. We use individual loan data provided in HMDA in conjunction with the HUD subprime lenders list.<sup>13</sup> Any loan application or origination associated with a lender on the list is identified as a subprime loan. All other loans are treated as not-subprime, that is, as a conventional loan. Because it is impossible to fully characterize borrower and location characteristics, the sample is reduced to include only counties at state borders, where labor and housing market conditions are likely more similar.<sup>14</sup> In particular, for the treatment group we use counties that lie in states with a predatory lending law in place and adjacent to a state without such a law. The control group includes counties in neighboring states that border the treatment state and do not have a predatory lending law in effect.<sup>15</sup> This contrasts with other studies (Harvey and Nigro [12], Elliehausen and Staten [6]) that have used whole states or regions to define both control and treatment groups. This approach should help to increase the comparability of the treatment group and the control group because they are geographically closer and, as a result, likely to be more economically similar than full state and region comparisons. In addition, to help remove the impact of any temporary reaction to each law and any market reaction prior to the law coming into effect, only the year before and the year after the law is in effect are included in the sample. This sampling procedure and HMDA availability reduce the sample to ten local predatory lending laws: California, Connecticut, Florida, Georgia, Maryland, Massachusetts, North Carolina, Ohio, Pennsylvania, and Texas.

### **6.1. Identification and Estimation Strategy**

To identify the impact of a local predatory lending law, we employ the difference-in-differences approach. By including indicators of location and the time period when the law becomes in effect, we can interpret the difference between the treatment and control group in the post-legislation time period as reflecting the impact of the law on mortgage market conditions. In addition, we also control for various borrower and location characteristics. Similar to Harvey and Nigro [11,12], three separate dependent variables (three outcomes) are tested for



impacts of local predatory lending laws—the probability of applying for a subprime loan relative to all (prime and subprime) applications, the probability of originating a subprime loan relative to all originations, and the probability of being rejected on a subprime application. The base model is specified in Eq. (1) as:

$$Outcome_{it} = \beta^0 + \beta^1 Ineffect_{it} + \sum_{j=CA}^{TX} \beta_j^2 Law_{ji} + \sum_{j=CA}^{TX} \beta_j^3 Postlaw_{jit} + \sum_{j=CA}^{TX} \beta_j^4 Sample_{ji} + \beta^5 Borrower_i + \beta^6 Location_{it} + \varepsilon_{it}, \quad (1)$$

where  $i$ ,  $t$ , and  $j$  index respectively the individual loans, the time period, and law samples, *Ineffect* indicates the time period and location where a law is effective, *Law* indicates that the loan is in a location that will eventually have a law, *Postlaw* indicates that it is the time period when the law is in effect, *Sample* indicates the law sample (control and treatment), *Borrower* represents various borrower characteristics, *Location* represents various location characteristics, and  $\varepsilon_{it}$  represents an identically and independently distributed random error term. For each outcome (application, origination, or rejection), the dependent variable is binary. We estimate Eq. (1) using the probit specification, which limits the estimated probabilities between zero and one and assumes a standard normal probability distribution.<sup>16</sup>

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. It is defined as zero before the law is effective, even in the treatment location, and is always zero in the control location. *Ineffect* is constructed by interacting the variable *Law*, which indicates treatment groups, and *Postlaw*, which indicates the time period the treatment is in effect. Therefore, *Law* identifies the location specific fixed effect and *Postlaw* identifies the time specific effects common to the treatment and control locations. Our estimation sample consists of ten local law samples each of which includes loans in the treatment location and the control location.<sup>17</sup> The variables *Law* and *Postlaw* are interacted with each law sample, with the North Carolina sample excluded as the reference group. The impact of the average law can then be interpreted directly from the *Ineffect* variable. Given the results from prior research we would expect *Ineffect* to be negative for the application and origination outcome and potentially insignificant for the rejection outcome.

Following Harvey and Nigro [11,12] and Elliehausen and Staten [6], we include a series of control variables associated with the location of the loan (*Location*) and the borrower (*Borrower*) because they may impact the demand or supply of subprime credit. Table 4 provides definitions of variables and data sources. In general we expect that borrowers will be more likely to use/apply for subprime loans (and perhaps be rejected by subprime lenders) in locations with

difficult economic conditions and when borrowers have lower income or are in minority areas (Calem, Gillen, and Wachter [3] and Pennington-Cross [18]). Location characteristics are proxied by the Census tract's income relative to metropolitan area income, the percent of minority population in the tract, the county unemployment rate, housing vacancy rate, and population growth rate. Borrower characteristics are proxied by borrower income and the loan-to-income ratio. In general, we expect that applicants with more income relative to their loan amount will have an easier time meeting prime underwriting requirements and therefore should be less likely to apply for or receive a subprime loan. One important caveat to this analysis is that the borrower's credit history or credit score, which has been shown to be a very important determinant of mortgage performance for both subprime and prime loans (Pennington-Cross [19]), is not reported in the HMDA data and therefore cannot be included in this analysis.

Table 5 provides descriptive statistics of the variables by outcome. The application sample includes over 590,000 prime and subprime loan applications; the origination sample includes over 390,000 prime and subprime originations; and the rejection sample includes over 89,000 subprime applications, which are either accepted or rejected.<sup>18</sup> Just over 20 percent of the applications were subprime, while only 9.7 percent of the originations were subprime. Consistent with the relative magnitude of applications and originations, the average rejection rate is very high for our sample of subprime loans: 42.9 percent. The borrowers and applicants typically have loans approximately twice the size of their income. In addition, as expected, the income of subprime applicants (rejection sample includes rejects and accepts of subprime loans only) is substantially lower than for the overall sample (application and origination samples include both subprime and prime loans). Subprime applications also come from census tracts with a higher concentration of minority households. The law sample dummy variables indicate that the Maryland sample is the largest proportion of the sample and the Texas sample is the smallest.

## 6.2. Base Model Results

We estimate the model specified in Eq. (1) using maximum likelihood. Table 6 provides the estimated coefficients, the standard error of the estimates, and the marginal impact of each variable at a specified interval and evaluated at the mean of all other variables. Results are reported for each outcome (application, origination, rejection).

The main variable of interest is *Ineffect*. This coefficient indicates whether the introduction of the law has had any impact on the application, origination, or rejection of subprime loans on average. The coefficient estimates are negative and significant at the 1 percent level in the

application equation and rejection equation, and insignificantly different from zero in the origination equation. The marginal impacts can be interpreted as a percentage point change from the mean predicted probability. Therefore, the average impact of a local predatory lending law, using the variable *Ineffect*, is a reduction of 5.1 percentage points in the probability of being rejected (mean = 42.9 percent), and a reduction of 1.2 percentage points in the probability of applying (mean = 20.5 percent).<sup>19</sup> Therefore, the average law is associated with only a small or statistically insignificant change in the flow of credit (apply or originate), but with a substantial reduction in the probability of being rejected on a subprime application.

Results for other control variables largely meet expectations. Location, borrower, and mortgage characteristics indicating economic stress are positively associated with the probability of applying for a subprime loan. For instance, subprime applications are positively associated with lower borrower income, higher loan-to-income ratios, lower-income census tracts, higher concentrations of minority populations, lower population growth rates, and higher unemployment rates. However, subprime applications are negatively associated with higher vacancy rates. This may partly reflect the need of many subprime applications to have substantial equity in their home to compensate for weak credit history.

The results for originations are very similar to the application results. However, higher vacancy rates, lower population growth rates, and higher loan-to-income ratios are all negatively associated with subprime origination probabilities. Again, the vacancy results may indicate the need for housing equity in the underwriting of subprime loans to compensate for other weaknesses in the loan application. In addition, consistent with the population growth results, Pennington-Cross [18] found that subprime loans were a larger part of the mortgage market in locations where economic conditions were stressful but improving. Coefficient estimates for the rejection equation also show that in general more adverse economic conditions are all associated a higher probability of rejection.

Results for the time and location indicators and law sample dummy variables are not presented to conserve space. As expected, coefficient estimates differ widely in sign and magnitude because they capture the prevailing probabilities in various time periods and locations. For example, the *Law* coefficients in the application equation, which indicate treatment locations, range from -0.19 (Texas sample) to 0.66 (California sample).

### **6.3. Results—Strength of the Laws**

While the average law may have only modest impacts on the flow of credit, it may be that relatively more stringent laws may have a larger impact. In general it is expected that stronger

laws should be associated with larger reductions in applications and originations due to tighter lending standards. In addition, stronger laws may reduce rejections by deterring marginal applications or through increased screening by lenders to ensure law compliance.

To gauge the potential relevance of a law's strength, we estimated two additional models. Model II replaces the *Ineffect* variable with the scaled law index as an explanatory variable, and Model III replaces the full law index with the disaggregated law indexes along the dimensions of coverage and restrictions. The results (coefficient, standard error, and marginal effects) are reported in Table 7.<sup>20</sup>

In Model II, the coefficient estimates indicate that stronger laws are associated with lower probabilities of applying for a subprime loan and being rejected on a subprime application. However, law strength had no impact on the probability of originating a subprime loan. Again, the magnitude of the impact on the probability of applying is very small. For example the marginal impact, measured by a one-standard-deviation increase in the index from the mean, is only  $-0.7$  percentage points in the application equation. In contrast, the marginal impact is much larger for rejection ( $-3.17$  percentage points). This is highlighted in Fig. 1, which plots the change in the probability of the outcome (apply, originate, and reject) relative to the strength of the law.

The strength of the law can also be measured along the dimensions of coverage and restrictions. If appropriate substitutes cannot be found, more restrictions on allowable lending should lead to less lending because lenders are required to tighten lending standards to comply with the law. Therefore, originations should be lower for stronger laws and likely applications will be deterred due to the reduced availability of loan types. In Model III, as illustrated in Fig. 2, the coefficient estimates indicate that laws with more or stronger restrictions are associated with reduced probabilities of applying and originating subprime loans. For example, a one-standard deviation increase in the scaled restrictions index reduces the probability of applying by 4.9 percentage points and the probability of originating by 2.2 percentage points. In addition, the marginal impact of restrictions gets larger as coverage increases. For example, the reduction in the probability of applying in response to a one-standard-deviation increase in the restrictions index increases from 4.4 to 6.1 percentage points as the coverage index goes from zero to six.<sup>21</sup>

The impact of increased coverage of a law, after controlling for restrictions, is largely an empirical question. If there is no problem with dishonest loans in the subprime market, more coverage should unambiguously reduce applications and originations. However, if potential applicants are deterred from applying because of fear of being taken advantage of by dishonest lenders or do not apply because of the cost of sorting the honest from the dishonest, then the introduction of a law that covers more applications may be associated with more applications due

to a reduced fear of predation and a lower cost of screening. Model III in Table 7 and Fig. 3 report that laws with broader coverage tend to be associated with increased originations and applications. In fact, the coefficient estimates are very similar in magnitude, although they have the opposite signs, to the impact of stronger restrictions. The marginal impact of a one-standard-deviation increase in coverage increases the probability of applying for a subprime loan by 6.6 percentage points and the probability of originating a subprime loan by 3.5 percentage points. As illustrated in Fig. 3, when a law is passed that covers your loan application more households are willing to apply. In other words, consistent with a market with a dishonest lenders problem, the demand for subprime credit can actually increase when a predatory lending law is enacted.

## **7. Conclusion**

Starting with North Carolina in 1999, states and other localities across the United States have introduced legislation intended to curb predatory and abusive lending in the subprime mortgage market. These laws usually extend the reach of the Home Ownership and Equity Protection Act (HOEPA) by including home purchase and open-end mortgage credit, lowering annual percentage rate (APR) and fees and points triggers and prohibiting and/or restricting the use of balloon payments and prepayment penalties on covered loans.

While prior literature found evidence that the North Carolina law did reduce the flow of credit, the results in this paper indicate that the typical law has little impact on the flow of subprime credit as measured by loan origination and application. However, rejections do decline by over 10 percent for the typical law. The reduction in rejections may reflect less aggressive marketing, additional pre-screening by lenders, increased self-selection by borrowers, a shift in applications to unregulated lenders, or other factors. While a reduction in rejection rates may not have been the intent of the predatory lending law, it does indicate that borrowers are benefiting by saving non-refundable application costs when rejected for a subprime loan.

However, not all local predatory lending laws are created equal. The strength of the law is measured along two dimensions—coverage and restrictions. Some laws provide broad coverage of the subprime market (Colorado) and others very little coverage (Texas). Some have substantial restrictions (Georgia) on allowable lending, while others have very few restrictions (Maine). The results indicate that coverage and restrictions tend to have opposite impacts. In general, laws with more extensive restrictions are associated with larger decreases in the flow of credit. In fact, laws with the strongest restrictions can decrease applications by over 50 percent. In contrast, laws with broad coverage can increase applications by even more than 50 percent.

Therefore, although on the surface local predatory lending laws seem to have little impact, the design of the law can stimulate the subprime market, depress the subprime market, or leave volumes relatively steady but with lower rejection rates. As a result, the design of the law can have economically important impacts on the flow and make-up of the mortgage market.

## Notes

\* The views expressed in this research are those of the individual author and do not necessarily reflect the official positions of the Federal Reserve Bank of St. Louis, the Federal Reserve System, and the Board of Governors.

1. These numbers are derived from type B&C loans. B&C loans are loans with less than an A (or prime) rating. See the Mortgage Markets Statistics Annual published by Inside Mortgage Finance for more details on loan classification schemes.

2. See HUD-Treasury Report (HUD-Treasury [15]) and Federal Reserve HOEPA Final Rule (Federal Reserve [8]).

3. 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.

4. While we do observe in the marketplace some rejections of prime applications, empirical research has shown that subprime loans are rejected at a much higher rate than prime loans: 33 percent versus 9 percent (Scheessele [22]). For those applicants who are reported as rejected in HMDA they may look to lenders who do not report to HMDA and are more likely to be unregulated for a loan or may reapply at a later point in time.

5. Ferguson and Peters [9] and Ambrose, Pennington-Cross and Yezer [2] present a more formal presentation of mortgage applications and lending standards which is similar to the concepts discussed here.

6. The data was provided by nine members of the American Financial Services Association (AFSA). AFSA represents some of the largest subprime lenders (Ameriquest Mortgage Company, Conseco Finance Corporation, Countrywide Home Loans, Equity One, CitiFinancial, Household Finance Corporation, Key Consumer Real Estate, Washington Mutual Finance and Wells Fargo Financial, Inc.).

7. LoanPerformance, a private data vendor, leased mortgage information based on securitized loans. If loans of better quality (A-rated) or pricing tend to have higher rates of securitization, then the LoanPerformance data represent only one segment of the subprime market. This is consistent with Chomsisengphet and Pennington-Cross [5] who show that the

Mortgage Bankers Association of America (MBAA) rate of foreclosures has different time series properties than the LoanPerformance rate and was on average has almost three times higher.

8. Congress enacted HOEPA (Pub. L. 103-325, 108 Stat. 21600) by amending the Truth in Lending Act (TILA, 15 USC 1601). In 1994, the Board of Governors implemented HOEPA through 12 CFR part 226 (Regulation Z), which articulates specific rules governing lending practices. The original version, in 1994, set out the framework and defined the triggers and restrictions. The second version, in 2002, adjusted some of the triggers and restricted some additional practices.

9. Closed-end loans are loans that disburse a certain amount of money to the borrower and are repaid over a fixed time period. Lines of credit are an example of an open-ended loan because the borrower can withdraw (increase the loan amount) more money at their discretion until the line of credit terminates at a predetermined point in time.

10. Every attempt was made to include all laws in effect by the end of 2004 that, similar to HOEPA, use triggers to define a class of loans eligible for restrictions and disclosures. Because other laws are likely to exist, those discussed here should be viewed as a sample of all the state and local predatory lending laws. Other states have laws that do not focus on high-cost or subprime lending and do not have any triggers (Idaho, Michigan, Minnesota, Mississippi, Nebraska, New Hampshire, Oregon, Tennessee, Washington, and West Virginia).

11. For example, some laws have different triggers depending on loan amount or other distinctions.

12. The law in Cleveland was determined to be restrictive and was assigned four points despite not neatly falling into any of the categories.

13. <http://www.huduser.org/datasets/manu.html>, accessed on 2/1/2005. HUD generates a list of subprime lenders from industry trade publications, HMDA data analysis, and phone calls to the lender confirm the extent of subprime lending. Since this list is defined at the lender level, loans made by the subprime lenders may include both prime and subprime loans. In addition, subprime loans made by predominately prime lenders will also be incorrectly identified as prime lending. Therefore, an alternative interpretation of the loans identified using the HUD subprime lender list is that it identifies the extent of specialized subprime lending—not full-service lending.

14. This is similar to the approach used by Holmes [14], who examined the impact of right-to-work laws on manufacturing employment at state borders in order to isolate the effect

of state policies from other state characteristics.

15. This geographically based sampling does not create a “matched” sample, where one similar loan in the treatment location is matched with another loan in the control location. In short, all observed loans in the specified location and time periods are included.

16. The probit specification is given by  $\Pr(Y = 1 | x) = \Phi(x_i'\beta)$ , where  $Y$  is the outcome (application, origination, or rejection),  $x$  is a vector of explanatory variables,  $\beta$  is a vector of parameters, and  $\Phi(\cdot)$  denotes the standard normal distribution. As given in Greene [10], the log-likelihood for the probit model is

$$L = \sum_{y_i=0} \ln[1 - \Phi(x_i'\beta)] + \sum_{y_i=1} \ln \Phi(x_i'\beta),$$

where  $y_i$  and  $x_i$  are, respectively, the observed values of outcome  $Y$  and explanatory variables  $x$  for observation  $i$ .

17. To enhance computational feasibility, we only include a 10 percent random sample of each location in the pool sample. We also estimate using the 25 and 50 percent random samples and find that results are robust across sample sizes.

18. The rejection sample excludes loans whose application was withdrawn by applicant or whose file was closed for incompleteness.

19. We calculated the marginal effect for the *Ineffect* variable using the “double-difference” approach outlined in Norton, Wang, and Ai [17]. Specifically, since *Ineffect* is the interaction between *Law* and *Postlaw*, the full interaction effect is the change in the predicted probability for a change in both *Law* and *Postlaw*, and therefore, does not only depend on the *Ineffect* coefficient.

20. To conserve space all the control variables are not reported. In addition, specification tests were conducted including both the variable *Ineffect* and the laws indexes. In all cases the *Ineffect* variable was insignificant and is not reported.

21. Note that zero coverage indicates that the law does not extend coverage beyond HOEPA. However, the law still covers some of the market.

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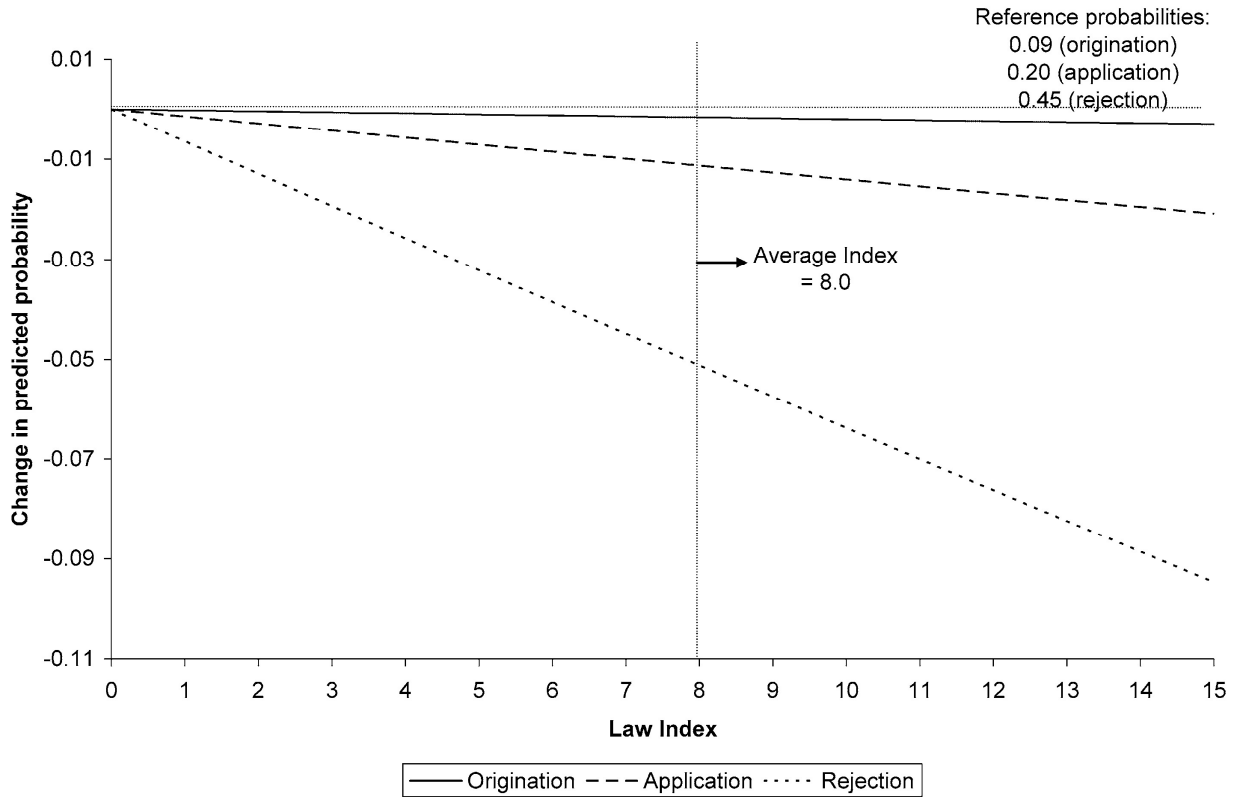
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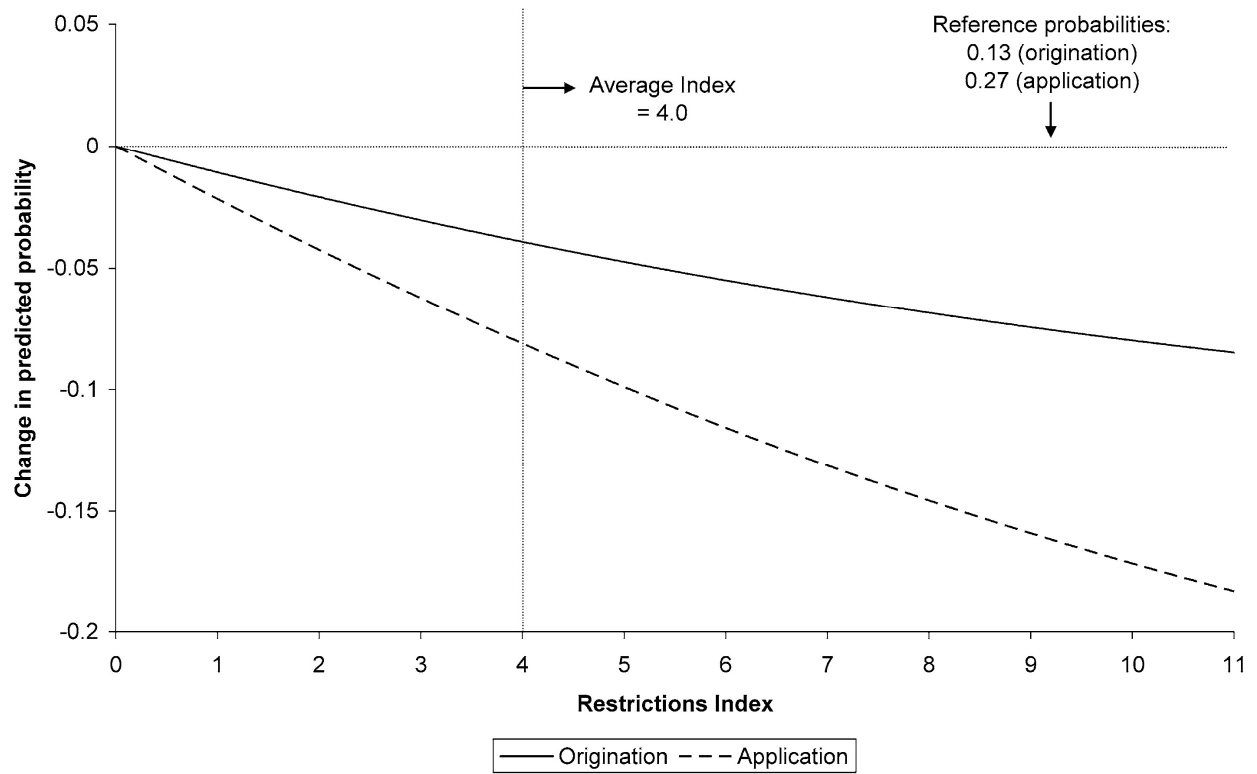
## Appendix

### Figure 1: Impact of Local Law Index on the Flow of Credit



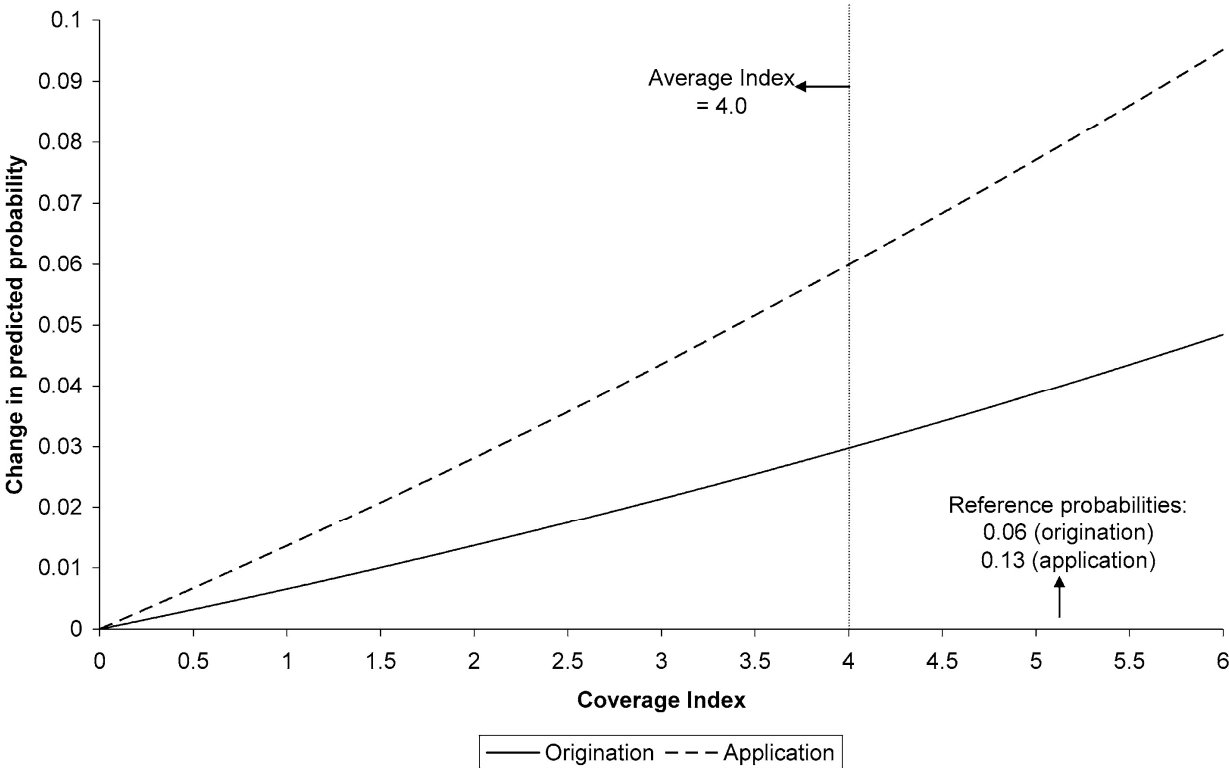
*Note.* All other variables are set to their mean and the law index is increased from 0 to the maximum observed value using Model II. Probabilities are indicated by fractions so that 0.05 is a five percent change in probability.

**Figure 2: Impact of Restrictions Index on the Flow of Credit**



*Note:* All other variables are set to their mean and the law index is increased from 0 to the maximum observed value using Model III. Probabilities are indicated by fractions so that 0.05 is a five percent change in probability.

**Figure 3: Impact of Coverage Index on the Flow of Credit**



*Note:* All other variables are set to their mean and the law index is increased from 0 to the maximum observed value using Model III. Probabilities are indicated by fractions so that 0.05 is a five percent change in probability.

**Table 1: Law Index Definition**

Category	Description of law index
<i>Coverage</i>	
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
<i>Restrictions</i>	
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

*Note:* The law index is calculated by summing all categories. The coverage and restrictions indexes are created by summing the subcategories.

**Table 2: The Law Index**

State	Full index	Coverage index	Restrictions index
Arkansas	8	5	3
California	11	7	4
Chicago, IL	15	10	5
Cleveland, OH	17	7	10
Colorado	13	8	5
Connecticut	10	5	5
Cook County, IL	15	10	5
Florida	4	0	4
Georgia	16	6	10
Illinois	13	6	7
Indiana	11	4	7
Kentucky	9	2	7
Maine	4	4	0
Maryland	8	7	1
Massachusetts	14	6	8
Nevada	4	4	0
New Jersey	10.5	5.5	5
New Mexico	17	7	10
New York	10	6	4
North Carolina	11	3	8
Ohio	6	4	2
Oklahoma	8	2	6
Pennsylvania	7	4	3
South Carolina	9	4	5
Texas	8	2	6
Utah	6	4	2
Washington, DC	15	8	7
Wisconsin	5	3	2
Average	10.16	5.13	5.04
Standard deviation	4.03	2.39	2.82

**Table 3: The Scaled 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

*Note:* The coverage and restrictions indexes are modestly correlated (0.21).



**Table 4: Variable Definitions**

Variable	Definition	Source
<i>Outcome</i>		
Application	Indicator variable = 1 for subprime application; 0 for prime application	HMDA & HUD subprime lender list
Origination	Indicator variable = 1 for subprime origination; 0 for prime origination	HMDA & HUD subprime lender list
Rejection	Indicator variable = 1 if subprime loan is denied; 0 if subprime loan is accepted	HMDA & HUD subprime lender list
<i>Identification</i>		
Law	Indicator variable = 1 if borrower is from a location with a law at some point; 0 otherwise	Working paper: Appendix A <sup>a</sup>
Postlaw	Indicator variable = 1 for post-legislation time period; 0 otherwise	Working paper: Appendix A <sup>a</sup>
Ineffect	Interaction of <i>Law</i> and <i>Postlaw</i> indicators indicating that the borrower is from a location with a law currently effective	Working paper: Appendix A <sup>a</sup>
<i>Control variables</i>		
Income	Borrower's gross annual income (in thousand \$)	HMDA
Loan2inc	Ratio of requested loan amount to borrower's income	Calculated from HMDA
Tract/MSA income	Ratio of tract median family income to MSA median family income	HMDA
Minority	Tract's minority population percentage	HMDA
Vacant	County's percentage of vacant housing units	Census 2000
Population	County's population growth from the calendar year before and after the law became effective	Census Bureau
Unemployment	County's unemployment rate	Bureau of labor statistics

<sup>a</sup> Ho and Pennington-Cross [13] provide a detailed description of each law in their Appendix A. The detailed descriptions of the laws are too long to include in this paper and have been summarized by the law index discussed above.

**Table 5: Descriptive Statistics of Selected Variables**

Variable	Application sample		Origination sample		Rejection sample	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
<i>Outcome variables</i>						
Application	0.205	0.404	–	–	–	–
Origination	–	–	0.097	0.296	–	–
Rejection	–	–	–	–	0.429	0.495
<i>Identification variables</i>						
Law	0.631	0.482	0.627	0.484	0.666	0.472
Postlaw	0.623	0.485	0.646	0.478	0.597	0.490
Ineffect	0.397	0.489	0.410	0.492	0.407	0.491
<i>Law sample variables</i>						
ca	0.215	0.411	0.208	0.406	0.277	0.447
ct	0.039	0.193	0.037	0.188	0.041	0.199
fl	0.040	0.196	0.039	0.192	0.036	0.186
ga	0.052	0.221	0.049	0.216	0.060	0.238
ma	0.186	0.389	0.199	0.399	0.143	0.350
md	0.289	0.453	0.318	0.466	0.214	0.410
nc	0.070	0.254	0.059	0.235	0.085	0.279
oh	0.060	0.238	0.054	0.226	0.071	0.258
pa	0.039	0.193	0.030	0.171	0.059	0.236
tx	0.011	0.105	0.008	0.090	0.014	0.116
<i>Control variables</i>						
Income (thousands \$)	80.8	109.5	87.4	108.5	64.0	65.4
Loan2inc	2.054	3.993	2.043	2.057	2.062	2.548
Tract/MSA income	1.106	0.321	1.134	0.326	1.019	0.287
Minority	24.5%	24.1%	23.5%	23.1%	30.3%	27.4%
Vacant	8.5%	7.0%	8.2%	7.1%	9.1%	6.2%
Population	1.9%	2.0%	1.9%	2.0%	2.0%	1.9%
Unemployment	4.7%	2.3%	4.6%	2.3%	5.0%	2.3%
Sample size	590,543		394,198		89,536	

*Note:* During estimation the law sample dummy variables are interacted with *Law* and *Postlaw* as part of the identification strategy.

**Table 6: Probit Results—Base Model**

Variable	Coeff.	Std. Err.	Marg. Eff.	Unit
<i>Application model</i>				
Intercept	-0.398**	0.021	-	-
Ineffect	-0.043**	0.011	-0.0117	-
Income	-0.150**	0.004	-0.0042	\$10,000
Loan2inc	0.001**	0.000	0.0000	10%
Tract/MSA income	-0.431**	0.008	-0.0118	10%
Minority	0.459**	0.012	0.0131	10%
Vacant	-0.652**	0.103	-0.0177	10%
Population	-0.010**	0.002	-0.0028	1%
Unemployment	4.324**	0.229	0.0123	1%
Log likelihood			-212, 116	
<i>Origination model</i>				
Intercept	-0.903**	0.033	-	-
Ineffect	-0.007	0.018	-0.0101	-
Income	-0.113**	0.006	-0.0018	\$10,000
Loan2inc	-0.014**	0.002	-0.0002	10%
Tract/MSA income	-0.343**	0.013	-0.0053	10%
Minority	0.562**	0.019	0.0093	10%
Vacant	-0.849**	0.168	-0.0128	10%
Population	0.005*	0.002	0.0008	1%
Unemployment	3.262**	0.363	0.0053	1%
Log likelihood			-85, 889	
<i>Rejection model</i>				
Intercept	0.028	0.047	-	-
Ineffect	-0.122**	0.026	-0.0509	-
Income	-0.049**	0.008	-0.0019	\$10,000
Loan2inc	0.020**	0.003	0.0008	10%
Tract/MSA income	-0.256**	0.020	-0.0100	10%
Minority	0.015	0.026	0.0006	10%
Vacant	0.651**	0.244	0.0257	10%
Population	-0.016**	0.004	-0.0064	1%
Unemployment	2.211**	0.546	0.0087	1%
Log likelihood			-43, 653	

*Note:* Marginal effects for the continuous variables are estimated as the discrete change in probability as the variable deviates from its sample mean by an appropriate unit. The chosen units are reported in the last column.

**Table 7: Augmented Models with Local Law Index**

Variable	Model II			Model III		
	Coeff.	Std. Err.	Marg. Eff.	Coeff.	Std. Err.	Marg. Eff.
	<i>Application results</i>					
Law index	-0.005**	0.001	-0.0070	-	-	-
Coverage index	-	-	-	0.061**	0.006	0.0656
Restrictions index	-	-	-	-0.067**	0.005	-0.0492
	<i>Origination results</i>					
Law index	-0.001	0.002	-0.0010	-	-	-
Coverage index	-	-	-	0.055**	0.009	0.0350
Restrictions index	-	-	-	-0.054**	0.008	-0.0222
	<i>Rejection results</i>					
Law index	-0.016**	0.003	-0.0317	-	-	-
Coverage index	-	-	-	-0.014	0.013	-0.0189
Restrictions index	-	-	-	-0.019	0.011	-0.0209

*Note:* Marginal effects for the indexes are estimated as change in probability as an index deviates from its mean by one standard deviation. Standard deviations are as reported in Table 3.