The Neighborhood Impact of Subprime Lending, Predatory Lending and Foreclosure

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Abstract

The neighborhood impact of subprime lending, predatory lending and foreclosure has been estimated at two to ten percent of home value. Further, as some neighborhoods see a concentration of foreclosures, the number of distressed properties in close proximity to a given property also has an impact on home value. Empirical evidence suggests that home values decline by one percent on average for each nearby distressed home. Extrapolated across the national housing stock, this translates into a 1 to 10% (or $5,000 average) spillover effect. We discuss current research in this area and identify gaps in the literature in the wake of the subprime mortgage crisis.

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Introduction

Many of the recent troubles in the housing market stem from risky behavior on the part of lenders. The primary research question in this study is 'what do we know about the impact of subprime lenders, predatory lending and foreclosure on neighborhoods?' This leads to the questions regarding what we can find out about tipping and turning points in foreclosures. This paper synthesizes existing studies and identifies the current gaps in the literature. The intent is to stimulate research that will fill the most relevant gaps in order to facilitate appropriate intervention necessary to stop a freefall in prices that generates excessive collateral damage.

We summarize current research in subprime and predatory lending as it leads to foreclosure and the resulting effect on neighborhoods with respect to property values. While we find that predatory lending and subprime lending appear to be intertwined, little evidence exists regarding effective measures to curb predatory lending or the specific elements of subprime mortgages that tend to lead to negative outcomes. Those negative outcomes -- default, foreclosure, real estate owned (REO) sales and a decline in neighborhood house prices -- have been modeled and documented in various forms in the existing literature. What we know so far about the contagion price effects of foreclosure is summarized in Table 1. Also, Figure 5 from Harding, Rosenblatt and Yao (forthcoming) is reproduced below to provide a graphical representation of what we now know about the neighborhood impact of foreclosure. Current research provides evidence that foreclosures decrease neighborhood property values by as much as 10% overall and nearly 1% per foreclosed property. Additional questions remain regarding the impact of very large numbers of foreclosures on home values. Based on average home prices, nearby foreclosures reduce the value of each neighboring home by $5,000 on average. In

addition, inner cities and areas where new construction is prevalent appear to be the hardest hit by foreclosure and the related contagion effects. While there is considerable evidence of this contagion effect, there is little evidence of foreclosure cascading -- where the number of foreclosures in a given neighborhood reaches a 'tipping point' and the foreclosure rate begins to increase rapidly. Anecdotal evidence suggests that when foreclosures in a given neighborhood reach this 'tipping point' the entire neighborhood can experience hardship due to a lack of residents to generate fees and taxes needed to support basic services.

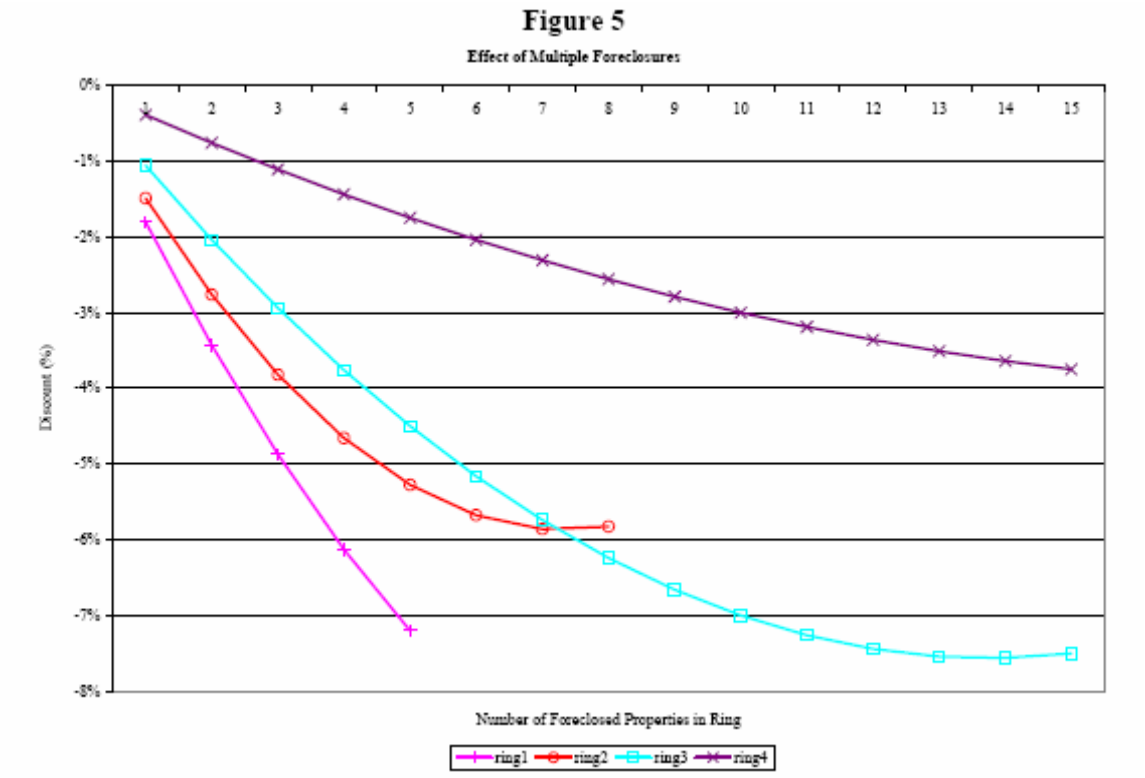
Table 1: Summary of Recent Findings

This table summarizes what we currently know about subprime lending, foreclosure rates and the contagion effect of foreclosures on neighborhood home values.

Study	*Neighborhood Impact Findings*
Immergluck and Smith (2006)	Each conventional foreclosure within an eighth of a mile of a single-family home results in a decline of 0.9 percent in value.
Pennington-Cross (2006)	Foreclosed property appreciates less than the area average appreciation rate.
Center for Responsible Lending (2008)	40.6 million neighboring homes will experience devaluation because of subprime foreclosures that take place nearby -- estimated at a value of $202 billion or $5,000 on average.
Dubin (2008)	Foreclosures adversely affect local housing prices by as much as 5.7%.
Harding, Rosenblatt and Yao (2008)	Nearby distressed properties have significant negative contagion effects over and above the overall trend in house prices of approximately 1% to 1.5% per foreclosure.
ICIC (2008)	There are 9.2 REOs per square mile in the inner city (0.63%) compared with 0.2 REOs per square mile (0.31%) in the rest of the United States.
Leonard and Murdoch (2008)	The direct effect of an increase in foreclosures is between $1,320 and $2,020, and the spatial reach of this impact is 250 feet.

Mayer and Pence (2008)	Subprime lending in 2005 was concentrated in Nevada, Arizona, California and Florida in the inner cities and the outskirts of metropolitan areas.
Rogers and Winter (2008)	The negative foreclosure effect on housing prices is as much as 5.3% when the foreclosed property is within 100 yards.
Lin, Rosenblatt and Yao (2008)	The spillover effect of foreclosure results in as much as a 9.7% discount in home prices when the foreclosed property is within 100 yards.
Calomiris, Longhofer and Miles (2008)	The national average price decline for houses from second quarter 2007 to fourth quarter 2009 will be approximately 5.5 percent. Further, the future path of housing prices will be flat for the next two years.

Figure 5



Note: Each line in Figure 5 shows how the estimated contagion discount varies with the number of nearby foreclosed properties within each of the specified rings around the subject property. The lines for Rings 1 and 2 are truncated to avoid extrapolating the effect beyond the range of the data used to estimate the models. Ring 1 includes all foreclosures less than 300 feet from the subject property. Ring 2 includes foreclosures that are 300 to 500 feet from the subject. Ring 3 includes foreclosures that are between 500 and 1000 feet from the subject, while Ring 4 includes foreclosures that are between 200 and 1,000 feet from the property.

Much additional work is needed in this area. Specifically, we need answers to the following questions. Why are there large regional differences in mortgage performance? Does state and local regulatory behavior affect loan behavior? How are age-income-ethnic characteristics related to ownership, loan issuance and performance? What role did incentives, moral hazard and adverse selection play in lending behavior? Related to this question, policy-makers have also asked to what extent foreclosures are the result of a "push me" phenomenon where borrowers are pushed up into more expensive homes or a "pull me" phenomenon where brokers are pulled to write more (and larger) loans. How extensive are risk externalities generated by the housing market? That is, what is the impact of risky behavior in housing markets on the broader financial markets? How do we stabilize the housing markets and what roles should state, local and federal entities play in this effort?

Discussion

Research related to the current foreclosure situation in U.S. housing markets began in earnest several years ago when researchers such as Case and Shiller (2003) questioned whether or not the housing market was experiencing a bubble and the likelihood that such a bubble would burst.

Shortly thereafter, as the subprime lending market grew in response to this perceived bubble, researchers such as Schloemer et al (2006), Mallach (2007) and Gerardi et al (2007) studied the effect of these loans on consumers. Discussions of subprime lending often question whether these loans are simply those made to borrowers of lower credit quality or if predatory lenders are extracting rents in excess of those warranted by the riskiness of the loans. Hill and Kozup (2007) and Wyly et al (2008) consider these questions. In the wake of the subprime crisis, renewed attention has been given to the policy implications of subprime and predatory

lending as well as default. What legislation is currently in place, what is needed and how effective are these rules and legislation? These are questions posed by Pyle (2003) and Bostic et al (2007).

As the housing bubble began to burst, borrower default and lender foreclosure became prevalent in the U.S. housing market. The volume of this activity has renewed old debates on how to model mortgage default as in Alexander et al (2002) and prompted new questions about the cost of foreclosure as in Pennington-Cross (2006) and Deng and Gabriel (2006).

These queries lead to the primary concern of this study: the neighborhood impact of foreclosure. Six sets of researchers approach this issue, each in a different way. Immergluck and Smith (2006) conduct an empirical analysis of the impact of foreclosures on nearby property values in Chicago in 1999. Lin, Rosenblatt and Yao (2008) develop a model for pricing this spillover effect on neighborhood property values and test it on homes in Chicago in 2006. Rogers and Winter (2008) also analyze the 'foreclosure effect' but allow for a dynamic effect – changing over time and space using data from St. Louis County from 1998 to 2005. Harding, Rosenblatt and Yao (2008) use a repeat sales model to estimate the foreclosure effect on neighborhoods. Dubin (2008) estimates the effect of foreclosures on housing prices and, conversely, the effect of changes in housing prices on foreclosures using a sample of data from Cuyahoga County, Ohio from 2003 to 2007. Finally, Leonard and Murdoch (2008) model foreclosure as a proxy for changes in neighborhood quality and then estimate the impact of this change on home sale prices using a sample of 2006 data from Dallas County, Texas.

Housing Bubble

Case and Shiller (2003) ask "Is the housing market experiencing a bubble and if so, is it likely to burst or deflate?" To answer the question, they define the term 'bubble' and argue that

while it is popularly referred to as an irrational run-up in home prices with a potential for a crash, they argue that it needs to be defined in terms of people's expectations about *future* price increases. Further, they argue that a fundamental analysis of current macroeconomic data is necessary to fully understand the root cause of housing market price increases. The goal of this analysis should be to assess the stability of the relationship between fundamentals and home prices over time and space[2]. They present the results of a 2003 survey of 2002 homebuyers in Los Angeles, San Francisco, Boston and Milwaukee as well as an analysis of quarterly, state-level home prices and economic data from 1985 to 2002. Based on the survey results, they find a strong investment motive, high expectations of future price increases and the strong influence of word-of-mouth discussion in some cities – all indicative of a speculative bubble. This result is more prevalent in the 'glamour' cities that they studied[3]. However, they also provide evidence that home price increases from 1995 to 2003 are driven by fundamentals – particularly income growth – and that the fundamental measures of bubble activity are down since 1988[4]. Case and Shiller (2003) conclude that despite people's expectations of high future prices – indicative of a bubble the observed rise in housing prices can be explained by historical trends in fundamentals. Therefore, they argue that a nationwide drop – or deflation of the housing bubble – in real housing prices is unlikely.

Loutskina and Strahan (2008) analyze lenders who concentrate in a few markets versus diversified lenders who do not and liken them to informed and uninformed investors. First they test how mortgage retention and acceptance rates vary with lender diversification. They find that

[2] The fundamentals they include in their study are personal income per capita, population, non-farm payroll employment, the unemployment rate, housing starts and mortgage interest rates.
[3] Case and Shiller (2003) define glamour cities as those that are home to international celebrities, the entertainment industry, world-class universities or high-technology industries. The prices of homes in these metropolitan areas are high as well as volatile.
[4] To test the relation between home prices and fundamentals, Case and Shiller (2003) perform regression analysis to estimate the degree to which changes in home prices can be explained by fundamental variables.

concentrated lenders accept and retain a higher proportion of mortgages than diversified lenders. Second, they compare stock performance and find that concentrated lenders have weathered the 2008 financial crisis better than diversified lenders with respect to stock price. Third, they test the housing price forecasting power of lender retention rates. They find that concentrated lenders retain a smaller portion of their loan portfolio when real estate prices are expected to fall, while diversified lenders loan retention rates are not correlated with expected housing prices. Finally, the authors conclude that these informed, concentrated lenders provide value to the markets through information production and the negative correlation between the share of informed lending to the housing price run-up helps to explain the 2001-08 real estate bubble and crash.

Subprime Lending

What Case and Shiller (2003) failed to consider in their assessment of the likelihood of a deflation in housing prices was the prevalence of subprime lending and its impact on the housing market. Using state-level data from the Federal Reserve Bank of New York, we analyzed outstanding subprime loans as of August 2008 versus outstanding Alt-A loans and found that subprime borrowers are charged nearly 2% higher interest rates[5]. As shown in Table 2, we found evidence that in the subprime market, loans were priced higher based on the riskiness of the borrowers but little evidence of this risk-based pricing in the Alt-A market. In the subprime market, the mean interest rate is 8.49 percent and the average FICO score is 616[6]. In the Alt-A market, the mean interest rate is 6.68 percent, and the average FICO score is 704. The difference in both sets of mean values is statistically significant. Moreover, the correlation coefficient

[5] Alt-A loans are defined as "near-prime".
[6] FICO score is a credit bureau risk score where the higher the score, the lower the believe likelihood of a delinquency or default.

between interest rate and FICO in the subprime market is indicative of risk-based pricing, while this practice is not evident in the Alt-A market.

Table 2: Evidence of Risk-Based Pricing in Subprime Markets

This table presents the mean interest rates and FICO scores on subprime and Alt-A loans as of August 2008 according to state-level data provided by the Federal Reserve Bank of New York. The correlation between average statewide interest rates and FICO scores is also given.

Market	*Mean Interest Rate*	*Mean FICO Score*	*Correlation Coefficient*
Subprime	8.49%	616	-0.7875
Alt-A	6.68%	704	-0.3369
Difference	*1.81%****	*-88****	

Further, we find evidence that affordability-stretching encouraged risky behaviors. Table 3 provides a comparison of subprime and Alt-A loans based on their foreclosure rates and specific loan characteristics. With the exception of interest-only loans, subprime borrowers tend to exhibit more risky behavior than Alt-A borrowers as shown by the percentage of ARMs and high LTV loans. Similar to the risk-based pricing evidenced in the higher interest rates charged to subprime borrowers, lenders are also more likely to include a prepayment penalty clause in subprime loans.

Table 3: Comparison of Subprime and Alt-A Loans

This table presents the mean values for various characteristics of subprime and Alt-A loans as of August 2008 according to state-level data provided by the Federal Reserve Bank of New York. All differences in means are statistically significant at the 1% level.

Market	*Foreclosure Rate*	*% of Interest Only Loans*	*% of ARM Loans*	*% of Loans with Prepayment Penalty at Origination*	*% of Loans with a High LTV Ratio*[7]
Subprime	9.3%	8.3%	60.2%	60.4%	32.5%
Alt-A	3.3%	20.0%	36.2%	20.4%	24.7%
Difference	*6.0%****	*-11.7%****	*24.0%****	*40.0%****	*7.8%****

Lax et al (2004) explain who gets subprime loans. Based on surveys of over 4,000 borrowers originating mortgages from January 1996 to June 1997, they find evidence that these borrowers are disproportionately minority and lower income, older, less well-educated, less financially sophisticated and less likely to search for the best interest rate when applying for a mortgage.

Similar to the Lax et al (2004) examination of subprime borrower characteristics, Chomsisengphet and Pennington-Cross (2006) examine subprime loan characteristics. Specifically, they ask "What makes a loan subprime?" The authors provide the simple explanation that the existence of a premium above the prevailing prime market rate makes a loan subprime[8].

[7] The Federal Reserve defines high LTV loans as those loans whose initial LTV is higher than the median LTV.
[8] Later studies classify loans as subprime if they are originated by a subprime lender. The Department of Housing and Urban Development maintains a list of subprime lenders.

Schloemer et al (2006) examine the trends in foreclosure and how homeowners have fared in the subprime mortgage market. Specifically, they predict subprime foreclosure rates in all major metropolitan areas of the United States and examine factors associated with subprime foreclosures. They analyze a proprietary, loan-level database of over six million securitized subprime loans totaling $1.2 trillion, originated from January 1998 through December 2004. They find that 1) as many as one in eight loans (12.5%) in their sample ended in foreclosure within five years; 2) after adding the delinquent loans that were refinanced, the 'failure rate' approaches 25% within five years of origination; 3) distressed prepayments are substitutes for foreclosure[9]; 4) using a modified life table, they project that 15.4% of the loans in the sample will foreclose and that the annual predicted foreclosure rate increases throughout the sample period; and 5) one-third (33%) of families who received a subprime loan in 2005 and 2006 will lose their homes[10]. The factors that they argue contribute to subprime foreclosures are loan risk, loose underwriting, predatory lending, third-party originators and inadequate oversight[11].

Mallach (2007) digs deeper into the effects of the subprime industry and its impact on consumers. The paper seeks to uncover the underlying issues related to how the workings of the subprime sector of the lending industry affect the public good or public welfare and how this sector should be perceived and treated by public policy. Mallach (2007) reports the effect of subprime mortgage lending on borrowers in two ways: 1) in terms of homeownership rates and the extent to which the sector leads to either increases or decreases in homeownership; and 2) in terms of the effect of subprime mortgages on the experience of homeowners and the extent to

[9] This conclusion was drawn based on the results of a model that regresses the average housing price appreciation in an MSA on the odds of a given outcome.

[10] This finding assumes: 1) 60% of borrowers who refinance a subprime loan will receive another subprime loan; 2) the rate of foreclosure will continue at the 2005-06 rate of 19.4%; and 3) these probabilities are constant for borrowers across multiple loans.

[11] Schloemer et al (2006) cites loan features such as adjustable interest rates, balloon payments, prepayment penalties and low documentation requirements as those contributing to the riskiness of subprime loans.

which it either does or does not impair their ability to share in the benefits of homeownership[12]. Citing Schloemer et al (2006), Mallach (2007) finds that due to the associated high rate of foreclosure, the subprime mortgage sector results in an actual decline in the number of homeowners overall with that decline likely disproportionately concentrated among African-American and Latino borrowers in lower-income neighborhoods. Mallach (2007) argues that the common features of subprime loans have the potential to negatively affect the homeownership experience in ways that affect the extent to which the borrower is likely to experience the benefits of homeownership[13]. Thus, the risk of foreclosures is greater with subprime loans as compared with traditional loans. Mallach (2007) concludes that the existence of the subprime lending industry has resulted in a net loss of public welfare as evidenced by a net decrease in homeownership and foreclosure fears associated with the riskiness of common features embedded in subprime loans.

Gerardi, Shapiro and Willen (2007) also consider the net effect of the subprime lending industry, but focus strictly on the state of Massachusetts. They ask: "What are the outcomes of ownership experiences in Massachusetts that started with a subprime mortgage, and what was their role in the Massachusetts foreclosure crisis of 2007?" Here, the authors differentiate between subprime loans that result from borrowers refinancing loans initially made to purchase their homes through prime lenders and home purchases initially financed with subprime loans. This exercise allows the authors to focus their analysis on the subset of subprime borrowers that

[12] Mallach (2007) identifies both social and economic benefits to homeownership that can either accrue to the individual homeowner or the community. See Mallach (2007) for a list of these benefits.
[13] Schloemer et al (2006) also described the common features of subprime loans as contributing to the riskiness of the loans.

some argue are not prepared for the responsibility of homeownership[14]. Using a dataset of deeds records from January 1987 through August 2007 for the entire state of Massachusetts and 2006-07 Massachusetts assessor data, they find that approximately 30% of the 2006 and 2007 foreclosures in Massachusetts can be traced to homeowners who used a subprime mortgage to purchase their house. The authors also find that house price appreciation is the main driver of foreclosures. They estimate that the probability of default (for either a subprime or prime borrower) increases significantly in periods with low or negative house price appreciation.

Mayer and Pence (2008) examine the data sources available to examine subprime mortgages and also describe nationwide subprime lending patterns in 2005[15]. They found the highest concentration of subprime lending activity in Nevada, Arizona, California and Florida, where the subprime lending rates were two to three times the national average in metropolitan areas of 3.6 subprime loans per 100 housing units. Further analysis of these subprime origination trends reveals that they are only partially correlated with house price appreciation. Also, Mayer and Pence (2008) find a higher concentration of subprime lending in inner cities and the outskirts of metropolitan areas[16]. Lastly, they find that economically depressed areas in the Midwest do not appear to have high rates of subprime originations – despite their weak housing markets.

Anderson, Capozza and Van Order (2008) examine the root causes of the negative outcomes related to subprime lending. They focus on changes in underwriting standards. They examine two time periods – the 1990s and post-2004 – and document specific changes in

[14] The results of the study appear to support this argument as these borrowers experience foreclosure more than six times as often as borrowers who initially finance their home through a prime lender.
[15] Perry (2007) also reviews data sources for subprime lending research.
[16] This finding is similar to that of an ICIC (2008) study discussed later, which finds a high concentration of REOs in inner cities.

underwriting standards such as lowering of required loan-to-value ratios. Using Mortgage Bankers Association data, the authors estimate a fixed-effects model that considers the impact of both economic factors and underwriting changes on foreclosure rates. They find that both the unfavorable economic conditions and a loosening of underwriting standards has led to an increase in foreclosure.

Predatory Lending

Predatory lending is commonly identified as a harmful lending practice and researchers and lawmakers continue to argue for and against methods to eliminate it. Pyle (2003), for example, considers legislative measures and questions the efficacy of the revised Regulation Z "flipping" prohibition. The type of "flipping" that this legislation seeks to eradicate is the early or frequent refinancing of a loan to extract greater points and fees from a borrower. Pyle argues that the intended gains to social welfare from subprime lending will only be realized if the subprime mortgage market is "actively policed," which history indicates is unlikely.

Schloemer et al (2006) identify predatory lending as a factor contributing to the riskiness of subprime loans. While investigating these practices is outside the scope of the Schloemer et al (2006) study, Hill and Kozup (2007) focus on exactly that issue. Their primary research question is: "What are the consumer experiences of predatory lenders – particularly in the exchange process?" Based on a series of telephone interviews with subjects identified from complaints filed in federal and state courts, the researchers present a thematic interpretation of their survey data. They identify common themes present in the collective experiences of consumers in four large cities. The authors dub these themes: 'The Friendly Veneer,' which occurs at the beginning of the relationship; 'The Rules of Engagement,' which details the three key rules that the borrower must follow to continue to experience 'The Friendly Veneer,' and

'An Aggressive Response,' which happens later in the relationship – particularly if it has soured. Several of the subcategories within these themes support the argument by Schloemer et al (2006) and Mallach (2007) that the predatory lending practices of subprime lenders contribute to the riskiness of subprime loans relative to prime loans[17].

Bostic et al (2007) study specific legislation to determine the effect of legal enforcement mechanisms and law design on the subprime home loan market. The authors use an updated version of the Ho and Pennington-Cross (2006) legal index. They estimate a model where the lending outcome is explained by variables that indicate whether the state in which the loan was originated has an anti-predatory lending law, whether the loan was originated in a border county, borrower characteristics, location characteristics, and regulation by the U.S. Office of the Comptroller of the Currency. They find – consistent with Pyle's arguments outlined earlier— evidence that the presence of state-level laws that regulate subprime lending appear to have little impact on subprime originations, applications or rejections.

Wyly et al (2008) take a different approach to predatory lending after observing that evidence linking the existence of the subprime mortgage market to predatory lending is often dismissed as anecdotal or isolated to a few unique locations. They consider how the justifications for deregulated risk-based pricing in the mortgage market differ by geographic region. Their argument is that if subprime lending is the optimal solution to the problems of credit rationing and exclusion, there should be lower denial rates in places with higher subprime activity. Hence, if subprime lending truly makes credit more accessible, subprime lending activity should lead to lower denial rates. To test this proposition, Wyly et al (2008) use HMDA

[17] 'Lack of full disclosure,' 'don't ask questions,' 'borrow more over time,' 'changing the loan package,' 'blaming the victim' and 'continuous assault' are examples of specific categories of experiences that, in the context of Schloemer et al (2006), arguably increase borrower fear associated with the likelihood of foreclosure.

data to estimate a model that attempts to explain denial rates (and separately, subprime market share) in metropolitan areas while controlling for economic and demographic variations across housing markets. Their results indicate that it is possible to account for 80% of denial rates across metropolitan areas (based on R-squared). However, rate-spread is the single most important factor explaining variations in metropolitan mortgage rejection rates[18]. The authors find no evidence that subprime credit helps to reduce the traditional problems of credit rationing and exclusion. Further, they find that subprime lending actually exacerbates these issues, and appears to persist in metropolitan areas throughout the nation.

Default/Foreclosure

'Bubbles' in the housing market increase homebuyers' willingness to purchase more expensive homes. The subprime lending sector provides loans to the portion of those borrowers who cannot qualify for a prime loan. Predatory lending practices are a common feature of these subprime loans. This string of events often leads to default. Because this default is often unobservable to researchers, studies frequently use foreclosure as a proxy for this negative borrowing outcome. Other aspects of the methodology used in default studies vary widely. Alexander et al (2002), for example, identify third-party originators as the root cause of the disproportionate underperformance of subprime loans as compared to prime loans. They model mortgage default as a principal-agent problem where lenders are the principals and third-party originators (TPOs) are the agents. They use a sample of 23,200 mortgage loans issued by a single, national subprime mortgage lender originated between January 1, 1996 and December 31, 1998. After estimating a hazard model with jointly estimated competing risks and unobserved

[18] 'Rate-spread' loans are loans where the annual percentage rate is more than three percentage points higher than the reported yield on Treasury securities of comparable maturity for first-lien obligations and 5% for subordinate liens.

heterogeneity, they find that TPO loans have a higher default probability and that this increased riskiness explains a 50 basis point rate difference between TPO loans and non-TPO loans.

Pennington-Cross (2006) examines expected price appreciation to determine if unique pairs of transactions (normal property, foreclosed property) appreciate in a systematically different way than a typical pair of repeat transactions. Using a sample of over 12,000 lender-owned property (REOs) sales in metropolitan areas, Pennington-Cross (2006) finds that foreclosed property appreciates less than the area average appreciation rate. Further, the author finds that the deviation between foreclosed HPA rates and non-foreclosed HPA rates is sensitive to loan characteristics, legal restrictions, housing market conditions and marketing time.

Deng and Gabriel (2006) find good news on default rates when compared to prepayment rates. The authors apply an options-based model to simultaneously estimate default and prepayment. That is, they model default as a borrower's decision to exercise a put option on the property and prepayment as a borrower's decision to exercise a call option. Thus, the mortgage instrument contains these embedded options and their values fluctuate with the value of the property relative to the mortgage balance. They estimate the model using data provided by HUD on FHA loans originated between 1992 and 1996. They find that both call and put options are more likely to be exercised when the option values are greatest. That is, default is most likely when there is a high probability of negative equity. Prepayment, often due to refinancing, is most likely when there is a high probability of positive equity. Further, they find that borrowers exercising the put (default) option tend to have similar characteristics such as lower credit scores. These higher default probabilities, however, are more than offset by their lower prepayment probabilities. The pricing implications of this simultaneous estimation of default and

prepayment risk are that financing costs could be lowered for these borrowers thus, increasing homeownership opportunities for underrepresented groups.

Dubin (2008) uses a system of two simultaneous equations to model house prices and foreclosures in an attempt to determine what factors impact home prices and the probability of foreclosure. The first equation is a hedonic pricing equation, and the second equation estimates the probability that the home will go into foreclosure. The first equation states that the sales price of a home is a function of the structural characteristics of the home, the fixed effects for the year and the neighborhood in which the home is located and the inverse distance-weighted sum of foreclosures surrounding the house. The second equation states that the probability that a home will go into foreclosure is a function of the LTV, whether or not the mortgage was made by a subprime lender, the age of the mortgage, the size of the mortgage pool, the neighborhood characteristics and the change in house prices since the purchase date. Dubin estimates the model using a data set consisting of all housing transactions between the first quarter of 2003 and the third quarter of 2007 in Cuyahoga County, Ohio. Dubin obtains dramatically different results dependent upon the estimation method used. However, Dubin concludes that regardless of the estimation method, foreclosures adversely affect local housing prices by as much as 5.7% and changes in housing prices affect the foreclosure rate.

Neighborhood Effects

An understanding of foreclosure as a proxy for default and the various ways in which foreclosure is modeled in the literature leads to a discussion of the impact of these events on neighborhoods. Rich datasets that provide detailed information on properties in a specific geographic region provide researchers with the opportunity to study foreclosure in the context of neighborhood effects.

Immergluck and Smith (2006) study the impact of foreclosures on nearby property values. The authors estimate a regression model that uses a vector of property characteristics, a vector of neighborhood characteristics and six foreclosure variables to explain changes in housing prices[19]. They use data on over 9,600 properties sold in Chicago, Ill., in 1999. They find that each conventional foreclosure within an eighth of a mile of a single-family home results in a decline of 0.9 percent in value.

Leonard and Murdoch (2008) study the impact of neighborhood quality (whose change is proxied by the rate of foreclosure) on home sale prices. The authors first put forth a model in which homeowners seek to maximize their utility subject to annual appreciation. Both the homeowners' utility and the rate of appreciation are modeled as a function of neighborhood quality. Utility is also dependent upon housing attributes, and appreciation is also dependent upon the homeowner's contribution to neighborhood quality. The authors estimate the model using a sample of 26,456 single-family homes that sold in Dallas County, Texas in 2006 with a neighboring sale within 1,320 feet[20]. Assuming that neighborhood quality decreases with foreclosure, the authors use the number of foreclosures within various distances of the property as a proxy for neighborhood quality. They estimate the direct effect of an increase in foreclosures is between $1,320 and $2,020, and the spatial reach of this impact is 250 feet.

In 2008, the Center for Responsible Lending (2008) updated its December 2006 study on foreclosures and the subprime mortgage market. The center quantifies the neighborhood effect of foreclosure by determining how many homes will suffer a decline in property values because

[19] These foreclosure variables are the number of foreclosures of conventional, government-insured, multi-family and commercial properties of varying distances – up to ¼ mile –from the property.

[20] As in Immergluck and Smith (2006), the authors refer to the literature on the effects of proximate phenomena on property values to determine that significant impacts of foreclosures on property values will occur with ¼ of a mile (1,320 feet) or less.

of foreclosures in their neighborhoods and the monetary value of these losses. The CRL uses the Immergluck and Smith (2006) estimate of a 0.9 percent decline in value per foreclosure. Applying this estimate to nationwide foreclosure and housing stock data, the CRL estimates that 40.6 million neighboring homes will experience devaluation because of subprime foreclosures that take place nearby. This decline, the CRL estimates, is valued at $202 billion. This translates into a $5,000 decline on average for a homeowner living near a foreclosed property.

An ICIC (2008) briefing paper studies the impact of foreclosures on the inner city by focusing on real-estate owned (REO) properties. The ICIC argues that the recent proliferation of these properties whose ownership has reverted back to banks has led to a decline in neighborhood values. This decline is argued to result from the high incidence of blight, abandonment and auction sales associated with these properties. The central theme of the ICIC briefing paper is that REOs are heavily concentrated in the inner city as compared with the rest of the United States. The paper provides statistics indicating that .63% of housing units in the inner city are REOs versus .31% in the rest of the United States. Further, the paper reports that there are 9.2 REOs per square mile in the inner city compared with 0.2 REOs per mile in the rest of the United States. The ICIC finds the highest REO rates in Detroit, Cleveland, Atlanta, Indianapolis and Akron – all with over 1.5% of owner-occupied housing units in REO.

Lin, Rosenblatt and Yao (forthcoming) use a theoretical model based on price comparables to determine the possible spillover effects of foreclosures on neighborhood property values. The paper theorizes that the spillover effect of foreclosure is equal to the sum of the weighted prices of comparable properties discounted at a rate based upon the current state of the

housing cycle[21]. The authors empirically test the model using a random sample of mortgages made in Chicago from 1990 to 2006. They find that the spillover effect results in as much as a 9.7% discount in home prices for homes located within a 0.1 km (300 feet) radius from a foreclosed property. Further, they find that the spillover effect is always significant for distances within 0.9 km (3,000 feet).

Just as the Lin, Rosenblatt and Yao (forthcoming) study factored time and space (distance) into its weighting of comparables into its spillover effect model, Rogers and Winter (2008) consider time and space when estimating the impact of foreclosures on housing sales. The authors build upon the Immergluck and Smith (2006) model and estimate the sales price based on two sets of independent variables. The first set includes dummy variables that account for the time of sales, structural characteristics of the property and spatial characteristics. The second set includes foreclosure variables. The authors estimate the model using data from 94,424 single-family property sales in St. Louis from 1998 to 2005. They find a foreclosure effect of as much as 5.3% at 100 yards and six months. They find that the negative impact of foreclosures does extend at least 400 yards and 18 months. They do not, however, find evidence of a 'tipping point,' where at some point sales decline rapidly. Instead, they find evidence of a diminishing marginal effect of foreclosure – the opposite effect.

Harding, Rosenblatt and Yao (2008) study the observed price declines of properties near foreclosures to determine if they are the result of an overall neighborhood decline in property values or if foreclosures reduce the prices of nearby non-distressed sales as the result of a contagion effect. The authors use a repeat sales approach to overcome perceived deficiencies in

[21] These weights are based upon the time between the liquidation date of the foreclosure and the sales date of the subject property and the distance between the two properties.

hedonic pricing models that do not account for the local trend in prices – resulting in an omitted variable problem. The authors use a sample of approximately 600,000 repeat sales transactions in seven MSAs from 1998 to 2007 from a private mortgage database[22]. They find evidence that nearby distressed properties have significant negative contagion effects over and above the overall trend in house prices of approximately 1% to 1.5% per foreclosure. They find three things: 1) the foreclosure effect is greater, the longer it takes to sell the foreclosed property; 2) it peaks at the time of the REO sale; and 3) it lingers beyond the REO sale.

Calomiris, Longhofer and Miles (2008) also consider the impact of foreclosures on house prices. However, they incorporate other macroeconomic and housing variables in a vector autoregressive (VAR) model to analyze these interactions. The variables in their model are employment, existing home sales, housing permits, the Office of Federal Housing Enterprise Oversight (OFHEO) home price index and the ratio of foreclosures to total mortgages. In contrast to other studies, they find that the impact of foreclosure on prices is negative and significant, but small in magnitude. The authors estimate that the national average price decline for houses from second quarter 2007 to fourth quarter 2009 will be approximately 5.5 percent. Further, they conclude that the future path of housing prices will be flat for the next two years.

Conclusion

An analysis of the neighborhood impact of subprime lending, predatory lending and foreclosure must initially address each of these issues independently. Our review of the existing literature has revealed that the subprime lending market grew at an unprecedented rate at a time when house prices were also experiencing a 'bubble'. Many of these subprime loans, however, were fraught with terms and conditions that could be considered predatory in nature. Many laws

[22] The MSAs included in the Harding, Rosenblatt and Yao (2008) study are Atlanta, Charlotte, Columbus, Las Vegas, Los Angeles, Memphis and St. Louis.

have been enacted at the state level to combat these practices while still allowing the subprime market to make homeownership possible for underrepresented groups. The impact of this legislation has been minimal. As the housing bubble began to deflate, many subprime loans defaulted. Mortgages originated by third-party originators were more likely to default as well as those loans that represented the first mortgage on a property and were obtained from a subprime lender. The extent of this default is estimated at over $200 billion. Further, African-American and Hispanic borrowers with low credit scores are more likely to default as the probability of negative equity increases. This default risk, however, is more than offset by empirical evidence suggesting that these same borrowers are less likely to prepay as the probability of positive equity increases. These results, coupled with the ineffectiveness of legislation in curbing predatory lending practices have significant policy implications.

As housing prices change, subprime lending increases, and homeowners default, there is a foreclosure or spillover effect on neighborhoods. Depending upon variances in time and space, foreclosures can depress home prices by as much as 10 percent. When taking into consideration the number of distressed properties in close proximity to a given residence, the residence will decrease in value by an average amount of 1% per distressed nearby property. When this value is extrapolated across the entire U.S. housing stock, the spillover effect is estimated at approximately $5,000 per home.

Due to data constraints, much of the detailed analysis conducted to-date is local, with generalizations made in order to quantify the national impact. Chicago, St. Louis, Cleveland and other large metropolitan areas have received the most attention. One reason for the emphasis on these urban areas is due to the correlation between recent foreclosures and subprime lending activity, which is most prevalent in the inner cities. Gaps remain in the literature to take on more

detailed analyses on a national level covering a wider range of MSAs. More work needs to be done to quantify the impact of subprime lending and foreclosure on the national housing market – beyond extrapolating local trends. This can best be accomplished through a large-scale national study of mortgage loans that identifies subprime versus prime loans across several MSAs, analyzes foreclosure rates for both populations at the ZIP code level and tracks the changes in mean home value across time in those same ZIP codes. Second, much of the work on neighborhood effects has focused on home prices and returns as opposed to the volatility of those returns. Finally, more work is necessary to examine the link between predatory and subprime lending and home price decline in neighborhoods. While it has been established that foreclosure leads to price decline in neighborhoods, is it possible to move back farther in the chain of events and establish a link between subprime lending concentration, foreclosure and price decline?

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