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Federal Reserve Board HOEPA Hearing
Federal Reserve Bank of Chicago
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Legislation modeled after the 1994 Federal Home Ownership and Equity Protection Act (HOEPA) and intended to curb abusive mortgage lending has gained quite a foothold across state and local jurisdictions since 1999. As of the end of 2004 at least 26 states had passed HOEPA-style laws, with wide variation in scope of coverage and the nature of constraints placed on loan terms and lender practices. These states have provided a natural laboratory for studying how different approaches to implementation have impacted loan activity. I don't think there is any question that such laws clearly can discourage the origination of subprime (higher-cost) loans, and alter the resulting profile of customers who get loans after laws are passed. I am submitting for the Hearing record a copy of a recently completed study that I co-authored that looks at subprime mortgage loan originations pre- and post-passage of such laws. In a moment I'll summarize the results of the study.

But, first I want to make a couple of observations about the challenge to evaluating the effectiveness of these laws. Let's begin with the rather fundamental problem that there is no widely accepted and unambiguous definition of the practices the laws are meant to curb. For example, neither a high price, nor the presence of a prepayment penalty, nor a balloon payment, nor a Loan-to-Value (LTV) ratio in excess of 100% are evidence of a predatory loan, per se. Contractual features like these can enable knowledgeable borrowers to engineer an affordable loan that fits their circumstances. For other borrowers, the same terms may be completely inappropriate. The Federal Reserve has repeatedly acknowledged this dilemma for regulators who wish to facilitate lending to the former borrower but also wish to protect the latter.

The challenge to efforts to curb predatory lending is that abuses usually arise when borrowers don't understand the terms of a mortgage and the implications of various contractual features, given their financial circumstances. When a borrower is misled or doesn't understand, an unscrupulous lender can exploit the situation and put the borrower into a bad loan. Without detailed knowledge of the circumstances surrounding the transaction, it is difficult to judge whether a particular loan is predatory. This complicates the task of crafting regulations to curb abuses. It also hinders empirical efforts to determine whether predatory lending laws generate net benefits for borrowers. It is very difficult to look at a portfolio of, say, one million mortgage loans and identify those that are unequivocally predatory, i.e., those that are a "bad fit" for the borrower.

Nevertheless, the approach of many of the HOEPA-style state and local laws has been to ban or sharply limit contract terms like prepayment penalties and balloon payments for certain categories of loans. These laws seem to rest on an implicit assumption that loans will be made anyway, just without the banned features. And, we've seen studies that "test" the impact of those laws by taking the following approach. The study defines the banned or limited contractual term as "predatory". The researcher measures the number of loans that have such characteristics before and after passage of the law. Any decline in such loans is claimed as evidence that the statute "worked", that is, it reduced predatory lending. This is an obvious sort of "result-by-definition." All it really says is that the law imposed a binding constraint on lenders and discouraged provision of loans with certain features. The important question that these studies don't answer is whether consumers seeking loans found other loan alternatives, or simply did without.

This is the problem I have with the studies that have noted declines in lending in states like North Carolina, but have claimed that the law was successful because the vast majority of the reduction was in "predatory loans". We can't readily judge whether loans that are actually made are predatory, let alone render judgment on loans that weren't made. These studies see the world in black and white, good or bad - and don't allow for the possibility that some of these proscribed features can often be helpful for borrowers.

One thing that careful empirical studies can do is to identify the magnitude of any change in lending activity in response to a predatory lending law. Based on our research, there is no question that some laws trigger much larger changes in loan originations than others. The changes are not always reductions in loan volume, but significant reductions in volume generally occur in states with more restrictive laws.

In a new working paper that I mentioned above we used a large subprime loan database to consider the impact of predatory lending laws in 22 states. The Federal Reserve Board research staff is very familiar with this database, which contains over five million loans made by the subprime units of eight large national lenders. In reviewing the database for a *Federal Reserve Bulletin* article in September 2005, the Fed's research staff estimated that the database contained 22% of all loans that reported price information under HMDA in 2004.

Because the database has detailed information on the loan APR, contract interest rate and fees, as well as borrower risk characteristics and property location, we can use it to consider the impact of various state laws on originations of all subprime loans, and especially high-cost loans, where we define high-cost according the relevant statute in each state. We would expect the greatest impact on loan volume to occur for high-cost loans since that is the category typically targeted for tougher restrictions. To our knowledge, ours is the first cross-state study that can actually pinpoint "high-cost" loans and measure the impact of the law on such loans separate from all other subprime loans.

Very briefly, let me describe our empirical approach. We built models that describe monthly loan originations in each state between 1997 and 2004. This allowed us substantial pre- and post-law observation periods for 22 states that had passed predatory

lending laws by the beginning of 2004. Across the 22 states that we analyzed, the database gave us a range of post-law experience from 9 months (Illinois, New Mexico, South Carolina, Oklahoma, Utah) all the way up to 60 months (North Carolina)

We used three different empirical frameworks for looking at the impact on monthly originations in a multivariate setting. In all three models we incorporated explanatory variables that captured factors that would influence supply and demand and consequently the total quantity of loan originations.

- One approach used a dummy variable approach to identify months in which a predatory lending law was in effect. This simplistic approach treated all laws as having the same potential effect on the market. We also used a dummy variable to indicate months following a negative evaluation of a state law by one of the major rating agencies.
- Recognizing that state laws vary substantially in their potential impact on lending operations, we used a second approach that incorporated the index developed by Anthony Pennington-Cross (Ho and Pennington-Cross, 2005) to distinguish state laws based on their scope of coverage and severity of restrictions on lenders and contracts.
- In still a third approach, we used an event-study approach that estimated a model of loan origination volume prior to passage of law, and then, for each state given the underlying economic factors, projected what originations should be in months after passage. We compared the projections with actual originations and the prediction error provided a measure of the law's impact, positive or negative.

Across all approaches, we found that the volume of high-cost loans declined most in states with more restrictive predatory lending laws. Elsewhere, laws in less restrictive states do not appear to dampen availability of high-cost loans. But, for those states for which the model identified significant reductions, the post-law cumulative decline (over the entire post-law period) ranged from a low of 26% in North Carolina, up to 94% in New Mexico. Additional analysis that split loans into high-risk and low-risk borrower groups (according to FICO scores) found that, where there were significant reductions, the declines were much larger for borrowers with low FICO scores. Of course, if we believe in risk-based pricing, and the resulting association of high-risk borrowers and higher-cost loans, this is exactly the result that economics would predict if a predatory lending law raises the lenders costs of making higher-priced loans. The higher-risk borrower is impacted the most.

For more details on our study and findings, I refer you to the report below. Thank you for the opportunity to testify.

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THE EFFECTS OF STATE PREDATORY LENDING LAWS ON THE AVAILABILITY OF SUBPRIME MORTGAGE CREDIT

Credit Research Center
Monograph #38

March 2006

Gregory Elliehausen,
Senior Research Scholar, Credit Research Center
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Ph.D. Candidate, Department of Economics
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THE CREDIT RESEARCH CENTER

The Credit Research Center (CRC) is a unit of Georgetown University's McDonough School of Business. The Center conducts research and provides education related to the economics of consumer credit and markets for retail financial services. Founded in 1974 at Purdue University, the Center relocated to Georgetown in 1997. Over the past three decades, the Center has gained a national reputation for its work in evaluating the impact of public policy on credit markets. The Center's academic affiliation and policy orientation bring sophisticated research expertise to bear on important regulatory issues. Throughout its history, the Center's research program has been supported by a mix of grants from the public sector and unrestricted private sector grants from foundations and corporations made to its host university on behalf of the Center.

The Center's research activities fall into two primary categories: public policy and basic consumer behavior. Public policy projects typically analyze and document the economic effects of legislation, regulation, and judicial decisions on consumers and firms in the financial services industry. For example, CRC's work figured prominently in the late-1970s debate over the impact of rate ceilings on the availability of credit and the structure of credit markets. CRC's credit scoring studies led to the legislative provisions for special purpose programs in the Equal Credit Opportunity Act. Two major CRC studies of consumers who filed for bankruptcy (1981 and 1997) were frequently cited in the Congressional debate leading to the 1984 amendments to the Bankruptcy Act as well as the bankruptcy reform legislation enacted in 2005.

Over one hundred articles and monographs written by affiliated scholars document the Center's research product. Senior research staff have testified before Congress and state legislatures on such topics as Truth in Lending disclosures, credit reporting, credit scoring, the impact of interest rate ceilings on credit availability, fair lending regulations, college student credit card usage, and personal bankruptcy.

Recent research has examined such issues as the long-run effect of credit counseling and financial education on borrower behavior, the impact on mortgage availability of legislation intended to curb predatory lending, the characteristics of borrowers who use payday advance and refund anticipation loans, and the value to consumers of more comprehensive credit reporting. To stimulate research and discussion of these and other credit-policy issues, the Center regularly organizes and sponsors research conferences, policy seminars, and industry forums in Washington, D.C. Center publications and information about its current events and activities are available on the CRC website at *www.msb.edu/faculty/research/credit_research*.

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EXECUTIVE SUMMARY

This monograph investigates the effects of state predatory mortgage lending laws on the availability of subprime mortgage credit. The monograph uses an event study methodology to compare actual originations of high-cost and non-high-cost subprime mortgages with predicted originations in the absence of predatory mortgage lending laws. The findings indicate that originations of high-cost mortgages were generally significantly less than predicted in states with more restrictive laws. High-cost mortgages are those which state predatory lending laws designate to be subject to tighter restrictions than non-high-cost mortgages. Originations of non-high-cost loans were not generally significantly less than predicted in states with more restrictive laws. In states with less restrictive laws, originations of high-cost loans were not significantly less than predicted in the post-law period. These findings suggest that the more restrictive state predatory mortgage lending laws reduced availability of regulated high-cost subprime mortgage credit.

The Subprime Mortgage Market and Predatory Lending

One of the great success stories of consumer lending in the United States has been the expansion of home mortgage and home purchase opportunities to consumers with blemished credit histories or other financial attributes that raise their perceived risk as borrowers. The benefits of enhanced mortgage availability have been diminished by instances of fraud and misrepresentation in the subprime market. The higher pricing, inclusion of contract terms such as prepayment penalties and balloon payments not typically found in prime mortgages, and relatively high market share of subprime loans in lower income and minority neighborhoods have elevated concerns among consumer activist groups and regulators about the incidence of abusive lending tactics and the targeting of particularly vulnerable borrowers.

Concerns over the prevalence of abusive mortgage lending practices have led to federal, state, and local legislation aimed at the subprime mortgage market. In 1994, Congress enacted the Home Ownership and Equity Protection Act (HOEPA), which imposed additional Truth in Lending disclosures and certain restrictions on contract terms for high-cost mortgages. The regulatory approach taken by HOEPA, and adopted by numerous jurisdictions since, deems high-cost mortgages as more likely to be associated with abusive tactics and contract features, and so deserving of tighter restrictions than prime or lower priced subprime loans.

Since passage of HOEPA, many states, cities, and counties have enacted HOEPA-like predatory mortgage lending laws. These laws often have thresholds for defining high-cost mortgages that are lower than HOEPA, impose more stringent restrictions on high-cost mortgages than non-high-cost mortgages, and sometimes impose restrictions on broader classes of mortgages. By limiting the use of risk management tools and imposing special procedures and new disclosures, the broad expansion of HOEPA-style regulations has raised the costs of making subprime loans that exceed statutory pricing

thresholds and reduced their liquidity. Both of these effects may discourage lenders from making high-cost loans.

Evidence from Previous Studies

Statistical evidence on the effects of state and local HOEPA-style predatory lending laws is limited. Most evidence concerns North Carolina's 1999 law, which was the first state law to impose tougher standards than HOEPA. The findings of these studies indicate that the volume of subprime mortgage lending in North Carolina declined relative to neighboring states after North Carolina's law became effective. Evidence indicates that declines in loans originated in North Carolina were declines in loans to lower income, higher risk borrowers. Other evidence shows that the declines in originations in North Carolina were due to declines in applications, not increases in rejection rates, which suggests that lenders in North Carolina may have been less aggressive in marketing loans in the post-law period.

Evidence for other states or localities has only recently begun to appear. One study found no significant change in the likelihood of origination by subprime lenders across all states after a predatory mortgage lending law became effective. However, the likelihood of application and rejection at subprime lenders declined significantly after a law. When differences in the stringency of state predatory laws were considered, declines in applications and rejection rates became more pronounced in areas with stricter laws. Moreover, stricter laws also significantly lowered the likelihood of origination by subprime lenders. These findings are consistent with the view that subprime lenders became less aggressive in marketing after enactment of predatory lending laws, avoiding loans to higher risk borrowers that are covered under such laws, especially in states with more restrictive laws.

Findings from this Study

None of the existing studies of state predatory mortgage lending laws to date considers the effects of the state laws on the loans designated as high cost under the laws. This paper examines the effects of several state predatory mortgage lending laws on the availability of high-cost and non-high-cost subprime mortgages. The database for the study consists of five million mortgage loans and includes all originations in the portfolios of the subprime mortgage subsidiaries of eight large financial institutions. Together these companies account for a large part of higher priced mortgage lending in the United States. A unique feature of the database for analyzing state predatory lending laws is that it provides information on the annual percentage rate and the amount of points and fees for each loan—the information that the state laws use to define high-cost loans covered by the laws. Because high-cost (covered) loans can be pinpointed, this study is able to measure the effects of state predatory mortgage lending laws on precisely those loans that are most heavily regulated by the laws. We are aware of no other pooled subprime mortgage database that has annual percentage rate and fee information necessary to identify high-cost loans.

This study develops a model using pre-law observations to predict subprime originations in a state based on demand and supply conditions in the state. The model is used to predict the number of originations in the post-law period. The predictions estimate the volume of lending that would have occurred if the law had not been in effect. Comparison of predicted originations with actual originations in the post-law period provides an estimate of the effects of a law in each state.

The pattern of prediction errors is consistent with the hypothesis that the volume of covered high-cost originations declined most in those states with more restrictive state predatory lending laws. Prediction errors were not statistically significant or were positive (that is, the model underpredicted loan volume) in states with less restrictive laws. Thus, the less restrictive state predatory mortgage lending laws do not appear to dampen the availability of high-cost loans. In contrast, the states with more restrictive laws experienced declines in originations of high-cost loans under the state laws. For those states for which the model predicts statistically significant reductions, the estimated post-law cumulative decline in high-cost loans ranges from a low of 26 percent in North Carolina to 94 percent in New Mexico. States with more restrictive laws generally did not experience declines in non-high-cost originations. North Carolina is the exception, but the North Carolina law also restricts non-high-cost loans. A few of the states with more restrictive laws experienced increases in non-high-cost loans, a result that suggests that lenders in these states shifted lending from covered high-cost loans to uncovered non-high-cost loans.

The Effects of State Predatory Lending Laws on the Availability of Subprime Mortgage Credit

INTRODUCTION

One of the great success stories of consumer lending in the United States has been the expansion of home mortgage and home purchase opportunities to consumers with blemished credit histories or other financial attributes that raise their perceived risk as borrowers. Growth of the subprime mortgage market during the 1990s expanded the availability of mortgage credit to these and other borrowers who, for one reason or another, did not qualify for a mortgage in the prime market. Subprime mortgage lending rose from $34 billion of originations in 1994 to over $530 billion in 2004, accounting for 10 percent of all home mortgage loan originations in the United States (*Inside B&C Lending* 2005).

Subprime mortgages are riskier than prime mortgages and therefore have higher interest rates and fees than prime loans and often contain features such as prepayment penalties or balloon payments, which are not typically found in prime mortgages. Subprime loans also have a higher market share than prime loans among low-to-moderate income households, and in minority neighborhoods (Calem, Gillen, and Wachter 2004; Pennington-Cross 2002; Canner, Passmore, and Laderman 1999). The higher pricing and relatively high market share in certain neighborhoods have elevated concerns among consumer activist groups and regulators about the incidence of abusive lending tactics, and the targeting of particularly vulnerable borrowers.

The term "predatory lending" has been coined to describe mortgage loans in which a lender takes unfair advantage of a borrower—often through deception, fraud, or manipulation—to make a loan that is disadvantageous to the borrower (US General Accounting Office 2004). Regulators have not adopted a clear definition of predatory lending. However, certain tactics have been observed in documented cases of abusive mortgage loans such as repeated refinancing in a short period of time to generate fee income (called "flipping"); excessive rates and fees (more than warranted by the loan risk) that lead to "equity stripping"; and collateral-based lending which puts borrowers in loan contracts on payment terms they are unlikely to meet, with the intent to foreclose and seize the property.

Concerns over the prevalence of these tactics have led to federal, state, and local legislation to curb abusive lending. Most of these laws have been aimed squarely at the subprime mortgage market. In 1994, Congress enacted the Home Ownership and Equity Protection Act (HOEPA), which imposed additional Truth in Lending disclosures and certain restrictions on contract terms for high-cost mortgages. High-cost mortgages were defined by the law in terms of pricing thresholds, (i.e., trigger values for the loan's annual percentage rate (APR) and fees). The regulatory approach taken by HOEPA, and adopted by numerous jurisdictions since, deems high-cost mortgage loans as more likely

to be associated with abusive tactics and contract features, and so deserving of tighter restrictions than prime or lower priced subprime loans.

Since passage of HOEPA, many states, cities, and counties have enacted HOEPA-like predatory mortgage lending laws. These laws often have thresholds for defining high-cost mortgages that are lower than HOEPA, impose more stringent restrictions on high-cost mortgages, and sometimes impose restrictions on broader classes of mortgages. As of January 2004, 25 states and the District of Columbia had passed laws intended to address predatory mortgage lending (US General Accounting Office 2004).

By limiting the use of risk management tools and imposing special procedures and new disclosures, the broad expansion of HOEPA-style regulations has raised the costs of making subprime loans that exceed statutory pricing thresholds. In addition, the expanded regulation of the subprime market has reduced the liquidity of subprime loans, which further elevates the cost of making such loans. Large purchasers of mortgages in the secondary market such as Freddie Mac and Fannie Mae will not purchase loans that are defined as high cost under the predatory lending laws of some states; and ratings services will not rate mortgage-backed securities transactions that contain loans defined as high cost in certain states or that require additional credit enhancements on transactions involving high-cost loans. Both of these effects may discourage lenders from making such loans. For this reason, HOEPA-style regulations have sometimes been described as "stealth" usury ceilings (Calomiris 2001), because they effectively eliminate product offers at rates above the threshold.

Statistical evidence on the effects of state and local HOEPA-style predatory lending laws is limited. Most evidence concerns North Carolina's 1999 law, which was the first state law to impose tougher standards than HOEPA. The findings of these studies indicate that the volume of subprime mortgage lending in North Carolina declined relative to neighboring states after North Carolina's law became effective. Evidence for other states or localities has only recently begun to appear.

The following sections of this paper examine the effects of several state predatory mortgage lending laws on the availability of subprime mortgages. After reviewing the existing literature, new findings are presented based on analysis of a database of five million mortgage loans that includes all originations in the portfolios of the subprime mortgage subsidiaries of eight large financial institutions. Together these companies account for a large part of higher priced mortgage lending in the United States.[1] A unique feature of the database for analyzing state predatory lending laws is that it provides information on the annual percentage rate and the amount of points and fees for each loan—the information that the state laws use to define high-cost loans covered by the laws. Because high-cost (covered) loans can be pinpointed, this study is able to measure the effects of state predatory mortgage lending laws on precisely those loans that

[1] Using the Home Mortgage Disclosure Act thresholds for reporting risk premiums as the definition of higher priced loans, Federal Reserve Board staff economists estimated that the Credit Research Center's subprime mortgage database accounted for 22 percent of originations of higher priced home purchase and refinance mortgages on owner-occupied homes in 2004 (Avery, Canner, and Cook 2005).

are most heavily regulated by the laws. We are aware of no other pooled subprime mortgage database that has annual percentage rate and fee information necessary to identify high-cost loans.

PREDATORY LENDING LAWS AND PRIOR STUDIES OF THEIR IMPACT

There is no widely accepted, unambiguous definition for predatory lending. High prices, the presence of specific contract terms, and racial or ethnic disparities in the incidence of certain types of loans are not generally considered evidence of predatory lending per se (for example, see Gramlich 2001; US Senate, Committee on Banking, Housing, and Urban Affairs 2000). Contractual features such as a balloon payment or prepayment penalty can enable knowledgeable borrowers to engineer an affordable loan payment to fit their budget. Yet, for other borrowers, those same terms may be inappropriate.

The problem in addressing predatory lending is that the abuses usually arise when borrowers do not understand the terms of the mortgage and implications of various contractual features, given their financial circumstances. When a borrower is misled or does not understand the terms of the mortgage, an unscrupulous lender can exploit the situation and put a borrower in a disadvantageous loan. Without detailed knowledge of the circumstances surrounding a transaction, it is difficult to judge whether a particular loan is predatory. This problem hinders an assessment of the extent of predatory lending and complicates the task of crafting legislation and regulations intended to curb abuses (see US Senate Committee on Banking, Housing, and Urban Affairs 2000; US General Accounting Office 2004). The problem also hinders empirical attempts to determine whether predatory lending laws generate net benefits for borrowers.

Predatory Mortgage Lending Laws

The first legislation addressing predatory mortgage lending was the federal Home Ownership and Equity Protection Act of 1994 (Pub. L. 103-325, 108 Stat. 21600). The Home Ownership and Equity Protection Act (HOEPA) and its implementing regulation (12 CFR part 226, Regulation Z) defined a class of mortgage loans that receive special attention. HOEPA applies only to refinance mortgages and closed-end second mortgages, but not to purchase-money mortgages or home equity lines of credit. For covered mortgages, HOEPA designates loans as "high cost" if they exceed specific annual percentage rate and fee thresholds.[2] The law requires additional disclosures and imposes restrictions on these high-cost loans.

Under HOEPA, disclosures must be provided earlier for high-cost loans (three days before closing) than for prime and lower cost subprime loans (at closing). Moreover, additional disclosures (relative to other loans) must be made for high-cost loans such as

[2] Currently, a loan is considered a high-cost loan under HOEPA if the loan's APR exceeds the rate for Treasury securities of comparable maturity by 8 percentage points or more on first mortgages, and 10 percentage points or more for second mortgages. It is also considered a high-cost loan if points and fees, including prepaid fees for optional insurance programs, exceeds the greater of 8 percent of the loan amount or $528.

the payment amount for the maximum possible interest rate on a variable rate, and the full payment amount based on the index rate plus margin for a loan with a reduced payment period.

Substantive restrictions on high-cost loans include prohibition of negative amortization, a ban on increases in the interest rate upon default, and prohibition of refinancing within a year unless the refinancing is in the borrower's interest or gives the borrower an interest rate or fees below HOEPA thresholds. HOEPA also limits prepayment penalties, acceleration, and balloon payments on high-cost loans. A practice of lending without regard to the borrower's ability to repay (collateral-based lending) is also prohibited.

Penalties for violations of HOEPA requirements are larger than for other Truth in Lending violations. HOEPA also subjects any holder of a high-cost loan to all claims and defenses that a borrower may have against the original lender.

Most state and local predatory mortgage lending laws follow the regulatory pattern initially established by HOEPA, but frequently adopt tighter restrictions.[3] High-cost loans are defined by reference to a threshold annual percentage rate or level of points and fees charged on the loan. These threshold rates are often lower than the HOEPA thresholds, and therefore cover more loans. Loans priced above the threshold are then subject to special regulatory provisions in addition to HOEPA restrictions. These regulations often sharply restrict high-cost loan contract terms to which the parties can agree as well as penalize credit-granting standards that allow for riskier loans. A few state and local laws also extend the coverage to restrict specific features of prime and lower cost subprime mortgages. Enforcement often incorporates new, sometimes ambiguous, liability rules reinforced by new private causes of action which can be enforced in class actions.

North Carolina was the first state to adopt a predatory mortgage lending law in 1999. The law was implemented in stages, beginning October 1, 1999, with full implementation by July 1, 2000. Although it utilized the same annual percentage rate threshold used by HOEPA to define a high-cost loan, the North Carolina statute adopted a lower fee threshold, which meant that more loans were covered under the North Carolina predatory lending law than under HOEPA. For loans deemed high cost, the North Carolina law imposed more stringent restrictions than HOEPA. For example, the law prohibited balloon payments, the financing of points or fees, and increases in the interest rate upon default. The law also prohibited charging points or fees if a high-cost loan was used to refinance another high-cost loan and mandated homeownership counseling prior to closing a high-cost loan.

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[3] Some states or municipalities have also adopted additional measures to combat predatory lending. Chicago and Philadelphia, for example, adopted laws prohibiting lenders making loans defined as "predatory" from obtaining funds or contracts from the government. For analysis of the Chicago and Philadelphia laws, see Harvey and Nigro (2003). Several states—North Carolina, Oklahoma, and Connecticut, for example—have enacted laws tightening licensing requirements for mortgage brokers and mortgage bankers.

In addition, the North Carolina law imposed new restrictions on some contractual features regardless of whether a loan was considered high cost. For all mortgage loans, the law prohibited prepayment penalties on loans of $150,000 or less, financing of single-premium credit insurance, and refinancing of an existing loan if the refinancing did not provide a net tangible benefit to the borrower.

Since passage of North Carolina's predatory mortgage lending law, over two dozen states have adopted HOEPA-like regulation of lending practices.[4] Relative to HOEPA, the laws range from extremely stringent (Georgia, Illinois, New York, New Jersey, and New Mexico), to those that impose significant changes that are fairly moderate (such as California, Connecticut, Florida, Maryland, Michigan, Ohio, and Pennsylvania), to those imposing only minor changes (for example, Virginia and Minnesota).[5]

Evidence from Prior Studies

Empirical evidence on the effects of state predatory lending laws is available primarily from analyses of North Carolina's law, the first state HOEPA-like predatory mortgage lending law. Analyses of other predatory mortgage lending laws have only recently begun to become available.

North Carolina's Predatory Mortgage Lending Law

Five studies of the North Carolina law's impact on credit availability have been released to date. The studies use three separate databases, but all found significant contraction of credit availability on refinance loans. However, they differ sharply in their interpretation of the decline.

Harvey and Nigro (2004) estimated a multivariate model using Home Mortgage Disclosure Act (HMDA) data to investigate subprime loan originations from 1998 through 2000 in North Carolina and four comparison states in the southeastern United States (South Carolina, Georgia, Tennessee, and Virginia).[6] The authors found that the North Carolina law reduced the overall level of mortgage originations by subprime lenders in that state. Minority and low-income borrowers in North Carolina were less likely to get loans after passage of the law. Declines at non-bank lenders were greater than declines at banks. The authors found that the decline in originations was due to a large decline in applications rather than an increase in denial rates, and concluded that

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[4] In addition, certain municipal governments in California, Illinois, Ohio, New York, and Georgia have adopted HOEPA-like laws intended to curb predatory lending. Some of the local predatory lending laws have been challenged in the courts on the basis that regulation of financial institutions is reserved by state constitutions to the states and is not a municipal police power. The status of these laws is unresolved.

[5] For a concise summary of the provisions of state and local predatory mortgage lending laws, see Ho and Pennington-Cross (2005).

[6] Researchers using the HMDA database distinguish between loans originated by subprime lenders and prime lenders. Until 2004, the HMDA database did not include information on loan prices, which could be used to identify subprime loans. Researchers relied on a list of subprime lenders complied by the US Department of Housing and Urban Development (HUD). HUD classified certain lenders as subprime if the majority of their originations were subprime loans.

subprime lenders may have been less aggressive in marketing loans during the post-law period.

Elliehausen and Staten (2004) investigated the North Carolina law using a unique database containing all mortgage originations in the portfolios of the subprime subsidiaries of nine large financial institutions. Their analysis produced results similar to those of Harvey and Nigro. Elliehausen and Staten estimated a multivariate model to analyze loans made from 1997 through June 30, 2000 in North Carolina and three adjacent comparison states. First mortgage loan originations per county in North Carolina fell 14 percent following passage of the state's predatory lending law, relative to county-level originations in the surrounding states. Significant declines occurred only in North Carolina and only among the lower income borrowers. Neither the higher income borrowers in North Carolina nor borrowers in the comparison states experienced significant declines. These observations are consistent with the prediction of economic theory that a law raising the cost and risk of making high-cost loans would reduce the availability of credit, particularly among the least creditworthy consumers.

Burnett, Finkel, and Kaul (2004) examined HMDA data to investigate lending at the Census-tract level in North Carolina before and after implementation of the law. They used the same four comparison group states as Harvey and Nigro, but had the advantage of a longer post-law observation period. The authors compared average growth in lending of subprime lenders in the 1997-1998 and 2000-2002 periods. Overall, Burnett, Finkel, and Kaul found a 16 percent decline in originations by subprime lenders in North Carolina after the law relative to the comparison states. In contrast, the relative change in originations by prime lenders in North Carolina after the law was negligible. They also found that the decline in originations by subprime lenders in North Carolina was the result of a large decline in applications, not an increase in denials, consistent with Harvey and Nigro (2004). Both home purchase and refinancing loans by subprime lenders in North Carolina declined relative to the comparison states after the law. Burnett, Finkel, and Kaul were careful to point out that they could not distinguish between predatory and legitimate loans and were therefore unable to separate intended reductions in predatory lending from unintended reductions in access to credit.

Two other studies found similar patterns in loan originations but interpreted the evidence quite differently. In 2002 a North Carolina-based advocacy group, the Center for Responsible Lending, released a study claiming to show that the decline in subprime lending due to the North Carolina law saved consumers $100 million on home mortgages originated during 2000 (Ernst, Farris, and Stein 2002). Ernst, Farris, and Stein evaluated HMDA data from 1998-2000, the same period analyzed by Harvey and Nigro (2004). They found declines in both total subprime originations and subprime originations per capita for North Carolina, relative to comparison states, but asserted that all of the foregone loans were "predatory."

None of the data used to support Ernst, Farris, and Stein's calculations of savings from banned contractual features derived from HMDA. Their estimates of savings to borrowers were calculated in terms of single-premium credit insurance premiums not

paid (because the statute banned the sale of the product), avoidance of payment of points and fees for foregone refinance loans that were assumed to provide the borrower no net tangible benefit, savings attributable to limits imposed by the statute on "excessive" fees, and the savings from the ban on prepayment penalties for loans under $150,000. More troubling from a methodological standpoint, the authors apparently relied on the (unstated) contention that a ban or limitation placed on a particular contractual feature triggers no additional cost or loss of benefit to borrowers. Consequently, there is little or no scientific justification for Ernst, Farris, and Stein's calculations.

Another study of the North Carolina law conducted by Quercia, Stegman, and Davis (2004) used Loan Performance System's (LPS) Asset Based Securities database, a large proprietary database of securitized subprime loans originated between 1998 and 2002.[7] The authors also found that securitized subprime originations declined more in 1999-2000 in North Carolina than in surrounding states. The decline applied to refinance loans. Purchase-money loan originations in their sample (not covered by HOEPA) rose in North Carolina, as well as in surrounding states during the period. After 2000, refinance loans grew nationally and in some surrounding states, but not in North Carolina.

Quercia, Stegman, and Davis noted that the reduction in originations is consistent with the findings of prior studies. What is significant about their findings, they claim, is the large decline in subprime refinance originations with abusive or predatory terms. As supporting evidence they pointed to sharp declines in refinance loans with characteristics that were explicitly limited by the statute.[8] Certainly, a decline in the incidence of a proscribed term is not surprising. But Quercia, Stegman, and Davis's insistence that a decline in loans with proscribed terms amounts to a decline in abusive loans is merely definitional. They define loans with these terms as abusive and then note how abusive loans decline when these terms become illegal. This is not the same as demonstrating that the loans are abusive. All we really know is that they declined. Nevertheless, Quercia, Stegman, and Davis interpreted the findings as evidence that the subprime market behaved essentially as the law intended and that there was a reduction in predatory loans but no change in the cost of subprime credit or reduction in access to credit for high-risk borrowers.[9]

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[7] The LPS database is not a random sample of originations. A loan must satisfy certain criteria to be rated and eligible for securitization, and lenders choose to securitize rather than hold the loans in their portfolios. Evidence suggests that securitized loans are not representative of all originations. Phillips-Patrick, Hirschhorn, Jones, and LaRocca (2000) concluded that the LPS database did not include much of the higher risk segment of the subprime market, and Litan (2003) presented statistics showing different growth rates for originations and securitizations.

[8] For example, they found declines in North Carolina in (1) loans with prepayment penalties imposed three or more years after origination (loans with such penalties were increasing during this period in surrounding states) and (2) loans with balloon payments (although Tennessee and South Carolina experienced declines of similar magnitude). But the North Carolina statute prohibited prepayment penalties on all loans up to $150,000, and prohibited balloon payments on any loan designated as "high-cost" under the statute.

[9] Yezer (2004) argued that the loans most likely to involve deceptive practices are probably those made by small, local lenders that do not securitize or report data to any source. Thus, observed declines in lending would reflect primarily declines in availability rather than declines in predatory lending.

Other State Predatory Mortgage Lending Laws

DeMong (2004) surveyed mortgage lenders and brokers in New Jersey about lending activity before and after implementation of New Jersey's predatory lending law. Mortgage lenders and brokers in Pennsylvania were also surveyed as a comparison group. Eighty-four percent of New Jersey mortgage lenders and brokers said that they reduced certain types of subprime lending because of the New Jersey law. New Jersey mortgage lenders and brokers reported a 67 percent decline in the dollar amount of cash refinance loans and a 75 percent decline in the dollar amount of home improvement loans in the first two months following implementation of the law compared to the two months before its implementation. Mortgage lenders and brokers in Pennsylvania reported 10 percent and 2 percent declines for cash refinance and home improvement loans, respectively. The very large declines in cash refinance and home improvement loans in New Jersey relative to the comparison state Pennsylvania are consistent with the hypothesis that New Jersey's predatory lending law reduced the availability of subprime mortgage credit in that state.

Ho and Pennington-Cross (2005) expanded the literature with a study that examined the effects of twenty-eight state and local predatory laws through 2004. The authors used HMDA data to estimate the likelihood of loan applications, originations, and rejections in states with and without predatory lending laws. They also devised an index of the "strength" of each law, in terms of scope of coverage and severity of restriction, relative to HOEPA. The index is an important element of a cross-state study because state and local laws vary widely in terms of trigger thresholds for coverage and the package of extra restrictions imposed on lenders.

Ho and Pennington-Cross utilized a two-equation model that accounts for the possibility that states with borrower and market characteristics that are more likely to generate subprime loan applications are also more likely to pass a predatory lending law. The authors found that the presence of a predatory lending law alone (without regard to strength) has little impact on loan originations, but applications and rejection rates generally decline. Importantly, the authors found that the decline in applications and rejection rates became more pronounced in areas with stronger laws. The authors concluded that, when faced with increased regulatory costs imposed by the laws, subprime lenders may have been less aggressive in marketing their products to higher risk applicants. Thus, limited or moderate laws appear to change the composition of subprime lenders' portfolios but produce little change in the number of subprime originations. Severe laws produce a decline in originations by subprime lenders. These changes appear to occur because of changes in marketing. These results are consistent with subprime lenders' avoidance of loans made to higher risk borrowers that are covered under state predatory mortgage lending laws.[10]

[10] Ho and Pennington-Cross estimated the effects of state predatory mortgage lending laws on interest rates using data on subprime mortgages from the LPS database. They found that state laws were associated with moderate increases in interest rates overall but also that more severe laws produced greater increases than less severe laws. These results cover a different set of loans (securitized subprime loans) than loans

DATA AND METHODOLOGY

If provisions of state predatory lending laws make subprime mortgage lending more costly, especially for loans extended to high-risk borrowers, the supply of loans to such borrowers would decrease, resulting in a reduction in the number of loans extended. In the following sections we specify aggregate state-level supply and demand functions and estimate reduced-form models to test statistically for hypothesized declines in the volume of subprime mortgage loan originations after effective dates of state predatory lending laws.

The Subprime Mortgage Origination Database

The Credit Research Center has compiled and maintains a subprime mortgage origination database, containing loan-level data on mortgage originations in the portfolios of the subprime subsidiaries of eight large financial institutions since 1995. The information on loans includes the loan amount, annual percentage rate, contract rate, the amount of points and fees, FICO risk score, borrower income, appraised value of the property, ZIP Code, loan quality, and loan performance. The availability of the annual percentage rate and the amount of points and fees permits identification of high-cost loans under HOEPA and various state and local predatory lending laws.

The subprime mortgage origination database covers a large part of the higher risk, higher priced subprime mortgage market. As mentioned in a previous section, the database accounted for nearly a quarter of the higher priced home purchase and refinance loans that were required to report risk premiums under HMDA (see footnote 1). Although the database reflects the particular lending activity of the large subprime lenders that contribute the data, it nevertheless includes a significant share of the higher risk segment of the subprime mortgage market, which the HOEPA-like laws target. [11]

We used data from the third quarter 2004 subprime mortgage origination database to obtain monthly state-level originations from the first quarter of 1997 through the third quarter of 2004. Twenty-two states that had at least six months of post-law observations were included in the analysis. We consider the effects of state laws on the number of originations overall, originations of high-cost loans, and originations of non-high-cost loans. High-cost loans are defined according to the relevant statute in each state. As mentioned, high-cost loans are the loans more likely to be affected by state predatory lending laws than non-high-cost loans since these laws impose tighter restrictions on high-cost loans.

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originated by subprime lenders in HMDA, although the sets undoubtedly overlap to some extent. The interest rate is only part of mortgage price, which also includes any points and fees charged.

[11] The data permit identification of several other groups of loans that, because of higher costs or greater risks, might be adversely affected by predatory mortgage lending laws. These groups of loans include loans with HMDA reportable risk premiums, loans to low-income borrowers, and loans to borrowers with relatively low FICO scores.

Supply of and Demand for Subprime Mortgages

The volume of originations is determined by supply and demand. Demand for subprime mortgages is a function of the price, income, existing debt, house values, past debt payment performance, life-cycle characteristics of the population, and market size. Demand may also be influenced by seasonal factors which we measure by seasonal dummy variables. The supply of subprime credit is a function of price, income, existing debt, house values, past debt payment performance, factor input prices, regulation, and market size.

Loan volume and price are endogenous variables. Since we are interested in the effects of state laws on the availability of credit, we solve supply and demand equations for the volume of originations to obtain a reduced form, in which volume is a function of the exogenous variables. Descriptive statistics for each of the variables can be found in Table 1.

Income reflects borrowers' ability to repay, since debt is repaid mainly from income. Greater income suggests greater ability to service debt, which is associated with greater demand for and supply of credit. The relationship likely is not linear. Higher income households may have sufficient income to service mortgage debt, but higher income may allow consumers to pay for household investments out of current income or to qualify for lower cost prime mortgages. We measure income as state per capita income.

We include the state unemployment rate as an indicator of the risk associated with income streams, with higher unemployment associated with greater risk and less supply. Greater risk of unemployment is expected to reduce demand for credit because consumers tend to borrow when their income and financial expectations are favorable. We also include the state tax burden to account for variations across states in discretionary income.

Other debts reduce discretionary income available for repaying mortgages. High levels of non-mortgage debt relative to income make consumers more vulnerable to financial distress when faced with unexpected expenses and interruptions in income. Demand for subprime mortgages is likely greater for consumers who have relatively high debt burdens, because they will be less likely to qualify for prime credit. Because high debt burdens make lending riskier and therefore more costly, supply would be inversely related to debt burden. Existing debt is measured by county-level non-mortgage debt per borrower. This variable was calculated using quarterly state-level aggregate data for non-mortgage debt from TransUnion, LLC's TrenData database.[12]

[12] TrenData is a product from TransUnion, one of the three major US credit bureaus. The database is created from a series of large random samples of US consumer credit histories drawn quarterly since 1992. Each quarterly sample contains approximately 30 million depersonalized credit reports. From this underlying sample, variables are built describing various borrowing and payment attributes of consumers aggregated to the county level.

We use Freddie Mac's conventional mortgage home price index as an indicator of home value. Home value is a determinant of borrowers' home equity, which is at risk because the pledge of collateral makes default costly for the borrower. The effect of equity on demand is indeterminate. Greater equity may reduce demand because the loss of equity at default may be higher, but greater equity may increase demand because greater equity may allow more mortgage borrowing, possibly at lower interest rates. Higher home value should be positively related to supply of loans because greater equity reduces the risk of default.

Past debt payment performance affects the demand for subprime mortgages because past debt payment problems may limit access to prime credit and influence the price of subprime credit. Past debt payment problems suggest greater credit risk and are therefore inversely related to supply. We measure past debt payment performance in a state by the percentage of borrowers with delinquencies of thirty days or more in the previous four years, which is obtained from TransUnion, LLC's TrenData database.

Demand for all types of credit including subprime credit is positively associated with household formation and family growth. Households using mortgage credit may be, on average, older than households using other kinds of credit because households need to accumulate sufficient assets to purchase a home. In addition, many households use mortgage credit as a means of tapping equity in their homes. Typically, these households refinance existing mortgages for larger amounts than the amount outstanding.[13] Households borrowing against equity in their homes tend to be older than first-time homebuyers because the passage of time allows them to accumulate sufficient equity in their homes through regular payments on their mortgages and increases in the value of their homes. We measure household life-cycle characteristics by a set of variables indicating the age distribution of population.

We measure the size of the market by population and the percentage of households that are homeowners. Greater population and homeownership percentage should be positively related to loan origination volume. We include dummy variables for month of origination to capture any seasonal influences on loan volume.

We include the three-month commercial paper rate for financial firms to measure the cost of funding mortgages, which we expect to be inversely related to supply. Regulations may also affect costs. The regulations of most interest for this study are the state predatory lending laws. The measurement of the effects of state predatory lending laws is discussed in the next subsection.

Effects of State Laws

We use two approaches to investigate the effects of state laws. The first approach uses dummy variables for states and time periods in which predatory lending laws were in effect. The impact of the law is estimated as a mean shift in the number of subprime mortgage originations for those months in which a state predatory mortgage lending law

[13] About 80 to 90 percent of mortgages in the database are refinance loans.

was in effect.[14] This approach treats all predatory lending laws the same across states in terms of potential impact. But, as described in the previous section, predatory lending laws differ widely in severity and coverage. In a modification of this approach, we also utilize an index (Ho and Pennington-Cross 2005) that reflects an assessment of the degree of severity and coverage of the laws.

A second approach uses an event study methodology, which develops a model using pre-law observations to predict the number of subprime originations for the post-law period. The estimated effects of the law are the difference between the predicted and actual number of originations. The event study approach is less restrictive than using the Ho and Pennington-Cross indices to differentiate state laws. There is an element of arbitrariness in assigning values for the degree of restrictiveness and in summing the assigned values to construct an index. The event study methodology allows the data to indicate the restrictiveness of the law.

The state laws considered for this study became effective at different times over a five-year period from 1999 to 2004. During this period, economic conditions varied across states and over time. The differences in implementation dates and variations in economic conditions allow the effects of the predatory mortgage lending laws to be distinguished from effects caused by changes in supply or demand.

Mean Shift Measures of the Effects of State Laws

We assume that the reduced-form model can be represented by a general panel data model with normal disturbances given by

$$y_{it} = X_{it}\beta + D_{it}\gamma + S_t\delta + \varepsilon_{it}. \quad (1)$$

The dependent variable y_{it} is the number of subprime mortgage originations. X_{it} represents the variables determining demand for or supply of subprime mortgages. D_{it} is a dummy variable indicating whether a state predatory mortgage lending law was in effect in state *i* during month *t*. S_t represents monthly dummy variables, which are included to account for any seasonal factors affecting mortgage originations. ε_{it} is an error term.

Under this approach, we consider two alternative specifications for the regulatory effects. One alternative consists of a set of two dummy variables, one indicating whether a state predatory mortgage lending law was in effect in state *i* during month *t* and the second

[14] Georgia amended its predatory lending law shortly after the law became effective. The amendment eliminated the most restrictive provisions involving assignee liability and limited damages that may be assessed against assignees of residential mortgage loans. We considered two specifications for Georgia, one in which the state law dummy equaled zero after the amendment and another in which the state law dummy remained equal to one after the amendment. Results were not sensitive to the specification for the Georgia law. Results reported in this paper are based on the former specification.

indicating months following a negative evaluation of a state law by one of the credit rating agencies (Moody's, Standard & Poor's, or Fitch Ratings).

The other alternative specification uses Ho and Pennington-Cross's (2005) severity and coverage indices. The severity index considers requirements for counseling and restrictions on prepayment penalties, balloon payments, and mandatory arbitration. The coverage index considers the types of loans that are covered and the levels of annual percentage rate and fee thresholds. Both indices are set to zero in the periods before the enactment of the predatory lending legislation.

Our statistical model is a one way fixed-effects model that captures fixed mean differences in originations across states:

$$y_{it} = \alpha_i + \beta x_{it} + \gamma d_{it} + \delta s_t + \varepsilon_{it}. \quad (2)$$

The intercept α_i of the fixed-effects model differs for each state. This specification is appealing because unobserved supply or demand characteristics are unlikely to be distributed similarly across states.[15]

Event Study Measures of the Effects of State Laws

In an event study, a statistical model is estimated to predict behavior using pre-event data. Again, we use a reduced-form model to estimate the number of subprime originations as a function of variables affecting supply or demand and seasonal dummy variables:

$$y_{it} = \alpha_i + \beta x_{it} + \delta s_t + \varepsilon_{it}. \quad (3)$$

The pre-event data do not include data from the period immediately preceding the event because market participants may take actions before the law actually takes effect. For, example, creditors may begin altering their business plans in a state once a law is passed (but prior to its effective date) or when they perceive that passage of a law seems imminent. We estimate equation (3) using data for each state from January 1997 to six months before a predatory lending law became effective.

The estimated statistical model is then used to predict behavior following the event. The predicted behavior can be interpreted as what would have happened if the event had not occurred. In this case, we are predicting the number of loans that would have been originated in each state if a predatory lending law had not been enacted.

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[15] We also estimated pooled and random-effects models. Results were largely consistent across statistical models, but statistical tests of model assumptions support the use of the fixed-effects model. Tests that the variance of state effects (that is, the α_{ij}) equal zero (see Breusch and Pagan 1979) were rejected, which support use of the fixed- or random-effects model over the pooled model. The Hausman (1978) tests reject the hypothesis that random state effects are uncorrelated with observed explanatory variables, thus indicating that coefficients estimated by the random-effects model are not consistent. These tests support use of fixed-effects model over the random-effects model.

The effect of the event can then be evaluated by comparing predicted and actual values. If the event had no effect, then actual values would be randomly scattered around a straight line on which the predicted values lie. That is, the underlying factors predicting behavior in the pre-event model would provide adequate predictions during the post-event period.

In contrast, the pre-event model may systematically under- or overestimate behavior in the post-event period. A finding that the model under- or overestimates the behavior suggests that the event has altered market participants' behavior. The difference between the actual and predicted values is an estimate of that effect. As mentioned, in the case of a predatory lending law that increases creditors' costs or risk, economic theory predicts a decline in creditors' supply of loans. The supply shift would result in a reduction in the number of originations, other things equal. Thus, the greater the impact of a law, the larger would be the overestimate produced by the statistical model for the number of mortgage originations during the event period.[16]

RESULTS OF ESTIMATION

As mentioned, we consider three measures of y_{it} : the total number of loans, the number of high-cost loans, and the number of non-high-cost loans originated. The dependent variable and continuous explanatory variables are included in the models as logarithms.

Mean Shift Estimates of the Effects of State Laws

Table 2 shows the results of estimation of reduced-form models that measure the effects of state laws as a mean shift in originations after the effective date of the law. Chi-squared statistics indicate that the models for total, high-cost, and non-high-cost mortgages are all significant. Models for total and non-high-cost mortgages explain the majority of variation in aggregate state originations for those loan categories.

Explanatory variables are generally significant. The three-month commercial paper rate and the percent of borrowers with delinquencies are significantly negatively related to both high-cost and non-high cost subprime originations. These results are consistent with hypotheses that higher costs and greater risk reduce supply. The number of originations is also positively related to population, although the coefficient for non-high-cost loans is not statistically significant. The number of non-high-cost loan originations is significantly positively related to the homeownership rate, another measure reflecting the size of the market. The home price index is negatively related to the number of subprime originations, although not significantly for non-high-cost loans. This result suggests that subprime lending may be relatively more important in real estate markets that are not especially strong in terms of home price appreciation.

[16] For discussion of event study methodology, see MacKinlay (1997).

There are several differences in results for the high-cost and non-high-cost loan originations, which suggest that the high-cost and non-high cost subprime markets may be segmented. For high-cost loans, the coefficients for income and income squared are positive and significant. The state tax burden coefficient is significant and negative. The non-mortgage debt per borrower coefficient is negative, although not significant. These results suggest that greater disposable income, which reduces lenders' risk or increases borrowers' ability to service debt, is associated with higher levels of high-cost loans. The unemployment rate coefficient is significant and positive for high-cost loans, consistent with the hypothesis that less stable incomes make qualifying for less risky loans more difficult and increase demand for subprime mortgages in the higher risk segment of the market.

In contrast, the coefficients for income and income squared though positive are not significant for the non-high-cost loans segment. The state tax burden coefficient is significant but positive. Neither the unemployment rate nor debt per borrower is significant. Thus, the level and stability of disposable income do not appear to be particularly strong determinants of non-high-cost lending.

Instead, life-cycle considerations appear to be more important for non-high-cost loans than high-cost loans. The share of the population under 20 years of age is significantly negatively related to high-cost loans and significantly positively related to non-high cost loans. The positive coefficient for non-high-cost loans suggests that non-high-cost mortgage borrowing is associated with life-cycle borrowing by families with children. Such early life-cycle borrowers may be credit constrained and turn to the subprime market for additional credit.

Larger shares of those aged 45-59 and 60 years or older (relative to the share of the population 21 to 44 years of age) are associated with a significantly greater number of non-high-cost loans. The large percentage of refinance loans in the database (see footnote 13) may account for the significance of shares of older borrowers in the non-high-cost loan market and the lack of a positive life-cycle effect for high-cost loans.

With these supply and demand variables held constant by the regression formulation, the coefficients for the dummy variable indicating months with a state predatory lending law in effect are negative and significant for both high-cost and non-high-cost loans, indicating that, on average, state predatory mortgage lending laws reduced originations in both segments of the subprime market. The estimated effect for high-cost loans is substantially greater than that for non-high-cost loans, a result that would be expected, since high-cost loans are those subject to special restrictions. Indeed, the coefficient for high-cost loans, -0.402, is nearly 2.75 times greater in absolute value than the coefficient for non-high-cost loans, -0.147.[17]

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[17] The high-cost segment of the market generally contains riskier borrowers than the non-high-cost segment. We used borrower FICO score to separate loans into two groups, higher risk (lower FICO score) and lower risk (higher FICO score), and estimated the reduced-form model for each group. Borrowers with FICO scores of 620 or less were assigned to the higher risk group. The estimated coefficient on the state law dummy variable for the higher risk group (-0.234) is substantially larger in absolute value than the

Results for the state law dummy variable were quite similar in the model that included a second dummy variable indicating months following a negative evaluation of a state law by one of the credit rating agencies (Table 3). That is, the estimated state law coefficients are negative and statistically significant for both high-cost and non-high-cost originations, with the coefficient in the high-cost origination regression being the larger of the two by a substantial amount. The coefficients for negative evaluation by a credit rating agency are also statistically significant for both types of loans. A negative evaluation by a credit rating agency is associated with a large decline in originations of high-cost loans and a smaller increase in originations of non-high-cost loans. These findings suggest that diminished liquidity of high-cost loans resulting from predatory lending laws reduces the desirability of originating such loans. Following a negative evaluation, lenders redirect their attention to the less regulated non-high-cost segment of the market.

Estimated coefficients for Ho and Pennington-Cross's state law restrictiveness index are statistically significant and negative (Table 4). The estimated coefficient for high-cost loans is substantially larger in absolute value than the coefficient for non-high-cost loans. These findings indicate the expected result that greater restrictiveness of a state predatory mortgage lending law is associated with greater reductions in originations and that, for a given level of the index, reductions in covered high-cost loans are substantially greater than reductions in originations of non-high-cost loans.

Event Study Estimates of the Effects of State Laws

For the event study analysis, we estimated the fixed-effects model of equation (2) excluding the state law dummy variables and using data for each state from January 1997 to six months before a predatory lending law became effective. The estimated statistical model was then used to predict originations during the post-law period using data on demand and supply conditions for that period. The prediction error, which is the difference between the actual and predicted logarithm of originations, is an estimate of the volume of lending that would have occurred in the absence of a law.

Overall, fifteen states have statistically significant prediction errors (see Table 5, Panel A). The prediction error (actual minus predicted) is negative for seven of the fifteen states. In these states the model overpredicts the post-law originations. Using Ho and Pennington-Cross's indices to evaluate the restrictiveness of the laws, the states having negative prediction errors are about average (Kentucky, Maryland, and South Carolina) or above average (California, Georgia, North Carolina, and New Mexico) in restrictiveness. Kentucky' law is above average in severity, and Maryland's law is above average in coverage.

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coefficient for the lower risk group (-0.086). This result is consistent with the hypothesis that a law imposing restrictions primarily on high-cost loans would affect primarily loans to higher risk borrowers.

Of the states having statistically significant positive prediction errors (i.e., model under-predicted the post-law originations), four are below average in severity and coverage, and one (New York) has high coverage but is below average in severity. Three of the states having significant positive prediction errors (Colorado, Connecticut, and Massachusetts) have high coverage and severity.

Considering now just the high-cost loan originations (see Table 5, Panel B), twenty states have statistically significant prediction errors. Nine of the twenty states have significant negative errors (overprediction) for high-cost loans (Arkansas, California, Colorado, Georgia, North Carolina, New Jersey, New Mexico, New York, and South Carolina). All but South Carolina have laws that are above average in restrictiveness. South Carolina's law is about average in restrictiveness. Colorado and New York also have significant positive prediction errors in total originations. The results suggest that lenders in Colorado and New York may have shifted lending from covered high-cost loans to uncovered loans in response to these states' predatory lending laws.

Most states with significant positive prediction errors for high-cost loans have laws with below average restrictiveness. Connecticut, Illinois, and Massachusetts are the exceptions. Lenders in these states made more high-cost loans in the post-law period than was predicted based on demand and supply conditions alone.

Lastly, consider the prediction errors for non-high-cost loans (see Table 5, Panel C). Ten states have statistically significant prediction errors for these loans. Prediction errors for Colorado and New York, which experienced increases in total originations, are positive, consistent with the hypothesis that lenders in these states increased overall lending by shifting from covered high-cost loans to uncovered loans in response to these states' predatory lending laws. In five of the ten states (Maryland, North Carolina, Ohio, Oklahoma, and Pennsylvania) prediction errors are negative. North Carolina's predatory lending law, which is above average in restrictiveness, also has specific restrictions that affect non-high-cost loans. The four other states' laws are below average in restrictiveness. Three of these four states (Ohio, Oklahoma, and Pennsylvania) have positive prediction errors for high-cost loans and insignificant prediction errors for total loans.

The pattern of prediction errors is generally consistent with the hypothesis that the volume of covered high-cost originations declined in states with more restrictive state predatory mortgage lending laws after implementation of the laws. In many states with more restrictive laws, the total volume of subprime originations also declined. The decline in total loans included high-cost loans, but the decline may also have included other loans because some state laws have provisions regulating loans that are not defined as high cost. In several states with more restrictive laws, total originations did not decline significantly, a finding that suggests that lenders in these states may have shifted lending from covered high-cost loans to uncovered loans.

For states in which the decline in post-law subprime originations (relative to predicted levels) is statistically significant, we converted logarithms to levels and calculated the

cumulative decline in the number of originations due to predatory mortgage lending legislation. The cumulative decline is simply the sum of prediction errors (actual minus forecasted loans) over all the months in which the law was in effect. The results of this analysis suggest that restrictive laws had a dramatic negative effect on credit availability in the subprime loan market (Table 6). For example, in North Carolina through the third quarter of 2004, 61,673 subprime mortgages were originated after the state's predatory mortgage lending law became effective in July of 2000. The number of loans actually originated was 21 percent lower than the 78,068 loans predicted on the basis of demand and supply conditions in North Carolina. The estimated cumulative decline in high-cost loans in North Carolina (8,675 actual vs. 11,692 predicted) was 26 percent.

Declines in total subprime originations (relative to the forecast) ranged from 11 percent in Kentucky and South Carolina to 36 percent in Georgia. Declines in covered high-cost loans were much larger on a percentage basis. Declines (relative to the forecast) in high-cost-loan originations ranged from 26 percent in North Carolina to 94 percent in New Mexico.

SUMMARY AND CONCLUSIONS

This study adds to a growing literature investigating the effects of HOEPA-like state predatory mortgage lending laws on the availability of subprime mortgage credit. The first studies examined lending in North Carolina following the passage of a predatory mortgage lending law in 1999. These studies generally found declines in subprime lending overall and in subprime lending to lower income borrowers in North Carolina relative to neighboring states following passage of the law. Some of the evidence suggested that the declines may have resulted from reductions in marketing to riskier borrowers.

Since North Carolina's law became effective, many other states have passed HOEPA-like predatory mortgage lending laws. These laws use interest rate and fee thresholds to define high-cost loans that are subject to greater regulation than mortgage loans generally. However, the severity and coverage of the different state laws varies. One recent study of different state laws using HMDA data (Ho and Pennington-Cross 2005) suggested that more restrictive state predatory mortgage lending laws negatively impact the volume of subprime mortgage lending. Laws that are only slightly or moderately more restrictive than the federal HOEPA law may change the composition of subprime lenders' portfolios but produce little change in the number of subprime originations. However, severe laws produce a decline in originations by subprime lenders. These changes appear to be effected by changes in marketing. That is, those state laws that are more restrictive generally reduce both the probability of application at a subprime lender and the probability of rejection by a subprime lender. These results are consistent with subprime lenders' avoidance of loans made to higher risk borrowers that are covered under state predatory mortgage lending laws.

Our analysis extends the literature by investigating the effects of state laws using a large database of loan originations from eight subprime lenders. Information in this database allows us to estimate the effects of the laws on those loans defined as high-cost under each state law. Other databases used in previous studies to investigate state predatory mortgage lending laws have been unable to identify high-cost loans and therefore have not pinpointed the effects of the laws on such loans.

This study develops a model using pre-law observations to predict subprime originations in a state based on demand and supply conditions in the state. The model is used to predict the number of originations in each state in the post-law period. The predictions estimate the volume of lending that would have occurred if the predatory lending law had not been in effect. Comparison of predicted originations with actual originations in the post-law period provides an estimate of the effects of a law. The pattern of prediction errors is consistent with the hypothesis that the volume of covered high-cost originations declined most in those states with more restrictive state predatory lending laws. In states with less restrictive laws, prediction errors were not statistically significant or were positive (i.e., the model underpredicted loan volume). Thus, less restrictive state predatory mortgage lending laws do not appear to dampen the availability of high-cost loans. In contrast, those states with more restrictive laws experienced declines in subprime originations, especially for those loans defined as high-cost loans under the state laws. For those states for which the model predicts statistically significant reductions, the estimated cumulative decline in high-cost loan originations ranges from a low of 26 percent in North Carolina to 94 percent in New Mexico.

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Table 1
Descriptive Statistics

Variable	Mean	Standard deviation	Minimum	Maximum
Number of loans originated per month	1,180	1,336	6	11,278
Number of high-cost loans originated per month	470	623	0	5,698
Number of non-high-cost loans originated per month	595	427	9	2,742
Three-month commercial paper rate (percent)	3.85	2.03	1.02	6.59
Conventional mortgage home price index	174	36	104	350
Non-mortgage debt per borrower (dollars)	15,772	2,784	10,484	43,880
Borrowers having delinquencies of 30 or more days in last 4 years (percent)	4	1	2	7
Homeownership rate (percent)	69	6	53	77
Population (in thousands)	8,764	7,881	1,259	35,900
Percent of population under 20 years	28	2	24	37
Percent of population 20-44 years	37	2	33	40
Percent of population 45-59 years	20	2	14	24
Percent of population 60 or older	15	3	9	22
Personal income per capita (dollars)	30,069	5,413	20,107	45,390
State tax burden (percent)	31	3	26	38
Unemployment rate (percent)	5	1	2	10

Table 2
Regression Results Estimating Mean Shift in Originations after a State Predatory Mortgage Law

Variable	Coefficient (t-statistic) All loans	High-cost loans	Non-high-cost loans
Three-month commercial paper rate	-0.370**	-0.283**	-0.459**
	(12.80)	(3.63)	(15.08)
Conventional mortgage home price index	-0.416*	-2.453**	-0.121
	(2.40)	(5.24)	(0.66)
Homeownership rate	0.882*	-1.205	1.209**
	(2.13)	(1.08)	(2.77)
Personal income per capita	18.320**	77.891**	3.187
	(5.67)	(8.91)	(0.93)
Square of personal income per capita	2.591**	10.741**	0.361
	(5.8)	(8.88)	(0.77)
Percent of population under 20 years	-4.422	-51.651**	8.022*
	(1.39)	(6.04)	(2.39)
Percent of population between 45-59 years	16.924**	-3.459	9.361**
	(5.17)	(0.39)	(2.71)
Percent of population 60 or older	15.715**	3.72	9.635**
	(4.91)	(0.43)	(2.86)
Unemployment rate	0.208**	0.316**	0.035
	(7.55)	(4.25)	(1.21)
State tax burden	0.333	-2.222**	0.950**
	(1.05)	(2.59)	(2.84)
Population	3.686**	8.610**	0.846
	(8.44)	(7.30)	(1.84)
Non-mortgage debt per borrower	0.149	-0.552	-0.075
	(1.15)	(1.58)	(0.54)
Borrowers having delinquencies of 30 days or more	-0.987**	-1.815**	-0.558**
	(13.98)	(9.54)	(7.50)
State predatory lending law in effect (dummy)	-0.078**	-0.402**	-0.147**
	(3.67)	(6.99)	(6.56)
Constant	-28.902**	40.794	-9.966
	(3.35)	(1.75)	(1.09)
Number of observations	1,782	1,776	1,782
R-squared	0.62	0.14	0.53
Number of states	22	22	22
Chi-squared for overall significance of the model	114.88**	11.58**	79.37**
	(0.00)	(0.00)	(0.00)

* Significant at 5 percent level.
** Significant at 1 percent level.

Table 3
Regression Results Estimating Mean Shifts in Originations after a State Predatory Mortgage Law and a Negative Credit Rating Agency Evaluation

	Coefficient (t-statistic)		
Variable	All loans	High-cost loans	Non-high-cost loans
Three-month commercial paper rate	-0.369**	-0.255**	-0.469**
	(12.76)	(3.34)	(15.69)
Conventional mortgage home price index	-0.407*	-2.184**	-0.217
	(2.34)	(4.75)	(1.21)
Homeownership rate	0.840*	-2.361*	1.647**
	(2.02)	(2.15)	(3.82)
Personal income per capita	18.174**	73.686**	4.74
	(5.61)	(8.58)	(1.41)
Square of personal income per capita	2.571**	10.157**	0.575
	(5.74)	(8.55)	(1.24)
Percent of population under 20 years	-4.194	-45.107**	5.596
	(1.31)	(5.35)	(1.69)
Percent of population 45-59 years	17.136**	1.923	7.114*
	(5.22)	(0.22)	(2.09)
Percent of population 60 or older	15.845**	6.858	8.247*
	(4.95)	(0.81)	(2.49)
Unemployment rate	0.210**	0.366**	0.017
	(7.58)	(5.00)	(0.61)
State tax burden	0.335	-2.222**	0.934**
	(1.05)	(2.65)	(2.84)
Population	3.692**	8.700**	0.787
	(8.45)	(7.52)	(1.74)
Non-mortgage debt per borrower	0.156	-0.365	-0.145
	(1.19)	(1.06)	(1.07)
Borrowers having delinquencies of 30 days or more	-0.984**	-1.715**	-0.596**
	(13.9)	(9.17)	(8.13)
State predatory lending law in effect (dummy)	-0.077**	-0.385**	-0.153**
	(3.64)	(6.82)	(6.98)
Negative evaluation by credit rating agency (dummy)	-0.023	-0.663**	0.250**
	(0.79)	(8.43)	(8.14)
Constant	-29.304**	30.41	-5.682
	(3.39)	(1.33)	(0.63)
Number of observations	1,782	1,776	1,782
R-squared	0.62	0.18	0.55
Number of states	22	22	22
Chi-squared for overall significance of the model	110.46**	14.32**	81.74**
	(0.00)	(0.00)	(0.00)

* Significant at 5 percent level.
** Significant at 1 percent level.

Table 4
Regression Results Estimating Changes in Originations using Ho and Pennington-Cross's Index of Restrictiveness of State Predatory Mortgage Lending Laws

	Coefficient (t-statistic)		
Variable	All loans	High-cost loans	Non-high-cost loans
Three-month commercial paper rate	-0.366**	-0.247**	-0.464**
	(12.73)	(3.31)	(15.12)
Conventional mortgage home price index	-0.396*	-2.223**	-0.192
	(2.30)	(4.96)	(1.04)
Homeownership rate	1.083**	0.367	1.105*
	(2.62)	(0.34)	(2.50)
Personal income per capita	19.116**	84.342**	3.039
	(5.94)	(10.04)	(0.88)
Square of personal income per capita	2.706**	11.668**	0.346
	(6.08)	(10.04)	(0.73)
Percent of population under 20 years	-4.684	-54.042**	8.540*
	(1.48)	(6.58)	(2.53)
Percent of population between 45-59 years	17.754**	3.259	8.620*
	(5.45)	(0.38)	(2.48)
Percent of population 60 or older	16.311**	8.191	9.456**
	(5.12)	(0.99)	(2.78)
Unemployment rate	0.203**	0.294**	0.022
	(7.40)	(4.13)	(0.74)
State tax burden	0.315	-2.475**	1.035**
	(1.00)	(3.01)	(3.07)
Population	3.592**	8.061**	0.703
	(8.28)	(7.13)	(1.52)
Non-mortgage debt per borrower	0.154	-0.511	-0.081
	(1.19)	(1.52)	(0.58)
Borrowers having delinquencies of 30 days or more	-0.964**	-1.639**	-0.563**
	(13.70)	(8.95)	(7.48)
Ho and Pennington-Cross restrictiveness index	-0.011**	-0.070**	-0.008**
	(5.74)	(14.26)	(3.88)
Constant	-27.170**	51.375*	-7.095
	(3.17)	(2.30)	(0.77)
Number of observations	1,782	1,776	1,782
R-squared	0.63	0.21	0.53
Number of states	22	22	22
Chi-squared for overall significance of the model	116.93	18.59	77.03
	(0.00)	(0.00)	(0.00)

* Significant at 5 percent level.
** Significant at 1 percent level.

Table 5
Prediction Errors for Total, High-Cost, and Non-High-Cost Subprime Originations, by State
(Error = actual value minus predicted value)

A. Total subprime originations

State	Months since law was effective	Mean (logarithm)	Standard error	95% confidence interval	
Arkansas	15	0.08	0.12	-0.19	0.35
California	27	-0.19*	0.06	-0.32	-0.06
Colorado	21	0.29*	0.05	0.19	0.39
Connecticut	36	0.38*	0.05	0.28	0.48
Florida	24	0.37*	0.08	0.22	0.53
Georgia	5	-0.45*	0.06	-0.61	-0.30
Illinois	9	0.28	0.13	-0.02	0.58
Kentucky	16	-0.13*	0.04	-0.21	-0.04
Massachusetts	43	0.23*	0.04	0.16	0.31
Maryland	28	-0.43*	0.05	-0.53	-0.33
Maine	13	0.44*	0.08	0.27	0.61
North Carolina	60	-0.25*	0.02	-0.29	-0.20
New Jersey	11	-0.17	0.11	-0.42	0.09
New Mexico	9	-0.43*	0.07	-0.59	-0.27
Nevada	12	0.25*	0.10	0.03	0.46
New York	18	0.22*	0.09	0.03	0.41
Ohio	29	-0.03	0.04	-0.11	0.04
Oklahoma	9	0.00	0.07	-0.15	0.15
Pennsylvania	28	-0.09	0.04	-0.18	0.00
South Carolina	9	-0.14*	0.05	-0.25	-0.03
Texas	16	0.38*	0.07	0.23	0.53
Utah	9	0.12	0.11	-0.14	0.38

B. High- cost originations

State	Months since law was effective	Mean (logarithm)	Standard error	95% confidence interval	
Arkansas	15	-1.00*	0.24	-1.53	-0.46
California	27	-1.49*	0.10	-1.70	-1.29
Colorado	21	-1.42*	0.12	-1.68	-1.16
Connecticut	36	0.97*	0.09	0.79	1.14
Florida	24	1.18*	0.11	0.97	1.40
Georgia	5	-0.90*	0.12	-1.25	-0.55
Illinois	9	0.77*	0.19	0.33	1.21
Kentucky	16	0.19*	0.04	0.10	0.28
Massachusetts	43	0.75*	0.09	0.56	0.94
Maryland	28	-0.03	0.07	-0.17	0.12
Maine	13	1.26*	0.09	1.07	1.45

North Carolina	60	-0.40*	0.05	-0.51	-0.29
New Jersey	11	-2.11*	0.45	-3.12	-1.11
New Mexico	9	-2.73*	0.17	-3.14	-2.32
Nevada	12	0.68*	0.12	0.41	0.96
New York	18	-1.52*	0.12	-1.77	-1.27
Ohio	29	0.54*	0.07	0.40	0.68
Oklahoma	9	0.27*	0.09	0.06	0.48
Pennsylvania	28	0.57*	0.09	0.39	0.76
South Carolina	9	-2.05*	0.21	-2.55	-1.56
Texas	16	0.68*	0.07	0.53	0.83
Utah	9	0.16	0.18	-0.26	0.57

C. Non-high-cost loans

State	Months since law was effective	Mean (logarithm)	Standard error	95% confidence interval	
Arkansas	15	0.03	0.12	-0.23	0.30
California	27	0.19*	0.06	0.07	0.31
Colorado	21	0.34*	0.05	0.25	0.44
Connecticut	36	0.21*	0.04	0.13	0.28
Florida	24	-0.04	0.05	-0.13	0.06
Georgia	5	0.01	0.09	-0.23	0.26
Illinois	9	0.18	0.08	-0.01	0.37
Kentucky	16	-0.08	0.05	-0.19	0.02
Massachusetts	43	0.00	0.03	-0.05	0.05
Maryland	28	-0.56*	0.05	-0.66	-0.45
Maine	13	0.09	0.06	-0.05	0.24
North Carolina	60	-0.23*	0.02	-0.28	-0.18
New Jersey	11	-0.06	0.09	-0.27	0.15
New Mexico	9	-0.06	0.07	-0.23	0.11
Nevada	12	0.06	0.07	-0.09	0.20
New York	18	0.63*	0.09	0.44	0.81
Ohio	29	-0.20*	0.03	-0.25	-0.14
Oklahoma	9	-0.15*	0.05	-0.26	-0.04
Pennsylvania	28	-0.34*	0.03	-0.40	-0.28
South Carolina	9	0.10	0.05	-0.01	0.22
Texas	16	0.30*	0.08	0.12	0.47
Utah	9	0.12	0.08	-0.06	0.30

Table 6
Cumulative Actual and Predicted Originations in Post-Law Period in States with Statistically Significant Negative Prediction Errors

A. All subprime originations

State	Months since law was effective	Cumulative actual loans	Cumulative predicted loans	Estimated decline
California	27	209,584	246,977	-15%
Georgia	5	4,569	7,167	-36%
Kentucky	16	11,073	12,431	-11%
Maryland	28	41,661	62,363	-33%
North Carolina	60	61,673	78,068	-21%
New Mexico	9	2,379	3,525	-33%
South Carolina	9	6,595	7,451	-11%

B. High-cost originations

State	Months since law was effective	Cumulative actual loans	Cumulative predicted loans	Estimated decline
Arkansas	15	32	101	-68%
California	27	6,785	27,604	-75%
Colorado	21	244	909	-73%
Georgia	5	1,409	3,452	-59%
North Carolina	60	8,675	11,692	-26%
New Jersey	11	39	425	-91%
New Mexico	9	39	616	-94%
New York	18	778	3,162	-75%
South Carolina	9	164	1,063	-85%

C. Non-high-cost originations

State	Months since law was effective	Cumulative actual loans	Cumulative predicted loans	Estimated decline
Maryland	28	17,398	29,568	-41%
North Carolina	60	52,998	65,298	-19%
Ohio	29	24,010	28,884	-17%
Oklahoma	9	1,613	1,849	-13%
Pennsylvania	28	19,375	26,803	-28%