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Housing Default: Theory Works and So Does Policy

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Abstract

Using a national loan level data set we examine loan default as explained by local demographic characteristics and state level legislation that regulates foreclosure procedures and predatory lending through a hierarchical linear model. We observe significant variation in the default rate across states, with lower default levels in states with higher temporal and financial costs to lenders when controlling for loan and local conditions. The results are notable given that many of the observed loans were sold to investors in national and international markets. State level legislative influences provide a foundation for discussion of national level policy that further regulates predatory lending and financial institution foreclosure activities.

JEL: E44, G21, G28, K11, R20.

Key Words: Residential Mortgage Default, Predatory Lending, Mortgage Pricing.

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Introduction

Residential mortgage default is a complex event triggered by a host of household and socio-economic events. The recent collapse of the subprime market, coupled with the imposing downturn in the housing and broader economic markets has resulted in a rapidly expanding rate of mortgage defaults, many of which end in foreclosure and REO.[1] We know from previous literature that there are trigger events, underwriting issues, economic factors, and interest rate changes that impact the probability and timing of default (Quercia, Stegman and Davis 2005; Renuart, 2004; Vandell, 1995; Foster and Van Order, 1984, 1985). We further recognize that variations in state level legislation regulating predatory lending and foreclosure proceedings exist, and that both legislative directives impose varying costs and benefits that affect the value of a mortgage to the lender and borrower. We have only limited information, however, on the impact of such legislation on the propensity of a default event and the ultimate foreclosure or REO from the lender's perspective (Ambrose and Buttimer, 2000; Capozza and Thomson, 2005, 2006; Crews-Cutts and Merrill, 2008).

We do not argue that the optimal foreclosure rate is zero. While lenders, of course, predicate their loans on the probability of repayment, those lenders who would seek only to minimize either the number of bad loans, or the volume of dollars foregone due to foreclosure, would clearly forego potentially substantial profits. Still mass foreclosures can have deleterious neighborhood and national impacts, as has become apparent in the United States since 2007. Policies that would reduce the numbers of foreclosures, and their external impacts, would be warmly greeted by mortgage lenders and borrowers alike.

The literature on foreclosures generally asserts that, except for workout efforts on the part of the lender, the ultimate decision to default rests with the borrower. Although we do not

challenge this proposition, we do posit that the legislative costs imposed on financial institutions create an incentive for credit rationing by lenders. Underwriting is the lender's instrument in risk reduction. State policies that impose costs to financial institutions for high-cost (often categorized as predatory) lending and foreclosure processing are designed to motivate restraint on lenders. By instituting higher underwriting standards, financial institutions attempt to reduce potential costs to the overall loan portfolio. This would suggest that restrictive lending policies simply result in lenders imposing greater restraint in granting loans via the underwriting mechanism – a form of credit rationing. Lenders will attempt to mitigate the higher cost of instituting foreclosure in states that impose more stringent legislation by 1) increasing the borrowers' cost of funds (Pence, 2006) and 2) instituting differential underwriting standards with more rigid benchmarks applied to borrowers in high-cost states. We expect to observe this in a lower default rate for those high-cost states as a result of the higher acceptance threshold.

Utilizing a dataset of over 20 million loans aggregated at the zip code level, we attempt to determine the political and locational drivers of default. We rely on state level variations in the foreclosure timeline and estimated cost as identified in Crews-Cutts and Merrill (2008) as a proxies for the costs of default to the lender. We also include variables from the predatory lending literature to test their relationship to the default rate (Bostic, et al, 2007). The zip code loan data and the state level variables are supplemented with static and dynamic demographic information to control for economic variations and location fixed effects.

In the next section, we outline the well developed literature on state legislation governing predatory lending and foreclosure proceedings. We rely on the literature to establish the model for the underwriting role in reducing cost in the setup to the analysis. We follow with the modeling approach to the analysis and the data, along with a discussion of the results. The paper

concludes with a summary and discussion of the implications for state policy.

State Legislation

Predatory Lending Laws

One of the first legislative acts directly addressing *predatory mortgage lending* was the Federal Home Ownership and Equity Protection Act of 1994 (HOEPA) (Pub. L. 103-325, 108 Stat. 21600).[2] HOEPA defined a class of mortgage loans that can be classified as "high-cost" if the APR on the loans exceeded the yield on a then-current Treasury Security, having a comparable maturity, by 8 percentage points.[3] In the late 1990s, many states adopted legislation designed to reduce predatory lending. Some of these state laws are patterned on older laws that pre-dated HOEPA (An and Bostic, 2008) while North Carolina was the first state to adopt a true state "mini-HOEPA" law in 1999.[4] The effect of these statutes is a matter of debate, and prior research provides support for both supporters and critics.

Supporters of these statutes argue that regulation is needed, both to allay consumer fears about dishonest lenders and to ensure that creditors internalize the cost of any negative externalities resulting from predatory loans (for an overview of predatory lending from marketing to securitization see Renuart, 2004). In a study on credit flows in North Carolina (Inside B&C Lending, 2001), lenders still offered a full menu of loan products with little or no effect on loan prices. Elliehausen and Staten (2004) find that the volume of subprime mortgages originated in North Carolina relative to the control states dropped for North Carolina borrowers with annual household incomes of $50,000 or less, but rose for higher-income borrowers in that state (Bostic, et al., 2007). Ernst, Farris and Stein (2002) estimated that the North Carolina law saved the state's borrowers $100 million by deterring predatory loan practices, while Quercia,

Stegman, and Davis (2004) confirmed that overall subprime originations dropped in North Carolina following enactment.[5]

Li and Ernst (2006) ranked state laws according to the type of loans covered, points-and-fee triggers, substantive legal protections, and remedies available to borrowers. The authors concluded that state anti-predatory lending laws reduced the prevalence of predatory loan terms, but failed to reduce subprime loan originations (except in Georgia and New Jersey), compared with unregulated states. In addition, compared with the control states, nominal interest rates on mortgages stayed level or dropped in all states with anti-predatory lending laws except Georgia and Virginia.

Critics charge that anti-predatory lending statutes reduce the availability of credit to borrowers who previously were credit constrained, including lower-income households and minorities, by rationing credit and increasing the price of subprime loans. Ho and Pennington-Cross (2006a) find that the presence of a predatory lending law alone has little impact on loan originations, while applications and rejection rates generally decline. The punitive severity of the legislation, however, appears relevant as more aggressive legislation is correlated with a decline in originations by subprime lenders. These changes appear to occur because of changes in marketing and are consistent with subprime lenders' avoidance of loans made to higher risk borrowers that are covered under state predatory mortgage laws. In a follow up study, Ho and Pennington-Cross (2006b) used the same legal index and border area methodology to examine the effect of state anti-predatory lending laws on the cost of credit. They discover that subprime loans originated in states with anti-predatory lending legislation have lower APRs than loans in unregulated states. They also observe that increasing the strength of a law increases the deviation in the APR. A study by Ernst, Farris and Stein (2002) indicated that total subprime originations

fell in North Carolina in 2000, compared with other states, but the drop was relatively small. The study, however, also reported that North Carolina had 15 percent more subprime home loans per capita than the national average in 2000 and that low-income borrowers in North Carolina received a higher proportion of subprime to prime loans in 2000 than low-income borrowers in any other state (Bostic, et al., 2007).

Two additional studies considered whether the reduction in North Carolina subprime loans, post-law, was due to supply-side or demand-side effects. Reports by Burnett, Finkel and Kaul (2004), and Harvey and Nigro (2004) find that loan originations fell due to relative reductions in application volumes, but the probability of subprime loan denials held constant. They attributed the reduction in North Carolina originations to reduced demand, not to supply.

Another line of research sought to explain subprime performance as a function of the factors that are used to categorize mortgage lending practices as predatory. For example, Quercia, Stegman, and Davis (2005) find that two risk factors, balloon payments and prepayment penalties, increase mortgage foreclosure risk 20 to 50 percent on refinance loans. Rose (2008), however, finds that the impacts of the examined loan features on the probability of foreclosure vary significantly across subprime refinances and home purchase mortgages.

Alexander et al. (2002) finds the risk of default to be higher for loans originated by a third party, such as a mortgage broker. The number of mortgage brokers has expanded in recent years, and the Office of Thrift Supervision has noted that mortgage brokers originate up to 80 percent of risky, subprime loans. A study by Harvey (2003) of HMDA data in Chicago seeks to ascertain the effect of anti-predatory lending ordinances adopted by Chicago. After enactment of the Chicago ordinance, the likelihood of subprime originations generally, and by nonbanks in

particular, increased when compared to the rest of Illinois. Among other things, this suggests that subprime lending migrated from banks to nonbanks after passage of the law.[6]

In a national study Elliehausen, Staten and Steinbuks (2006 a and b) report that about half of the states with strong laws had higher-than-expected originations and roughly half of those states had weaker-than expected originations. For the vast majority of laws with high combined scores for coverage and restrictions, high-cost originations fell while non-high-cost subprime originations remained the same or grew. The authors interpret these findings as evidence that lenders shifted from covered high-cost loans to uncovered loans in response to the enactment of state mini-HOEPA statutes.

An and Bostic (2008) take into account enforcement mechanisms of anti-predatory lending laws that have not previously been examined in detail. The results are consistent with the view that anti-predatory lending laws have not hampered the expansion of subprime lending and indeed may have contributed to the functioning of the market. The data show that applications for, and originations of, subprime lending are higher, and denial rates are lower in states that have stronger anti-predatory lending laws. The authors assert this relationship suggests some portion of borrowers that apply for a "high-cost" loan possess higher than anticipated credit quality. This is consistent with the view that predatory lending laws have adversely affected access to credit for marginal borrowers who would be served by the subprime lending market.

Provisions of anti-predatory lending laws also seem to matter, as the observed overall patterns (higher applications and originations, lower denial rates) are stronger with language providing wider coverage, greater restrictions, and stronger enforcement mechanisms. Consider Figure 1 where the current status of loans in default is compared against that of states with and without HOEPA like legislation. The percent of loans 30 and 60 days late is higher for states

with HOEPA laws in place. That relationship is reversed as the loans become delinquent at 90 days and move into foreclosure and REO status, indicating there may be some correlation between legislation and the potential for delinquent loans to cure. The effect of predatory lending practices on default rates, however, appears more complex than a superficial view would suggest and as yet is not fully resolved. The mixed results from this group of studies call into question the merit for federal legislation designed to restrict mortgage products.

Figure 1 approximately here

Foreclosure Laws

It is clear that lenders face differential loan default costs based on state legislation. For example, some control over default losses is afforded to lenders through the workout process and the use of deficiency judgments where available (Ambrose and Buttimer, 2000). In states that provide deficiency judgment the lender receives the house plus any deficiency judgment, collections, and the borrower receives the benefit of eliminating negative equity less any deficiency judgment. In 21 states, judicial foreclosure requires lenders to go through the court system to foreclose on property. Judicial foreclosure proceedings restrict lenders or trustees in their disposition of the property (Edmiston and Zalneraitis, 2007) resulting in a foreclosure process that takes, on average, five months longer than the nonjudicial alternative (Wood, 1997) and imposes more transaction costs.

Several studies have verified that the judicial requirement can significantly raise lender foreclosure costs, perhaps by as much as 10 percent of the loan balance (Ghent and Kudlyak, 2009). From the defaulting borrower's perspective, this requirement provides several months of free rent and protection against lender excesses. Likewise, the findings of Kahn and Yavas (1994) indicate increased legal fees and holding costs in states with a judicial foreclosure

requirement. The costs, however, are not borne directly by the financial institution, as Meador (1982) and Kahn and Yavas (1994) report higher effective interest rates on mortgages in judicial states (Edmiston and Zalneraitis, 2007). Clauretie (1989) argues there is evidence that the increased transaction costs in judicial states deter financial institutions from exercising foreclosure. Pence (2006) finds that loans are 3 to 7 percent smaller in defaulter-friendly states, suggesting that legislation favoring the defaulting borrower imposes material costs on borrowers at the time of loan origination.[7]

Foreclosure costs can also vary according to the type of redemption allowed (statutory or equitable), and whether the state allows deficiency judgments. Statutory redemption refers to the period of time after a foreclosure sale during which the borrower has the right to redeem the property by paying the principal balance, accrued interest, any penalties or fees, and court costs (Clauretie and Herzog, 1990). Deficiency judgments allow the lender to attempt to recover funds that remain unpaid after the foreclosure sale. The availability of deficiency judgments has the opposite effect on default rates as foreclosure relief, such as redemption (Kahn and Yavas, 1994). Crews-Cutts and Merrill (2008) observe that the probability of successful reinstatement of defaulted loans can be reduced by 3 to 9 percentage points by shortening state statutory timelines to match the national median timeline. Pennington-Cross (2003) finds that houses in judicial foreclosure states sell for 4 percent less than those in statutory foreclosure states, presumably due to greater depreciation during the longer foreclosure process.

Clauretie (1989) and Clauretie and Herzog (1990) look at losses to primary mortgage insurance companies in the 1980s. They conclude that because a judicial procedure and a statutory right of redemption lengthens the foreclosure process and delays the liquidation of the property, losses are greater in states that require the former and grant the latter.

Regardless of the extent of underwriting and information gathering that typically occurs in the qualification of borrowers at origination, lenders still have limited ability to control the borrower's decision to default (Ambrose and Buttimer, 2000). For example, trigger events and house price volatility are virtually impossible to foresee. Further, most mortgage pricing models rely on the interaction of interest rates and property values post origination to determine the probability of borrower default (Kau and Kim, 1994; Kau, Keenan and Kim, 1993; Foster and Van Order, 1984). [8]

The objective of the underwriting process is to minimize those costs subject to information constraints regarding the borrower and future events with the profit incentive as guidance in the decision process. It is assumed that applying for a loan is costly, so that individuals will only do so if their chance of being approved is sufficiently high (Longhofer and Peters, 2005). Borrowers decide whether to apply for a loan given their creditworthiness, and assets (the houses) are fixed in location. It is this location variation (across states) that exposes all borrowers within a state to similar levels of discrimination, as borrowers select lenders naively.[9]

Consider the case in which there are pools of applicants residing in two states; one is a low cost state for default and the other is a high cost state, with costs representing lender costs if the borrower defaults. The borrowers are applying for loans with a single financial institution that services both states. The state with lower cost of default provide incentive to lenders to institute more liberal underwriting practices than for similar loans in the high cost state. Given the borrower's inability to self-select, borrowers from the two states will face different requirements.

From this set of conditions, we formulate the following hypotheses.

- *The legal prescript regulating the time before lenders can execute foreclosures (Crews-Cutts and Merrill, 2008) influences the rate of foreclosures across the market.*

- *The more options and lower costs for borrowers to default, the greater the cost to lenders. The increased incentive on lenders to tighten underwriting standards influences the rate of foreclosures across the market.*

This is particularly relevant to the period of observation (August, 2008) given the overall downward trend in the housing market. Financial institutions that proceed from foreclosure to REO incur extensive transaction and holding costs in acquiring and disposing of foreclosed properties given the time that they are on market is increasing and property values are decreasing at the end of the analysis period. In the analysis that follows we incorporate legislative controls for both predatory lending and foreclosure execution in order to gauge the impact they have on the extent of default.

Analysis

Establishing the models

Our analysis uses a database comprised of individual loan performance data aggregated by zip code. Default and foreclosure might be considered as an issue of either "place" or "people" problems. In this paper, we concentrate on *place*. Housing markets have multiple geographic aspects, including neighborhood externalities, municipal tax base impacts, and real estate markets. Large parts of urban areas have been adversely affected by large-scale default and foreclosure, and as such location is an important policy issue in regulating foreclosure.[10]

We assume that each observation has a set of unknown factors that contribute to an individual's mortgage selection and includes characteristics of the mortgages that make up the

subsamples for each zip code. The observations include both dynamic data (the number of loans

in various states of default, the number of loans with prepayment penalties, and the number of

loans in foreclosure); and static data (loan to value ratio, original FICO and original purchase

price). To compare zip codes we convert count variables into percentages. Mean level data

includes the average age of the loans, the average remaining balance, and the interest rates

charged. Foreclosure rates are assumed to be given in the independent standard forms as follows:

$$y = X_f b_f + \varepsilon_f , \qquad\qquad [1]$$

where y is the percent of loans in foreclosure and/or REO observed for each zip code and X is a

vector of explanatory variables including loan attributes. The disturbance ε represents those

unobservable characteristics of the pool of zip-code level loans that affect the foreclosure rate,

and the errors are assumed to follow a normal distribution with zero mean and variance σ^2.

Additionally, we know that the distribution of loan types is subject to conditions

endogenous to the neighborhood such as geographic targeting by mortgage venders, variations

that underwriting place on borrower credibility by neighborhood, and the borrower's selection

process in purchasing a mortgage product (Pavlov and Wachter, 2006). The borrower's selection

can be influenced by information asymmetries that limit the choice set, perceived variations in

transaction costs, and motivations for borrowing. Furthermore, given that households—either

consciously or through socioeconomic mechanisms—sort themselves into neighborhoods

comprised of households with similar characteristics, it is reasonable to expect that neighborhood

composition plays a formidable role in determining the loan products offered and acquired by

borrowers and consequently the inevitable probability of foreclosure (Phillips and VanderHoff,

2004). We control for the characteristics of the neighborhood by including zip code level census

data.

Zip code location variables do not address all the unobserved biases embedded in the economic conditions of the local market. For this reason we include both dynamic and static data at the metropolitan level. Finally, the models include state level proxies for foreclosure and predatory lending legislation to respond to our hypothesis that higher lender costs (both fiscal and temporal) result in tighter underwriting, thereby reducing default rates.

HLR Modeling

Our analysis is based on zip-code level observations that occur within MSAs and within particular states. For example, New York City and Buffalo are subject to the same state regulations, but are located almost 400 miles apart, and are subject to different MSA-level housing market conditions. Kansas City, Missouri and Kansas City, Kansas share a common border, but lie in different states. Both MSA and state level variables matter.

While metropolitan or state level indicators can be included in an ad hoc manner, depending on the problem, it is useful to borrow an analytical framework from the education, evaluation, and health care literatures. School researchers have long recognized that students learn within groups, within classrooms, within grades, within schools, and within school districts. The achievement of students within a particular classroom may be related to the specific teacher, which may be related to attitudes or supervision at the particular school. Bryk and Raudenbush (1992) provide detailed explanation of the method, and Goodman and Thibodeau (1998) apply it to housing markets and submarkets.

We begin our analysis with a baseline set of ordinary least squares regressions to serve as a point of comparison and demarcation. Start with model

$$y_f = a_f + b_f x_f + c_f z_f + \varepsilon_f \tag{2}$$

f subscripts refer to foreclosure variables

y_f = appropriate foreclosure indicator

x_f = variables subject to HLM

z_f = variables not subject to HLM

ε_f = error term.

An OLS formulation implicitly assumes that the relationships are constant either across metropolitan areas or across states and that the error variances are also constant.

Referring to Equation [2], assume arbitrarily that constant a_f varies by state and slope b_f varies by MSA (which may or may not be nested within a single state). Then, write coefficients:

$$a_f = g_o' + g_S'S + \varepsilon_a' \qquad \text{State} \qquad [3]$$

$$b_f = h_o' + h_M'M + \varepsilon_b' \qquad \text{Metro} \qquad [4]$$

where ε'_a are the error terms in the constant substitutions and ε'_b are the error terms in the slope substitutions.

Substituting [3] and [4] into [2],

$$y_f = g_o' + g_S'S + h_o'x_f + h_M'Mx_f + c_f z_f + \varepsilon' \qquad [5]$$

where $\varepsilon' = \varepsilon_f + \varepsilon_a' + \varepsilon_b'x_f$

Referring to Equation [2], one can assume alternatively that constant a_f varies by MSA (which again may or may not be nested within a single state) and slope b_f varies by state. Similar to above:

$$a_f = g_o'' + g_M''M + \varepsilon_a'' \qquad \text{MSA} \qquad [3']$$

$$b_f = h_o'' + h_S''\,S + \varepsilon_b'' \qquad \text{State} \qquad [4']$$

where ε_a'' are the error terms in the constant substitutions and ε_b'' are the error terms in the slope substitutions.

Substituting [3′] and [4′] into [2],

$$y_f = g_o'' + g_M'' M + h_o'' x_f + h_s'' S x_f + c_f z_f + \varepsilon'' \qquad [5′]^{11}$$

where $\varepsilon'' = \varepsilon_f + \varepsilon_a'' + \varepsilon_b'' x_f$. Equations 5 and 5′ are estimated using maximum likelihood methods

(in SAS 9.2).

Data

      The loan data (from LPS Applied Analytics, Inc.) represent the servicing reports on anonymous individual loans aggregated to the five-digit zip code for the third quarter of 2008 for all 50 states and the District of Columbia.[12] The zip-code level socioeconomic variables have been obtained from the United States Census Bureau from the summary tape files for the 2000 census. Recognizing that the composition of mortgages in a neighborhood is a function of the economic and demographic characteristics of borrowers in that neighborhood, these variables allow us to control for variations both within and across zip codes. Additionally, to control for the overriding effects of the metropolitan economy on a single neighborhood, we have included MSA level controls. Incorporating this level of control requires us to restrict our observations to those zip codes located in MSAs.

      To test for externalities that influence the length and cost of the foreclosure process, we consider variations in state regulations on the foreclosure filings by financial institutions. Each state has unique legislation restricting the foreclosure proceeding, and this variation has implications for the rate at which properties progress into foreclosure. The proxies used in this case come from the Freddie Mac analysis of expected optimal statutory timeline for foreclosure presented by Crews-Cutts and Merrill (2008). From foreclosure referral through the title work,

the foreclosure sale and, where applicable, the redemption period, the authors present expected

total and actual average days from "due date of the last paid installment" to disposition.[13] Using

Freddie Mac's experience with lenders, the average actual time across all states between the due

date of the last paid mortgage installment and the foreclosure sale is nearly a year (355 days).

Figure 2 illustrates the distribution of the average number of days from initiation through

disposition for foreclosures and the estimated cost of foreclosure as a percent of the loan value.

Although the trend line indicates a positive relationship between the time and cost, the

relationship is not particularly strong. There are two strong clusters of observations. One is a

group of states (including Virginia, Georgia, and Tennessee) with the average days less than 300

and the average cost of foreclosure less than 1 percent of the loan value. Another cluster shows

up around 420 days (Kansas and Indiana are examples), where the time and cost are closely

correlated. Crews-Cutts and Merrill also provide us with the average of the incurred gross costs

of foreclosure as represented by Freddie Mac's experience as an investor in conventional,

conforming prime mortgages. Gross costs include all expenses incurred by the investor,

including "pre-foreclosure" costs, and any losses taken on the unpaid principal balance when the

property is sold.

Figure 2 approximately here

Bostic et al. (2007) provide us with the information to construct variables that distinguish

between states with and without HOEPA legislation. The authors distinguish between what they

refer to as pre-predatory laws and mini-HOEPA laws, and their analysis, provide evidence that

newer mini-HOEPA laws influenced the subprime market above and beyond the older

preexisting laws, particularly for subprime originations. We construct dichotomous variables

representing those states that do (coded 1) and do not (coded 0) possess either of these two market regulations.[14] After cleaning and filtering the loan data we are left with a dataset that includes 11,950 zip codes created from a cross sectional dataset of over 23 million individual loan records. Table 1 presents the overall summary statistics by zip code with variable definitions.

Table 1 Approximately Here

At the time the data were gathered, the mean interest rate charged by zip code ranged from 5.45 to 8.73 with a median of 6.42, which is only moderately above the national average for conventional loans over the observation period (Federal Reserve Bank of St. Louis, 2008). The data show a range on variables that help determine the strength of borrowers' credit. The average of borrowers' FICO scores, aggregated by zip code, ranged from 565 to 783.[15] The average loan-to-value ratio by zip code ranged from 37 to 184 as a percent of the value. This range is interesting given it represents the range of averages for the observed zip codes. Additionally, there are zip codes in the sample where the percent of loans classified as interest only approaches 50 percent. The average rate of foreclosures by zip code is 1.4 percent although some zip codes have as much as 24 percent of the loans classified as in foreclosure. The Census data show that the percent of the population classified as black in a zip code ranges from 0.00 to 100. The data also reveal that the average age of loans in this sample is short - just over two years - suggesting few if any seasoned loans in the data and thus a reasonably homogeneous dataset. Over 83 percent of the loans in this dataset were originated in 2003 or later.

Discussion of Results

We present our findings in a sequential manner to discuss the general modeling approach (OLS and HLR) in Table 2, and then expand it to look at state level effects in Table 3. With

large numbers of explanatory variables, we often look at variables in groups, singling out

particular variables where the results are important or informative. Three different default

settings for the dependent variable are used:

foreclosure – column a,

REO – column b, and,

both foreclosure and REO – column c, the sum of columns a and b.

We test this combined dependent variable given the cross sectional nature of our data and the

fact that both foreclosure and REO represent default in different states in the process.

Metro Level Analysis

Both the adjusted R^2 for the OLS model and the χ^2 for the Hierarchical Linear Regression

(HLR) model indicate significance in the models' ability to explain variation in the default rate,

with the adjusted R^2 coming in at 57 to 73 percent and the χ^2 significance in excess of 99

percent. The results for the models also indicate a general stability in the direction and

significance of the coefficient estimates.

Table 2 approximately here

Columns (a) – (c) present the OLS results. In addition to the zip-level variables, we

introduce five variables at the MSA level to address MSA-specific market conditions:

gdp04_05 – Percentage change in MSA level GDP between 2004 and 2005, a measure of

economic activity.

pchval – Percentage change in house values from 2007 to 2008, the most immediate

measure of housing market conditions.

ppopch – Percentage population change from 2000 to 2005, an indicator of housing

demand.

avevalch – Average annual percent change in housing value from 1999 to 2007, a lagging measure of value changes.

stdvalch – Standard deviation of annual percent changes, reflecting market volatility.

Although these MSA-level variables are included largely as controls, they provide some interesting impacts in that the signs (positive or negative) differ depending on whether we are measuring loan foreclosures or REO. For example, both household income and house values are positively related to foreclosure but negatively related to REO and the combined REO foreclosure variable. This is our first indication that there are different factors at the state level that influence foreclosure and the transition of foreclosed properties to REO. We calculate the elasticity of the foreclosure percent by zip code with respect to average value change. For foreclosures, the elasticity is +0.79; for REO, it is -0.41. These suggest that systematic increases in home values over previous years are positively related to foreclosures, but negatively related to REO. Other variables have similar opposite signs, and the combined percentage (loanforereo) is generally an average of the two elasticities.

Consider the results of the OLS models for the interest rate and FICO scores as indicators of foreclosure probabilities. For ease of interpretation the results are converted to elasticities, which are large and significant. For column (a), the foreclosure percentage, the elasticity with respect to the interest rate is +7.35, and the elasticity with respect to the FICO score is -4.12. For column (b), the interest rate elasticity is +14.97, and the FICO elasticity is -1.20. Although there is no theoretical foundation for the sizes of the elasticities, the signs are intuitive.[16] High interest rates are related to large numbers of foreclosures; high FICO scores prevent them. Other loan characteristics included in the models also appear to have the anticipated signs and connection to default.

Anomalies in the OLS models, however, suggest that OLS is limited in its ability to explain the variations in the dependent variables. For example, the lack of significance at any level for the variable *median household income* is also interesting. This is an estimate of the real household income in 2008 dollars based on the Regional Consumer Price Index applied to each zip code. The lack of significance in this variable suggests the foreclosures observed in this dataset are not restricted to low-wealth neighborhoods as is frequently asserted. The variable indicating the percent of the population that is composed of African Americans, however, suggests there is racial dependence. The percent of the population identified as black is significant in every case, suggesting race matters in spite of the influence of legal elements. The socio-economic elements of the immediate neighborhood provide relevant explanatory power of the tendency for households to cluster in neighborhoods comprised of households with similar socio-economic characteristics and, thus, similar levels of exposure to economic transition.

Columns (d), (e), and (f) show the impacts of the metropolitan level HLR, in which we allow the intercept and the interest rate impact to vary with the percentage change in house value. In other words, this provides a change in the impact, for each MSA. The individual MSA variables have smaller explicit impacts (because the HLR models are translating the intercept and slope variables). Nonetheless, the interest and FICO elasticities remain large and significant. Finally, because this is a "place" analysis, relating to aggregate impacts by zip code, we examine the "age profile" related to increased rates of foreclosure. As noted in the accompanying Figure 3, compared with earlier years, the percentage of loans originated in 2003 and 2005 has the expected impact on default rates. For example, a 1 percent increase in the percentage of loans initiated in 2003, leads to a 1.13 percent increase in the variable loanreo and a 0.93 percent increase in the variable loanforeclosure. The timing of default is not surprising given previous

research demonstrated that default occurs within the first four years of the loan tenure (Kau,

Keenan, Muller, Epperson, 1992; Ambrose, Buttimer and Capone, 1997).

Figure 3 Approximately Here

State Effects

Interpreting multiple policy effects in an econometric model can be challenging. Policy

analysts have long realized, for example, that increasing the generosity of food stamps might

adversely affect the impacts of housing subsidies if the imputed income from the food stamps

reduces or eliminates the housing subsidies. In our case, pre_HOEPA and mini_HOEPA are not

exclusive – 12 states (including California) have both – so that their joint impacts may be

ambiguous. If increased costs in the past have led somehow to "better" loans then the

days_to_foreclosure variables may have smaller impacts than otherwise because the overall

quality of the loans is better.

Table 3 incorporates the vector of 7 state level variables at the OLS level (equations a –

c) and at the HLR level (equations d – f). In all estimates, elements in the group as a whole are

significant, and in most cases, the single variables are significant at the 1% level. In brief, the

elasticities with respect to interest rate and FICO are the same signs and similar magnitudes. In

the OLS estimates, the addition of the seven variables improves the fit as measured by R^2 and $\bar{R}^2$

at nearly 73 percent, as well smaller standard errors of estimate and appropriately significant

analysis of covariance F-tests (for OLS) and χ^2 tests (for HLR).

Although the coefficient values vary from those reported in the Table 2 models, the

direction and significance of relationship is generally consistent. The HLR estimates support the

use of the enriched procedures. Consider the variables, redemption and confirmation, provided

at the state level. Using OLS, their impacts (although statistically significant) are small.

However, looking at the HLR analysis for foreclosures (column d), the redemption and confirmation elasticities are -0.85 and -0.71, respectively, whereas the comparable elasticities for REO are +1.06 and +0.65, respectively. In the combined estimate (column f), the combined elasticities are rough averages of (c) and (d), suggesting a substantive aggregation bias. In other words, with respect to state laws and practices, it is essential to disaggregate foreclosure and REO. This result is not surprising as there are different incentives in the borrower's decision to default, and the lender/servicer proceeding from foreclosure to REO.

Looking at those state variables of interest, there are five variables representing lender/investor foreclosure costs. The variables "cost" (transaction and holding costs during the foreclosure period) "days_ref_sale" (total days from foreclosure to referral of sale) and "total_days" (total days from DDLPI to finalized sale including post-sale redemption period) are values presented in Crews-Cutts and Merrill (2008) and derived from Freddie Mac internal data. The variables "redemption" and "confirmation" have been obtained from published estimates from Realtytrac.com and All-foreclosures.com respectfully. In states with a redemption period, the borrower has the right to occupy the property and may reclaim title and possession by paying the outstanding debt until the redemption period expires or until the borrower voluntarily vacates the property. Clauretie (1989) suggests a redemption period lengthens the foreclosure process, thereby increasing possible losses. In states with a confirmation period, the court is charged with reviewing the sale of foreclosed property to ensure that a "fair" price has been paid and that the sale represents an arms length transaction. A confirmation period further extends the foreclosure process by protecting the borrower. Typically, the new owner of the property cannot market the home for sale until the confirmation has elapsed. As constructed, all five variables increase the cost of foreclosure to the lender. Our hypothesis is that higher costs encourage discrimination in

lending through the underwriting process, thereby reducing the number of higher risk loans.

Thus, we expect to see fewer foreclosures as costs increase. Although not entirely consistent

across the model runs, there is clearly a strong association between lower foreclosures and higher

costs. Many of the coefficient estimates are negative, or are insignificant.

Two variables are included in the model to represent legislation defined as obstructing

predatory lending practices, identified as "mini_HOEPA" and "pre_HOEPA." Both obtained

from Bostic, et al. (2007). The role of predatory lending laws is to reduce unscrupulous

underwriting. One outcome of relaxed underwriting standards is equity stripping, as periodic

resets force borrowers into perpetual refinancing sequences incurring transaction costs and

lender fees. The prepayment penalty frequently associated with many predatory loans further

burdens borrowers by locking borrowers into a higher interest rate for a fixed period. As

previously noted, legislation that is more stringent, or constructed in a similar fashion to the

HOEPA legislation, has been shown to have a greater impact in reducing predatory lending

practices than legislation devised prior to HOEPA (pre_HOEPA). The coefficient estimates for

the variable "mini_HOEPA" offer conflicting conclusions. The coefficients for the HLM models

are consistent with expectations, reducing the level of foreclosures. The OLS coefficients,

however, are all significantly positively related to foreclosures.

The variable "pre_HOEPA" offers a more convincing conclusion with all the significant

coefficients negatively related to the percent of foreclosures. Figure 4 compares the outcomes

beginning with year 2000, and again the major impacts involve the percentage of loans

originated in 2003 and 2005. For example, a 1 percent increase in the percentage of loans

initiated in 2003, leads to a 0.96 percent increase in "loanreo" and a 0.97 percent increase in

"loanforeclosure." Consistent with the previous models, the two origination years most related

to these rates are 2003 and 2005. This is likely an artifact of loan seasoning, as most "bad" loans originated prior to 2003 have dropped out, and loans originated after 2005 are entering the period of likely foreclosure.

Figure 4 approximately here

Conclusion

It is clear that from 2003 to 2006 many factors—stagnant home prices, rising interest rates, lax underwriting, predatory lending, fraud, lack of borrower due diligence, and underlying economic factors in some regions—combined to create an environment in which some homeowners found themselves in negative equity positions, while other homeowners were trapped in loans they could not afford to keep current or refinance. Many of these borrowers acquired their homes with unconventional mortgage loans. While we reiterate that a zero default rate is not necessarily desirable, the unprecedented high rates (at least since the 1930s) almost certainly would have been reduced by closer attention to

- the types of loans made available (interest rates and interest terms),
- borrower characteristics (particularly FICO scores),
- the profit incentive of the mortgage lenders as it affects access to credit, and
- appropriate state legislation that regulates mortgage products

Opponents of increased regulation of the subprime market may argue that amplified restrictions will result in higher costs and reduced access to credit for many borrowers. Immergluck and Smith (2005) argue that the social costs of foreclosure outweigh lower borrowing costs. Foreclosures may have spillover effects in terms of value loss, tax base erosion, instability in retirement wealth for middle income households, and ultimately the economic stability of local communities. The results from this analysis suggest that state level legislation is

linked to the rate of default and provides a foundation for discussion of a national level policy that might regulate predatory lending and financial institution foreclosure activities. This is one of many proposed directives for addressing the current (2009-2010) mortgage challenges and future borrower lender interaction during potential default. The elasticity of foreclosures is influenced by those factors illustrated in prior literature to be important in explaining the probability of default as well as the timing of loan origination and the legislative variables of interest.

The results presented in this analysis suggest that higher lender costs for foreclosure and stringent controls on predatory lending are connected to lower foreclosure rates. As we noted earlier, high interest rates are related to large numbers of foreclosures; high FICO scores prevent them. A lack of servicing incentives further exacerbates the probability of foreclosure of troubled loans, and such incentives can be built into the origination process (Cordell, et al., 2008). Caution is warranted in interpreting these results. As Crews-Cutts and Merrill (2008) point out, longer foreclosure timelines alter the cost/benefit relationship for the borrower's decision to default by creating opportunities for borrowers to occupy the house free of rent during the foreclosure process. Alternatively, states with short timelines to foreclosure reduce the incentive for lenders to conduct workouts in an attempt to cure loans and reduce costs.

The analysis supports the argument that in order to more fully understand the progression to default results adequately, it is necessary to recognize that local household composition, regional economics, and state regulations on lending and the foreclosure process imposed at origination of the loan must be considered. Further, as the HLM models indicate, there is merit to recognizing the hierarchical relationships between state policy and local market outcomes.

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Figure 1: Distribution of Loan Status by State
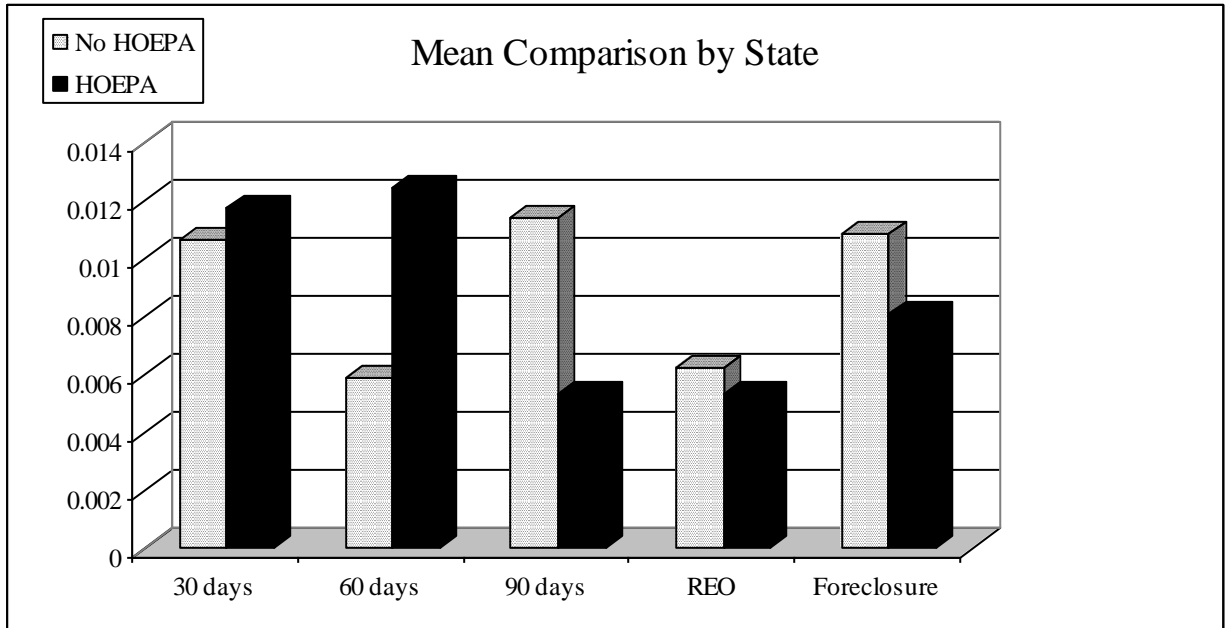
*Created from the data used in the analysis

Figure 2: Comparison of Average Days to Foreclosure and Average Cost of Foreclosure

Figure 3 - Year Elasticities by Type of Loan - Metro Only

Figure 4 - Year Elasticities by Type of Loan - State and Metro
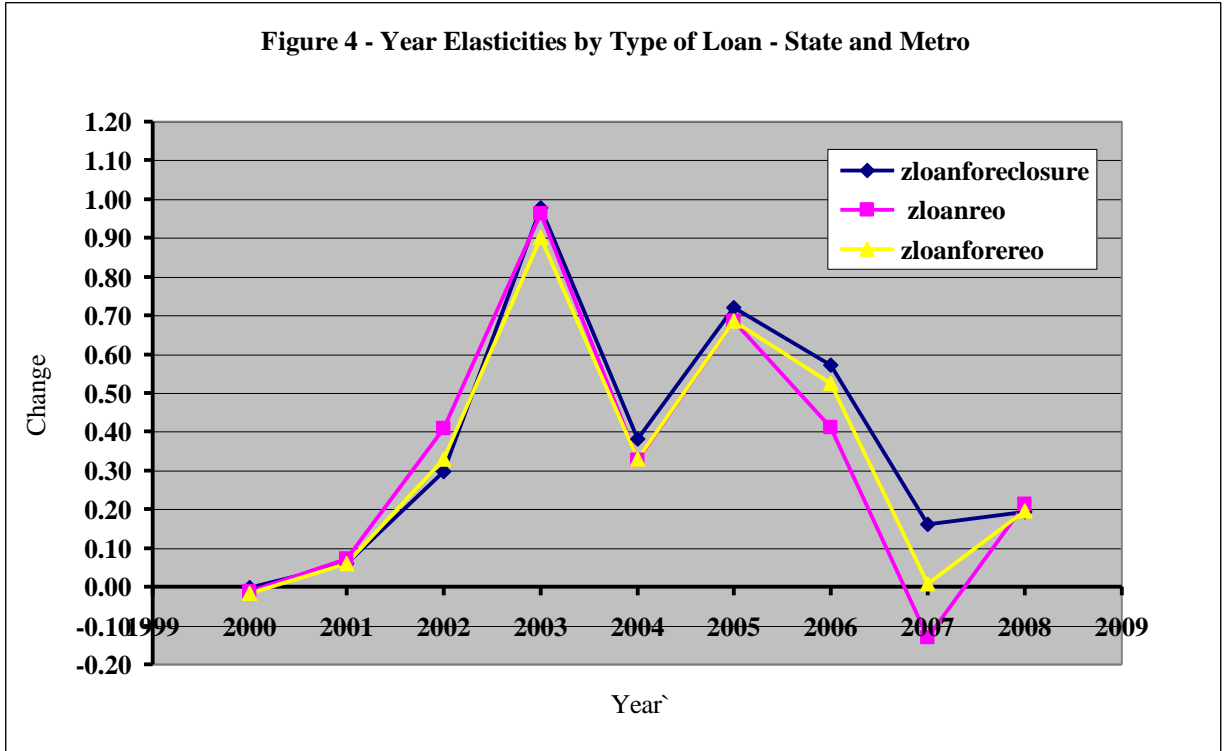
Table 1 Summary Statistics

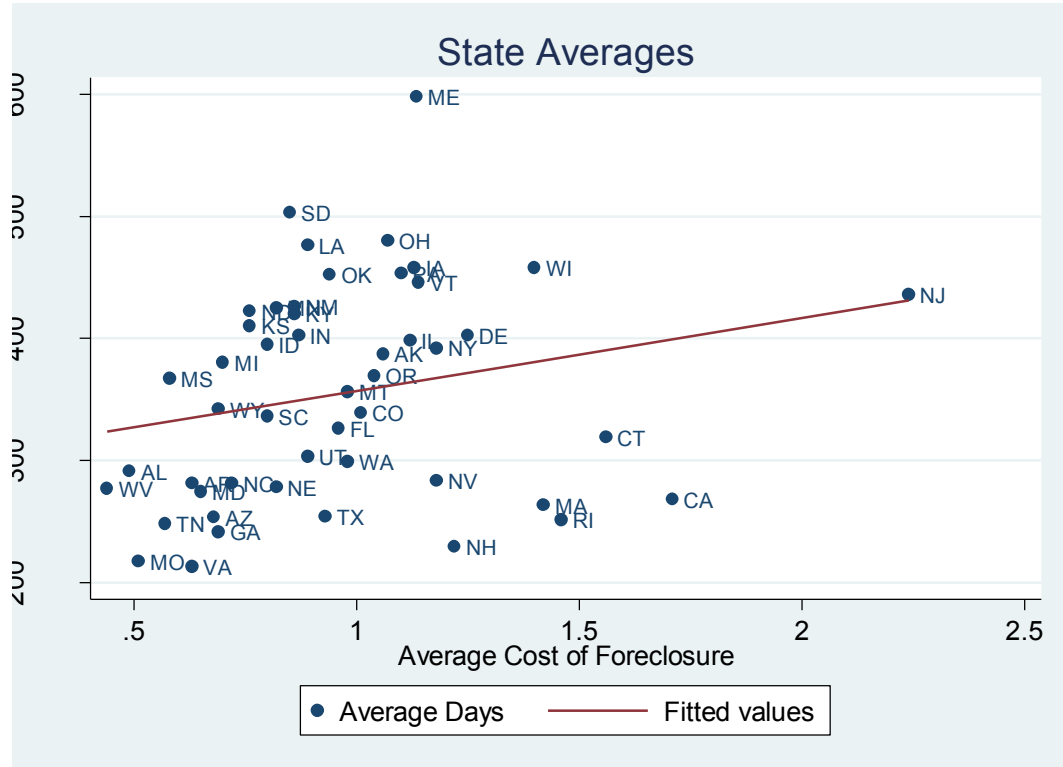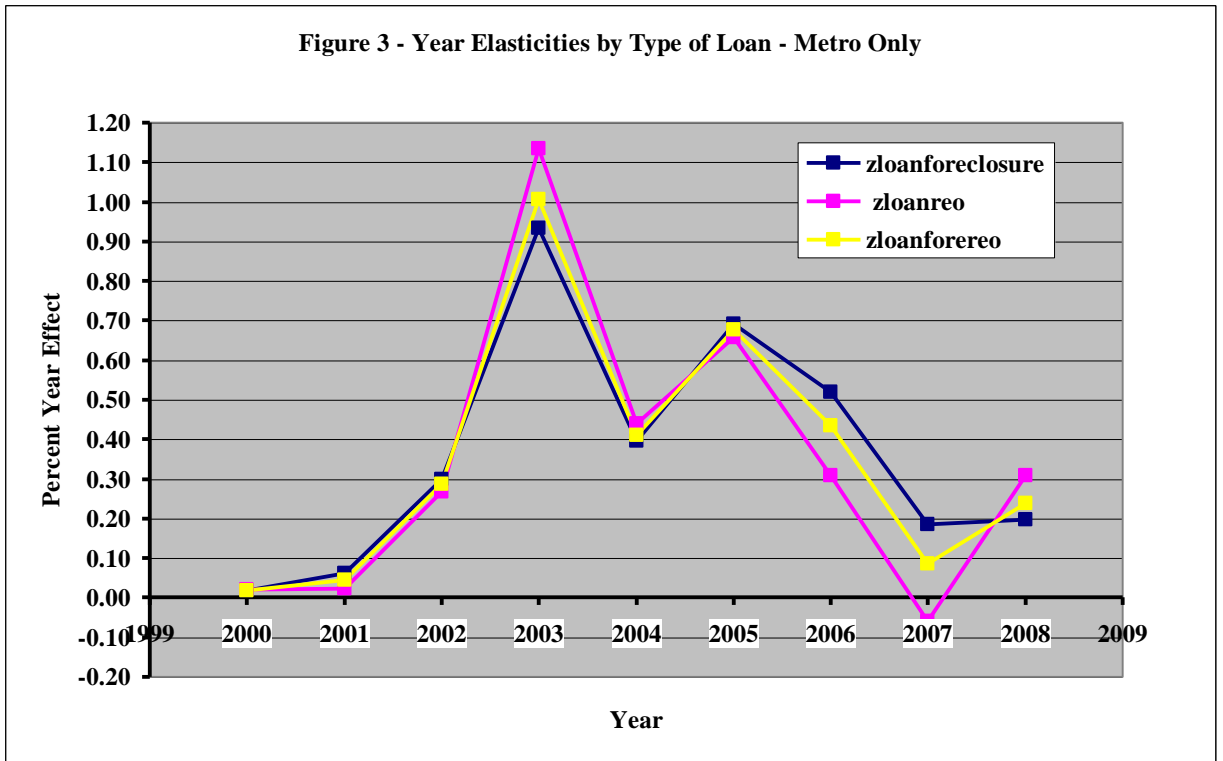| Variable		Mean	Standard Deviation
REO	% loans reported in REO	0.009	0.012
Foreclosure	% loans reported in process	0.014	0.015
Loan and Borrower			
Interest rate	Mean by zip	6.416	0.379
Refinance	% loans refis	0.120	0.066
LTV-Ratio	Mean by zip	70.590	8.551
FICO	Mean by zip	706.451	30.431
Term remaining	Mean by zip	265.120	16.240
Interest only flag		0.067	0.067
Current balance due	Mean by zip	0.067	0.067
Political/Economic/Temporal Controls			
Year controls 00-08			
Population black	Mean by zip	0.101	0.177
Rental rate	Mean by MSA current	565.322	227.071
Median Hse Inc	Mean by MSA current	49,070.410	18,827.610
Median Value	Mean by MSA current	147,111.600	101,962.900
GDP test	Change by MSA		
Population Change	Change by MSA		
Median Value Change	Change by MSA		
Std Dev Value Change	Change by MSA		
State Legislation Variables			
Cost of Foreclosure to Investor	ranges from 0.44 to 2.24	0.960	0.340
Days Ref Sale	ranges from 33 to 312	121.280	76.430
Redemption Allowed	ranges from 0 to 180 days	20.500	49.670
Confirmation Required	ranges from 0 to 101	67.000	18.270
Total days to initial foreclosure	ranges from 183 to 462	297.694	81.443
Mini_HOEPA	0 or 1	0.400	0.500
Pre_HOEPA	0 or 1	0.580	0.500

Table 2   Loan Foreclosure Estimates - MSA Effects Only

Dependent	OLS			HLR		
	a.	b.	c.	d.	e.	f.
Variable	Foreclose	REO	Both	Foreclose	REO	Both
Intercept	**-0.1213**	**-0.1869**	**-0.3082**	**-0.1583**	**-0.1538**	**-0.3134**
	0.0124	0.0089	0.0149	0.0109	0.0091	0.0157
zcur_int	**0.0166**	**0.0212**	**0.0378**	**0.0206**	**0.0171**	**0.0378**
	0.0009	0.0007	0.0011	0.0011	0.0009	0.0015
zprepay_penalty	**0.0631**	**0.0472**	**0.1103**	**0.0710**	**0.0680**	**0.1379**
	0.0034	0.0024	0.0041	0.0044	0.0036	0.0062
zrefi_nocash_purpose	**0.0149**	**-0.0020**	**0.0128**	**0.0055**	**0.0044**	**0.0111**
	0.0016	0.0011	0.0019	0.0015	0.0012	0.0021
zltv_rati	**0.0003**	**0.0002**	**0.0004**	**0.0002**	**0.0002**	**0.0004**
	2.765E-05	1.976E-05	3.326E-05	0.000021	0.000018	0.000031
zfico_cur	**-8.1E-05**	**-1.5E-05**	**-9.6E-05**	**-0.00006**	**-8.7E-06**	**-0.00007**
	8.29E-06	5.92E-06	9.97E-06	6.26E-06	5.284E-06	9.18E-06
zterm_rem	**7.59E-05**	**6.54E-05**	**0.00014**	**0.00004**	**0.00005**	**0.00009**
	1.126E-05	8.05E-06	0.00001	0.00001	0.00001	0.00001
zio_flg	**0.0090**	**0.0529**	**0.0619**	**0.0407**	**0.0359**	**0.0773**
	0.0036	0.0026	0.0044	0.0029	0.0024	0.0042
zprin_bal	**1.16E-05**	**6.52E-06**	**1.81E-05**	**4.73E-06**	**-3E-06**	**1.93E-06**
	3.84E-06	2.74E-06	4.62E-06	2.67E-06	2.261E-06	3.938E-06
zyear2000	**-0.1059**	**-0.0455**	**-0.1514**	**0.0390**	**0.0271**	**0.0638**
	0.0233	0.0166	0.0280	0.0160	0.0135	0.0235
zyear2001	**0.0407**	**0.0084**	**0.0491**	**0.0311**	**0.0073**	**0.0375**
	0.0121	0.0086	0.0145	0.0085	0.0072	0.0125
zyear2002	**0.0617**	**0.0453**	**0.1070**	**0.0608**	**0.0340**	**0.0946**
	0.0082	0.0058	0.0098	0.0058	0.0049	0.0085
zyear2003	**0.0431**	**0.0831**	**0.1262**	**0.0703**	**0.0534**	**0.1232**
	0.0054	0.0038	0.0065	0.0043	0.0036	0.0062
zyear2004	**0.0198**	**0.0493**	**0.0691**	**0.0478**	**0.0330**	**0.0805**
	0.0067	0.0048	0.0080	0.0048	0.0041	0.0070
zyear2005	**0.0568**	**0.0563**	**0.1131**	**0.0656**	**0.0390**	**0.1044**
	0.0057	0.0041	0.0069	0.0041	0.0035	0.0061

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zyear2006	**0.0706**	**0.0213**	**0.0919**	**0.0463**	**0.0172**	**0.0631**
	0.0055	0.0039	0.0066	0.0039	0.0033	0.0057
zyear2007	**-0.0118**	**-0.0033**	**-0.0151**	**0.0176**	**-0.0035**	**0.0133**
	0.0056	0.0040	0.0068	0.0040	0.0034	0.0059
zyear2008	**-0.0077**	**0.0392**	**0.0315**	**0.0365**	**0.0355**	**0.0711**
	0.0070	0.0050	0.0084	0.0050	0.0043	0.0074
zip_black_pop	**0.0021**	**0.0070**	**0.0090**	**0.0041**	**0.0054**	**0.0094**
	0.0007	0.0005	0.0008	0.0006	0.0005	0.0008
valrent	**-2.8E-06**	**4.06E-06**	**1.21E-06**	**-7.83E-07**	**1.7E-06**	**7.93E-07**
	1.55E-06	1.11E-06	1.87E-06	-1.01E-06	8.596E-07	1.498E-06
med_house_inc	**2.74E-06**	**-1.4E-05**	**-1.1E-05**	**0.00001**	**6.75E-06**	**0.000019**
	9.04E-06	6.46E-06	1.087E-05	6.30E-06	5.335E-06	9.293E-06
med_value	**3.02E-06**	**-1.1E-05**	**-7.6E-06**	**4.51E-06**	**4.6E-07**	**5.04E-06**
	3.17E-06	2.27E-06	3.82E-06	2.29E-06	1.936E-06	3.376E-06
gdp04_05	**0.0013**	**-0.0007**	**0.0006**	**0.0003**	**-0.0003**	**0.0001**
	6.266E-05	4.478E-05	0.0001	0.0001	0.0001	0.0002
pchval	**0.0070**	**0.0101**	**0.0171**	**0.0095**	**0.0073**	**0.0169**
	0.0004	0.0003055	0.0005	0.0009	0.0007	0.0012
ppopch	**-0.0003**	**0.0001**	**-0.00020**	**0.00001**	**0.00000**	**-0.00002**
	2.298E-05	1.642E-05	0.00003	0.00005	0.00004	0.00006
avevalch	**0.0013**	**-0.0004**	**0.000891**	**0.0005**	**-0.0001**	**0.0005**
	5.176E-05	3.698E-05	6.226E-05	0.0001	0.0001	0.0002
stdvalch	**-0.0013**	**0.0002**	**-0.00117**	**-0.0005**	**0.0001**	**-0.0005**
	7.349E-05	5.252E-05	8.841E-05	0.0002	0.0001	0.0002
pchval* zcur_int	**-0.0011**	**-0.0017**	**-0.00282**	**-0.0016**	**-0.0012**	**-0.0028**
	6.655E-05	4.755E-05	8.005E-05	0.0001	0.0001	0.0002
N	11950	11950	11950	11950	11950	11950
R^2	0.5701	0.6297	0.7296			
SER	0.0100	0.0071	0.0120			
Elasticities						
zcur_int	7.3545	14.9706	10.2816	9.1030	12.1317	10.2888
fico	-4.1189	-1.2037	-2.9980	-3.0466	-0.7095	-2.1876
pchval	-0.0126	-0.0359	-0.0227	-0.0170	-0.0229	-0.0194
gdp	0.2661	-0.2235	0.0784	0.0543	-0.0838	0.0156

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population growth	-0.1159	0.0660	-0.0460	0.0046	0.0014	-0.0047
avevalch	0.7912	-0.4095	0.3313	0.2724	-0.0580	0.1922
stdvalch	-0.3513	0.0682	-0.1902	-0.1294	0.0355	-0.0813

Year Effects

2000				0.0175	0.0195	0.0176
2001				0.0617	0.0232	0.0458
2002				0.2985	0.2676	0.2861
2003				0.9330	1.1346	1.0070
2004				0.3969	0.4388	0.4111
2005				0.6910	0.6577	0.6768
2006				0.5186	0.3080	0.4352
2007				0.1861	-0.0598	0.0868
2008				0.1982	0.3084	0.2374

Coefficient in **bold** type; Standard error in roman type.

Table 3   Loan Foreclosure Estimates - State and MSA Effects

Variable	OLS			HLR		
	a. foreclosure	b. REO	c. both	d.[†] foreclosure	e.[‡] REO	f.[‡] both
Intercept	**0.0081**	**-0.2085**	**-0.2004**	**-0.1705**	**0.1094**	**-0.0237**
	0.0108	0.0086	0.0151	0.0499	0.0149	0.0260
zcur_int	**0.0009**	**0.0208**	**0.0218**	**0.0206**	**0.0165**	**0.0177**
	0.0008	0.0007	0.0012	0.0010	0.0019	0.0024
zprepay_penalty	**0.0922**	**0.0549**	**0.1471**	**0.0749**	**0.0984**	**0.2003**
	0.0031	0.0024	0.0042	0.0045	0.0035	0.0061
zrefi	**0.0005**	**0.0076**	**0.0081**	**0.0092**	**0.0036**	**0.0134**
	0.0014	0.0011	0.0019	0.0016	0.0014	0.0024
zltv_rati	**0.0001**	**0.0003**	**0.0004**	**0.00020**	**0.00027**	**0.00052**
	2.28E-05	1.80E-05	3.16E-05	2.20E-05	1.90E-05	3.30E-05
zfico_cur	**-9.07E-05**	**-2.16E-05**	**-1.12E-04**	**-6.00E-05**	**-2.99E-06**	**-6.00E-05**
	6.89E-06	5.45E-06	9.57E-06	6.62E-06	5.64E-06	9.92E-06
zterm_rem	**6.77E-05**	**7.28E-05**	**1.40E-04**	**4.70E-05**	**7.00E-05**	**1.16E-04**
	9.17E-06	7.24E-06	1.27E-05	9.26E-06	7.84E-06	1.40E-05
zio_flg	**2.46E-02**	**3.82E-02**	**6.27E-02**	**4.05E-02**	**2.53E-02**	**5.85E-02**
	2.96E-03	2.34E-03	4.11E-03	3.05E-03	2.60E-03	4.58E-03
zprin_bal	**8.96E-06**	**6.29E-06**	**1.52E-05**	**9.03E-06**	**1.94E-06**	**1.10E-05**
	3.10E-06	2.45E-06	4.30E-06	2.81E-06	2.46E-06	4.29E-06
zyear2000	**-0.0715**	**-0.0184**	**-0.0899**	**-0.0072**	**-0.0179**	**-0.0620**
	0.0188	0.0149	0.0261	0.0165	0.0142	0.0248
zyear2001	**0.0342**	**0.0514**	**0.0856**	**0.0300**	**0.0224**	**0.0496**
	0.0098	0.0077	0.0136	0.0090	0.0078	0.0137
zyear2002	**0.0342**	**0.0616**	**0.0957**	**0.0605**	**0.0520**	**0.1086**
	0.0067	0.0053	0.0093	0.0061	0.0053	0.0092
zyear2003	**0.0569**	**0.0607**	**0.1175**	**0.0736**	**0.0453**	**0.1101**
	0.0045	0.0035	0.0062	0.0045	0.0038	0.0067
zyear2004	**0.0349**	**0.0345**	**0.0693**	**0.0459**	**0.0246**	**0.0644**
	0.0054	0.0043	0.0075	0.0051	0.0043	0.0076
zyear2005	**0.0458**	**0.0644**	**0.1102**	**0.0683**	**0.0407**	**0.1057**
	0.0047	0.0037	0.0065	0.0044	0.0037	0.0066

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zyear2006	**0.0536**	**0.0261**	**0.0797**	**0.0511**	**0.0229**	**0.0760**
	0.0045	0.0035	0.0062	0.0041	0.0035	0.0062
zyear2007	**-0.0039**	**-0.0033**	**-0.0072**	**0.0153**	**-0.0077**	**0.0013**
	0.0046	0.0036	0.0063	0.0042	0.0036	0.0064
zyear2008	**0.0182**	**0.0374**	**0.0555**	**0.0357**	**0.0246**	**0.0586**
	0.0057	0.0045	0.0079	0.0053	0.0046	0.0081
zip_black_pop	**0.0049**	**0.0071**	**0.0121**	**0.0046**	**0.0059**	**0.0103**
	0.0006	0.0005	0.0008	0.0006	0.0005	0.0008
valrent	**4.57E-07**	**4.57E-06**	**5.03E-06**	**1.10E-06**	**2.72E-06**	**4.47E-06**
	1.26E-06	9.93E-07	1.74E-06	1.07E-06	9.40E-07	1.64E-06
med_house_inc	**-2.16E-05**	**1.01E-05**	**-1.15E-05**	**1.20E-05**	**4.33E-06**	**1.10E-05**
	7.36E-06	5.81E-06	1.02E-05	6.69E-06	5.83E-06	1.00E-05
med_value	**-1.21E-06**	**-9.95E-06**	**-1.12E-05**	**-5.61E-06**	**-3.06E-06**	**-9.47E-06**
	2.57E-06	2.03E-06	3.57E-06	2.32E-06	2.03E-06	3.55E-06
gdp04_05	**3.26E-04**	**1.21E-06**	**3.27E-04**	**-4.21E-03**	**-9.00E-05**	**1.25E-04**
	5.40E-05	4.27E-05	7.49E-05	8.70E-04	7.50E-05	1.70E-04
pchval	**5.28E-03**	**9.72E-03**	**1.50E-02**	**7.46E-03**	**-2.20E-04**	**-3.80E-04**
	3.56E-04	2.81E-04	4.94E-04	5.42E-04	4.70E-05	1.06E-04
ppopch	**-4.88E-05**	**1.16E-05**	**-3.72E-05**	**2.96E-04**	**-1.23E-03**	**7.60E-05**
	1.98E-05	1.56E-05	2.75E-05	3.47E-04	6.60E-05	7.80E-05
avevalch	**2.21E-04**	**5.02E-05**	**2.71E-04**	**-3.64E-03**	**-9.08E-03**	**2.13E-04**
	4.54E-05	3.59E-05	6.30E-05	8.08E-04	2.59E-03	2.31E-04
stdvalch	**-4.18E-04**	**-1.31E-04**	**-5.50E-04**	**3.10E-05**	**-1.99E-02**	**-2.00E-04**
	6.23E-05	4.93E-05	8.65E-05	1.29E-03	2.49E-03	2.98E-04
investor cost	**-4.26E-04**	**3.81E-03**	**3.39E-03**	**6.45E-03**	**5.10E-05**	**-9.11E-02**
	3.78E-04	2.99E-04	5.25E-04	1.70E-02	3.40E-05	8.36E-03
days_ref_sale	**-5.31E-04**	**6.94E-05**	**-4.61E-04**	**-1.18E-03**	**-7.00E-05**	**2.70E-05**
	1.62E-05	1.28E-05	2.24E-05	2.70E-04	1.00E-04	1.22E-04
redemption	**6.79E-05**	**-2.44E-05**	**4.35E-05**	**-6.60E-04**	**7.07E-07**	**-4.00E-05**
	4.43E-06	3.50E-06	6.15E-06	2.47E-04	1.29E-04	1.02E-04
confirmation	**1.86E-04**	**-9.33E-05**	**9.27E-05**	**-1.01E-03**	**-6.35E-02**	**-1.14E-03**
	3.98E-06	3.14E-06	5.52E-06	2.37E-04	4.79E-03	9.30E-05
total_days	**-7.58E-05**	**7.78E-05**	**1.93E-06**	**7.72E-04**	**1.35E-03**	**-4.40E-04**
	5.30E-06	4.19E-06	7.36E-06	2.61E-04	7.00E-05	1.15E-04
mini_HOEPA	**1.49E-03**	**1.26E-03**	**2.74E-03**	**-2.27E-02**	**5.17E-04**	**-3.14E-02**
	1.96E-04	1.55E-04	2.72E-04	8.34E-03	5.80E-05	4.43E-03
pred_pre_HOEPA	**-1.82E-03**	**-1.11E-04**	**-1.93E-03**	**-2.64E-03**	**5.77E-04**	**-3.57E-02**
	1.77E-04	1.40E-04	2.46E-04	8.43E-03	5.30E-05	4.29E-03

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pchval*zcur_int	**-7.73E-04**	**-1.64E-03**	**-2.42E-03**	**-1.62E-03**		
	5.51E-05	4.36E-05	7.65E-05	1.08E-04		
days_ref_sale *zcur_int	**1.02E-04**	**-2.58E-05**	**7.63E-05**		**-2.00E-05**	**8.80E-05**
	2.48E-06	1.96E-06	3.44E-06		1.20E-05	1.40E-05
days_ref_sale *pchval*zcur_int	**-8.09E-07**	**4.40E-07**	**-3.69E-07**			
	5.72E-08	4.52E-08	7.94E-08			
N	11950	11950	11950			
R^2	0.7229	0.7081	0.7679			
SER	0.0080	0.00633	0.01112			
Elasticities						
zcur_int	6.3293	12.2646	8.6101	9.0661	10.2403	8.2531
fico	-4.6074	-1.7579	-3.5117	-3.0466	-0.2430	-1.8751
pchval	-0.0130	-0.0254	-0.0187	-0.1069	-0.0203	0.0041
gdp	0.0684	0.0004	0.0422	-0.8821	-0.0302	0.0161
redemption	0.0872	-0.0501	0.0895	-0.8474	1.0624	-0.0316
confirmation	0.1309	-0.1051	0.1044	-0.7108	0.6500	-0.4938
Year Effects						
2000				-0.0032	-0.0129	-0.0171
2001				0.0595	0.0710	0.0605
2002				0.2971	0.4090	0.3283
2003				0.9775	0.9629	0.8999
2004				0.3811	0.3273	0.3291
2005				0.7199	0.6861	0.6853
2006				0.5722	0.4110	0.5241
2007				0.1621	-0.1310	0.0083
2008				0.1938	0.2137	0.1957

* Significant at 1% level.

[†] Current interest rate effect varies at the MSA level; constant varies at the state level.

[‡] Current interest rate effect varies at the state level; constant varies at the MSA level.

[1] The phrase *real estate owned property* indicates that the property in question has been foreclosed on and taken back by the mortgage lender or trustee. Real estate owned and foreclosures are not synonymous, however an REO is the result of a foreclosure that is not cured or ends in a short sale.

[2] Although subprime lending and predatory lending are not synonymous, the similarities in the target borrower segment and the accompanying results in high fee and interest costs to the purchaser are telling. There is no common legal definition in the United States of predatory lending; however, there are laws against many of the specific practices commonly identified as predatory. In the strictest and legal sense of the word, predatory lending refers to secured loans, such as home or car loans, that are made by the lender with the intention that the borrower will be precluded from paying in a timely fashion, allowing the lender to seize the car or home. The phrase has been expanded to refer to deceptive or aggressive sales tactics that unduly expose ill-informed borrowers, coupled with excess fee structures, and prepayment penalties.

[3] In classifying a loan as predatory the 8 percent APR threshold includes the interest rate on the loan and all fees.

[4] Today, well over half the states and the District of Columbia have anti-predatory lending statutes that regulate a more limited set of lending practices associated with predatory lending, such as prepayment penalties (Bostic, et al., 2007). Many additional states have expanded or created lending restrictions since Bostic et al.

[5] The authors also observe that the North Carolina reduction was confined to the refinance market, where loan flipping abuses are more prevalent.

[6] No conclusions can be drawn from the Philadelphia results because the study did not examine data during the brief time-period when the Philadelphia ordinance was in effect.

[7] The "power of sale clause," according to Edmiston and Zalneraitis, 2007 grants the lender (or trustee) the right to sell the property at auction without requiring court authority.

[8] As Ambrose and Buttimer (2000) report, numerous studies that examine time to default indicate that borrower characteristics have a limited impact in predicting borrower default after the second year from origination (von Furstenberg and Green, 1974; and Williams, Beranek, and Kenkel, 1974).

[9] The prospect of borrowers spilling across boundaries does affect our comparison by state as we anticipate varying underwriting standards determined by the location of the asset which is fixed in space.

[10] Individual foreclosure/defaults represent an alternative level of analysis, looking at which people are foreclosed as opposed to which places have foreclosures. Although regrettably more common than in the past, even foreclosure rates of 4 or 5 percent present problems for the use of common logit, probit, or hazard based models. This is fertile ground for future analysis, but beyond the scope of the current analysis.

[11] In principle, the nesting can combine both metropolitan and state effects, but the memory requirements of current software make this process computationally intractable.

[12] LPS Applied Analytics, LLC, is a data repository for the mortgage banking industry. The firm aggregates loan level data provided directly by servicers into a single anonymous database going back to 1990. Data from LPS is used by the Federal Reserve Board for analysis of mortgage performance. Moreover, the data is considered among the most comprehensive data sets available on performance of loans over time. The individual loan data has been provided by the

Federal Reserve Bank of Richmond via an operating and use agreement between LPS Applied Analytics, Inc., the Federal Reserve Bank and Brent C Smith.

[13] Due date of the last paid installment (DDLPI) is the term used by Freddie Mac for the onset of a delinquency. The DDLPI is calculated as 60 days delinquency for a loan. For example, if a payment is due and paid on June 1st but the borrower fails to make a payment in July and August, the DDLPI will be 60 days counted from the June 1 due date of the last payment (Crews-Cutts and Merrill, 2008).

[14] There is overlap for twelve states where both laws are present and 13 states with neither forms of legislation at the time of this analysis. The recent trauma in the residential market has created incentives for many new recent legislative acts designed to similarly restrict lending activities.

[15] We use the reported FICO score in our analysis because it is a naïve value; scaling issues limit a reasonable alternative. The mean and minimum FICO scores have fallen for the sample between origination and the last observation.

[16] One might conjecture that these are changes over a small base. However, the variable values have natural meaning, and although the base rates are in fractions of a percent, of the 11,950 observations for the loan foreclosure variable, only 396, or 3.3 percent, have values of zero. We find that 6,097 zip codes (50.9 percent) have rates greater than 0 but less than 0.1 percent and another 3,094 (25.8 percent) have rates greater than 0.1 percent, but less than 0.2 percent. Using the median rate of 0.0092 as the reference value, rather than the mean of 0.0140, the calculated elasticity is even higher.