The External Costs of Foreclosure: The Impact of Single-Family Mortgage Foreclosures on Property Values

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Abstract

To measure the impact of foreclosures on nearby property values, we use a database that combines data on 1997 and 1998 foreclosures with data on neighborhood characteristics and more than 9,600 single-family property transactions in Chicago in 1999. After controlling for some 40 characteristics of properties and their respective neighborhoods, we find that foreclosures of conventional single-family (one- to four-unit) loans have a significant impact on nearby property values. Our most conservative estimates indicate 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.

Cumulatively, this means that, for the entire city of Chicago, the 3,750 foreclosures that occurred in 1997 and 1998 are estimated to have reduced nearby property values by more than $598 million, for an average of $159,000 per foreclosure. This does not include effects on the value of condominiums, multifamily rental properties, and commercial buildings.

Keywords: Foreclosure; Homeownership; Mortgages

Introduction

Since at least the late 1960s, foreclosures of single-family homes (one- to four-unit) have been viewed as a serious threat to neighborhood stability and community well-being. Foreclosures, particularly in lower-income neighborhoods, can lead to vacant, boarded-up, or abandoned properties. These properties, in turn, contribute to physical disorder in a community, create a haven for criminal activity, discourage the formation of social capital, and lead to further disinvestment. If foreclosures lead to such negative effects, then we would expect them to also lead to lower property values in the immediate vicinity, especially for residential property.

In this article, we measure the impact of foreclosures on nearby property values by using a unique database that combines data on 1997 and 1998 foreclosures with data on neighborhood characteristics and more than 9,600 single-family property transactions in Chicago in 1999. Even after controlling for over 40 characteristics of properties and their respective neighborhoods, we find that foreclosures of conventional single-family loans have a significant impact on nearby property values. Our most conservative estimates indicate that each conventional foreclosure within an eighth of a mile of a single-family home results in a 0.9 percent decline in the value of that home. Cumulatively, this means that for the entire city of Chicago, the 3,750 foreclosures that occurred in 1997 and 1998 are estimated to have reduced nearby property values by more than $598 million, or an average of $159,000 per foreclosure. This does not include effects on the value of condominiums, larger multifamily rental properties, and commercial buildings.

Less conservative estimates suggest that each conventional foreclosure within an eighth of a mile of a property results in a 1.136 percent decline in that property's value and that each foreclosure between an eighth and a quarter of a mile away results in a 0.325 percent decline in value. This less conservative finding corresponds to a citywide loss in property values (again, not considering multifamily or commercial values) of just over $1.39 billion—or an average of more than $371,000 per foreclosure.

The private and social costs of foreclosures

Foreclosures can mean significant costs and hardships for those most directly affected in that they can involve not only the loss of accumulated home equity and the cost of acquiring the home, but also access to stable, decent housing. Moreover, foreclosures can damage credit ratings, hurting owners' prospects in credit, labor and insurance, and rental housing markets. There are potential psychological and emotional costs as well. For the holders of the loan, foreclosures are estimated to cost an average of $58,792 and take 18 months to resolve (Cutts and Green 2004).

But economic and social costs can have implications for surrounding neighborhoods and for larger communities as well as the parties directly involved. (For example, cities, counties, and school districts may lose tax revenue from abandoned homes.) The neighborhood and municipal costs of concentrated foreclosures are beginning to be recognized and quantified. These costs increase significantly for properties that are not quickly returned to the market via regular mechanisms.

In examining Federal Housing Administration (FHA) foreclosures, Moreno (1995) estimated average city costs of $27,000 and neighborhood costs of $10,000 for a foreclosure. Apgar and Duda (2005) found that the direct costs to Chicago city government involve more than a dozen agencies and two dozen specific municipal activities, generating government costs that exceed $30,000 per property in some cases.

One potential impact of increased foreclosures in a community is crime. Vacant and abandoned buildings are often considered a component of neighborhood physical disorder (as opposed to social disorder). Physical disorder involves "signs of negligence and unchecked decay" in a neighborhood (Skogan 1990, 4). Several observers and researchers have argued that physical and social disorder causes crime (Kelling and Coles 1996; Wilson and Kelling 1982) and that disorder undermines the ways in which communities maintain social control. Fewer residents are concerned about or take responsibility for disorder in public spaces outside their own households. Criminals flock to such communities because they do not fear being caught. Thus, social and physical disorder leads to more serious crime.

Skogan (1990) argues that abandoned buildings can harm a neighborhood in various ways. First, they can harbor decay. They may be havens for trash, rats, or other stray animals; squatters; or even criminals. Abandoned houses may also serve as places where drugs are sold and used or can be taken over by criminals who may attack neighborhood residents. Finally, abandoned or vacant homes may be targets for vandalism, the theft of wiring or other building components, or arson. Moreover, theft of property from such ostensibly unoccupied buildings may be less likely to be reported. Indirectly, the presence of boarded-up and abandoned buildings may lead neighborhood residents to exhibit a lack of collective concern over neighborhood crime.

In examining the relationship between neighborhood foreclosures and crime, Immergluck and Smith (2006) find that higher levels of foreclosures do contribute to higher levels of violent crime, although the results for property crime are not statistically significant. An increase of one standard deviation in the foreclosure rate (about 2.8 foreclosures for every 100 owner-occupied properties in one year) corresponds to an increase in neighborhood violent crime of approximately 6.7 percent.

Despite the persistence of the problem of concentrated foreclosures and their perceived ill effects, little systematic research has directly measured their impact on nearby property values. Some recent literature has addressed the impact of deteriorated or vacant residential buildings on property values or, conversely, the impact of rehabilitation on property values. Shlay and Whitman (2004) examined the impact of vacant housing units on nearby home values in

Philadelphia and found that properties located within 150 feet of an abandoned unit sold for over $7,000 less than other properties. Ding, Simons, and Baku (2000) found that housing rehabilitation and, especially, new construction have a positive effect on nearby property values and that this effect is larger in lower-income neighborhoods and in predominantly white neighborhoods.

In assessing the societal, as well as the individual, risks and costs of mortgage lending policies and programs, regulators and policy makers need to have better information on the spillover costs of foreclosures on neighborhoods and communities. A significant portion of the neighborhood costs of foreclosures should be capitalized into local property values. In this article, we seek to estimate such capitalized impacts.

Short- and long-term increases in foreclosures

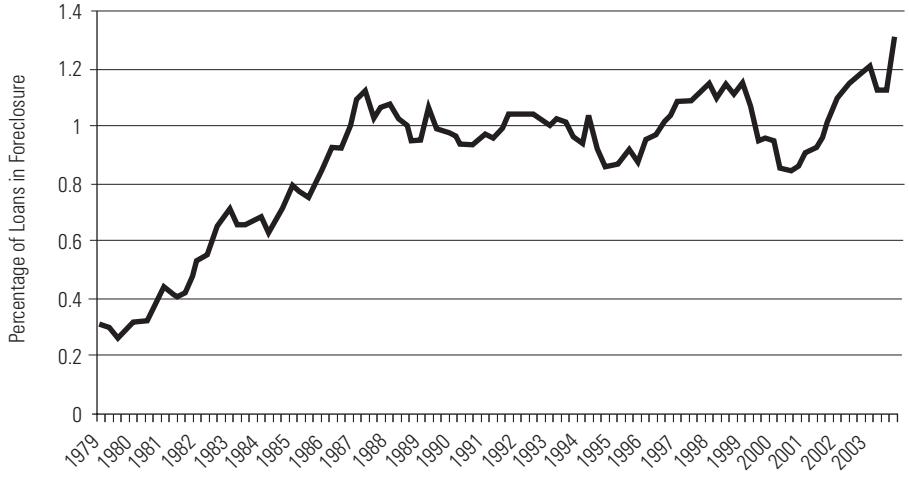
In the past decade, many cities have experienced substantial growth in foreclosures, with particularly large increases occurring during recent economic downturns. These increases have been particularly steep in low- and moderate-income and minority neighborhoods.

Nationally, foreclosure rates have ebbed and flowed, but over the long term, the trend has been decidedly upward. Figure 1 tracks foreclosure rates on all mortgage loans since 1979. In the early 1980s, foreclosure rates on conventional loans were on the order of 0.3 to 0.4 percent. They rose significantly over that decade to exceed 1 percent. Even as the economy grew in the late 1990s, foreclosure rates increased, exceeding 1.1 percent by late 1997. In the late 1990s and early 2000s, foreclosure levels reached historic highs (1.3 percent in late 2003) (Federal Deposit Insurance Corporation [FDIC] 2004).

At the state level, 23 states saw foreclosures increase more than 24 percent from the end of 2001 to the end of 2003, and 8 saw increases of more than 50 percent over the same period (FDIC 2004). States like Indiana, Ohio, Kentucky, South Carolina, Pennsylvania, and Mississippi all had foreclosure rates above 2 percent in late 2003. Increases have been particularly large in regions with weak economies. In Indiana, rates climbed steadily from less than 0.5 percent in 1995 to over 2 percent by 2003. In Pennsylvania, rates increased from less than 1 percent in 2000 to more than 1.5 percent by 2003 (National Association of Realtors, Research Division 2004).

However, economic conditions do not provide a sufficient explanation for why some regions and cities have experienced particularly severe increases. Using multiple regression to identify factors that explain state-level foreclosure rates for prime and subprime loans, Goldstein et al. (2005) found that income, average credit score, unemployment rate, owner-occupancy rate, and a number

Figure 1. Percentage of Outstanding Mortgages in Foreclosure at End of Quarter, 1979 to 2003

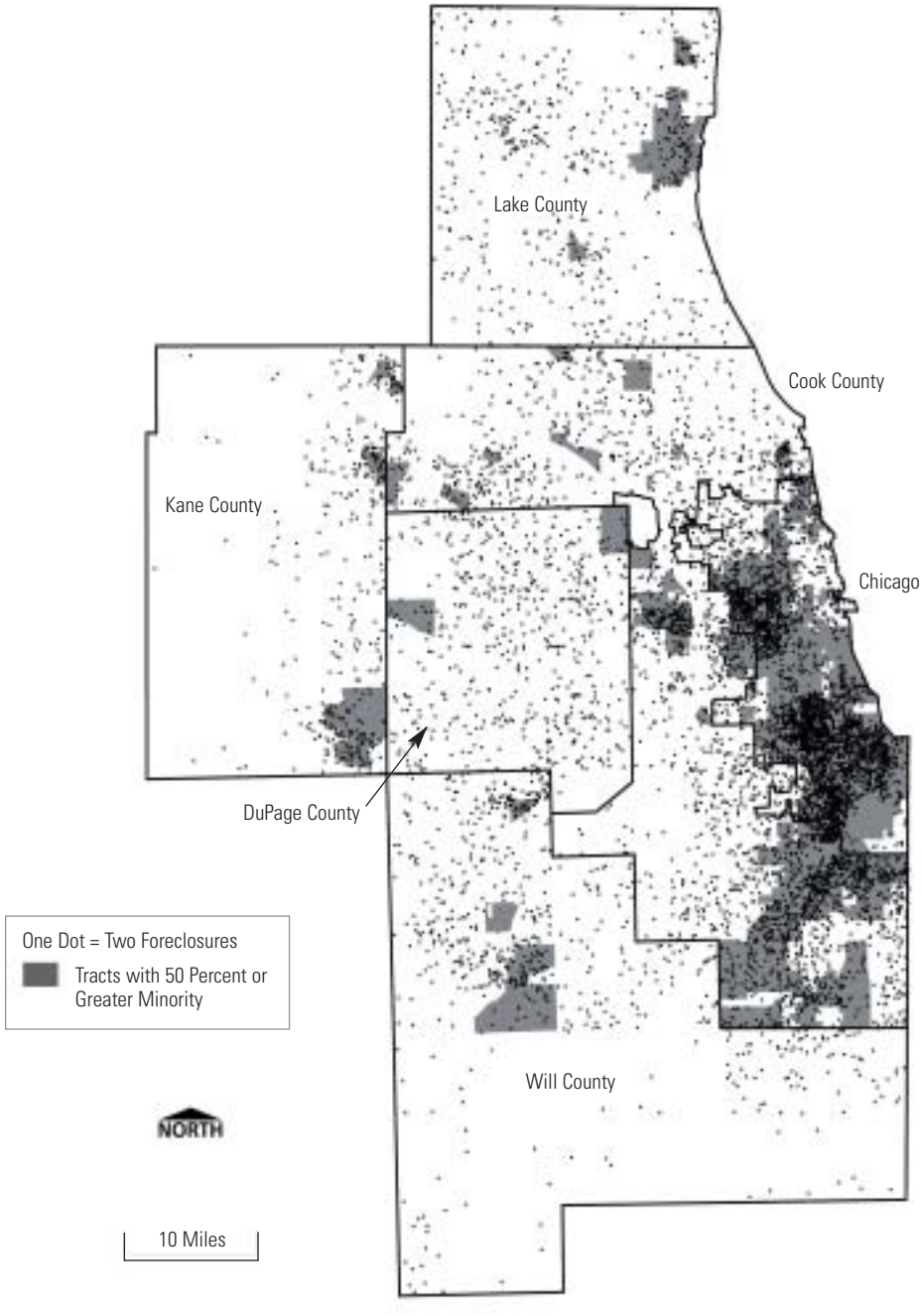


Source: National Association of Realtors, Research Division 2004.

of other demographic factors all have predictable impacts on the rate. But even after accounting for many independent variables, there was still substantial unexplained variance among state foreclosure rates, although the model explained a greater proportion of the variance among prime rates than among subprime rates (0.595 versus 0.453). States with large, positive standardized residuals (the standardized difference between the actual and predicted foreclosure rates) included Ohio, Indiana, Pennsylvania, Georgia, Maryland, South Dakota, and Missouri; there, the standardized residuals exceeded 1.0.

Cities, and especially lower-income and minority neighborhoods, have accounted for a disproportionate share of the increase in foreclosures. In the Chicago area, total foreclosures rose 238 percent from 1995 to 2002. In census tracts where less than 10 percent of the 2000 population consisted of minorities, there was an increase of 215 percent, while in tracts where 90 percent or more of the population consisted of minorities, there was an increase of 544 percent. Specifically, tracts with 90 percent or more minority residents in 2000 accounted for 40 percent of the 1995–2002 increase in conventional foreclosures. These same tracts represent only 9.2 percent of the owner-occupied housing units in the region. Tracts with minority populations of 50 percent or more accounted for over 61 percent of the increase in conventional foreclosures. Figure 2 illustrates the distribution of foreclosures in the Chicago metropolitan area in 2002.

Figure 2. Foreclosure Starts in the Chicago Area, 2002



Subprime lending and foreclosures

More than 30 years ago, when the FHA's loan programs began experiencing large increases in defaults, community activists recognized foreclosures as a threat to neighborhood and community stability. Despite some well-intentioned efforts to reverse the FHA redlining practices of previous decades, neglect and hostility toward the agency by various administrations and fundamental design flaws in its programs led to high levels of foreclosures in many older, working-class, and inner-city neighborhoods. FHA programs that worked fairly well when borrowers had options in the conventional lending market broke down in a system of "reverse redlining."

Unlike the FHA's earlier problems, today's foreclosures—and particularly the growth in foreclosures—are increasingly driven by conventional loans. In particular, high-risk subprime lending is resulting in substantially higher levels of foreclosures, with much of the increase concentrated in minority and lower-income communities. In the Chicago area, while foreclosures of government-guaranteed mortgages rose by 105 percent from 1995 to 2002, foreclosures of conventional mortgages increased 350 percent. As a result, while conventional loans accounted for only slightly more than half of foreclosures in 1995, they accounted for almost three out of four just seven years later.

Quercia, Stegman, and Davis (2005) found that 20.7 percent of all first-lien subprime refinancing loans originated in 1999 had entered foreclosure by December 2003 and that the rate at which subprime loans entered foreclosure in late 2003 was more than 10 times the rate for prime loans. In examining foreclosures in Philadelphia, Goldstein et al. (2005) estimated that some 40 percent of subprime loans made in 1998 or 1999 were in foreclosure between 2000 and 2003, compared with less than 3 percent of prime loans. In neighboring Montgomery County (PA), approximately 20 percent of subprime loans made in 1998 or 1999 were in foreclosure during the same period, compared with less than 0.4 percent of prime loans.

In the case of refinance lending, for example, Immergluck and Smith (2005) found that, other things being equal, 100 more subprime loans in a census tract over a five-year period led to almost eight foreclosures in a single year following this period. They also found that the effect of subprime lending on foreclosures is generally on the order of 20 to 30 times the effect of prime lending.

While the specific magnitude of foreclosure rates varies by the type of data, the way they are measured, and the timeframes and geographies involved, it is clear that in recent years, subprime loans had a propensity for foreclosure 10 to 40 times higher than prime loans did, with the lower differential frequently occurring in areas where prime foreclosure rates were already quite high.

Measuring the effect of foreclosures on nearby property values

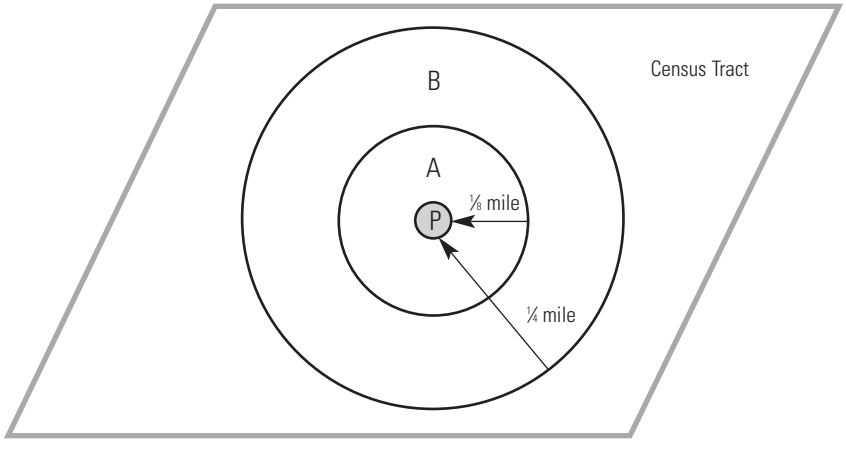
We use a hedonic regression model to estimate the impact of foreclosures on the value of nearby single-family properties and to discern the independent effect (that is, controlling for other explanatory variables) of a change in an attribute or location of a property on its price. Figure 3 provides a schematic representation of our hedonic model of housing values and nearby foreclosures. In this model, each property sale, p, is situated in 1 of the more than 800 census tracts in Chicago. Around each property, we draw two buffer areas, one with a radius of an eighth of a mile and one with a radius of a quarter of a mile. From the literature on the effects of proximate phenomena on property values, we assume that significant impacts of foreclosures on property values will occur within a quarter of a mile or less. We then measure the number of foreclosures within a buffer distance of an eighth of a mile (area A) and the number of foreclosures between a radius of an eighth of a mile and a quarter of a mile (area B).

To estimate the value of a property, p, we develop a pricing model as follows:

$$\begin{aligned} \text{Ln}(p_i) = \alpha + \boldsymbol{\beta}_1\mathbf{X}_i + \boldsymbol{\beta}_2\mathbf{Z}_i + \beta_3\text{AC}_i + \beta_4\text{BC}_i + \beta_5\text{AG}_i + \beta_6\text{BG}_i \\ + \beta_7\text{AO}_i + \beta_8\text{BO}_i + \varepsilon_i \end{aligned} \quad (1)$$

where Ln(p) is the natural log of the price of the property, $\mathbf{X}$ is a vector of property characteristics (e.g., square footage, garage, construction, etc.), and $\mathbf{Z}$ is a vector of neighborhood characteristics (population density, income, race, etc.,

Figure 3. Modeling the Impact of Forecosures on Property Values



as well as locational measures such as longitude and latitude), as measured by 2000 census tract data. The remaining variables measure the phenomena of interest—foreclosures. Specifically we disaggregate the following types:

1. AC is the number of foreclosures of conventional single-family loans within an eighth of a mile from the property.
2. BC is the number of foreclosures of conventional single family loans between an eighth and a quarter of a mile from the property.
3. AG is the number of foreclosures of government-insured single-family loans within an eighth of a mile from the property.
4. BG is the number of foreclosures of government-insured single-family loans between an eighth and a quarter of a mile from the property.
5. AO is the number of other foreclosures (multifamily and commercial property) within an eighth of a mile from the property.
6. BO is the number of other foreclosures (multifamily and commercial property) between an eighth and a quarter of a mile from the property.

To estimate equation (1), we were able to obtain property characteristics and sales prices for over 9,600 detached, single-family properties that were sold in Chicago in 1999. These data do not include all single-family transactions in the city. The data were originally assembled by the Illinois Department of Revenue, which obtains them from state real estate transfer tax records. The department cleaned the data, eliminated transactions that have extreme ratios of sales price to assessed value, and then provided a 50 percent random sample of the remaining residential property sales.

Data on property characteristics are from the Cook County Assessor's office and are for the 1999 assessment year. Because we expect a lag between foreclosures and their effect on property values, we gathered data on foreclosures in the city in 1997 and 1998.

Before we estimate equation (1), it is helpful to examine the average values of the independent variables of interest for different types of neighborhoods. Table 1 breaks these variables out by the income level of the census tract. It shows that the average number of foreclosures surrounding a property within a radius of an eighth of a mile drops from 2.07 conventional and 1.08 government foreclosures in low-income tracts to 0.38 conventional foreclosures and 0.09 government foreclosures surrounding properties in upper-income tracts. Between an eighth and a quarter of a mile, the average number of conventional foreclosures drops from 5.49 for low-income tracts to 1.03 for upper-income tracts, and the average number of government-guaranteed foreclosures drops

Table 1. Average Number of Nearby Foreclosures (1997 and 1998) by Neighborhood Income, Chicago

Number of Foreclosures by Type and Radius	Income of the Census Tract, 1999			
	Low	Moderate	Middle	Upper
Conventional, within 1/8 mile	2.07	1.74	0.78	0.38
Government, within 1/8 mile	1.08	0.99	0.37	0.09
Conventional, 1/8 to 1/4 mile	5.49	4.50	2.23	1.03
Government, 1/8 to 1/4 mile	2.79	2.69	1.04	0.23
Other, within 1/8 mile	0.13	0.14	0.06	0.03
Other, 1/8 to 1/4 mile	0.60	0.46	0.18	0.15
Average sales price	$99,117	$113,286	$147,987	$294,408

Note: Low-income tracts are those where median family income is below 50 percent of the metropolitan median income. Moderate-income tracts are those where median family income is between 50 and 79 percent of the metropolitan median. Middle-income tracts are those where median family income is between 80 and 119 percent of the metropolitan median. Upper-income tracts are those where median family income is 120 percent or more of the metropolitan median.

from 2.79 to 0.23, respectively. Multifamily and commercial foreclosures (grouped here as "other") exhibit similar patterns.

On average, the number of conventional foreclosures within a block (an eighth of a mile) of properties in low-income tracts is more than five times the number of conventional foreclosures within a block of properties in upper-income tracts. In the case of government-guaranteed loans, the difference is more than 11-fold. Similar differences occur when foreclosures between one and two blocks away are considered.

Results of the multivariate analysis

The estimation of equation (1) is presented in table 2. Results are given for two versions of the equation. The first model includes all available property characteristics, neighborhood characteristics expected to influence property values, and the foreclosure variables. The second includes an additional independent variable: the median home value for the census tract in which the property is located. This variable, which is added to control for the possible effect of nearby property values on the central property value, p, also reduces the vulnerability of the results to concerns that there may be important variables that change across neighborhood space, that these are unmeasured or unobserved, and that they influence p.

The first model (without tract median property value) gives results for most property and neighborhood characteristics that are generally consistent with previous research on property values, as well as with theory. Most, but

Table 2. Regression Results for Estimation of Single-Family Property Values

	Without Tract Median Property Value		With Tract Median Property Value	
	Coefficient	Standard Error	Coefficient	Standard Error
(Constant)	8.20622	0.12882***	7.20178	0.12346***
LN(LAND AREA)	0.17683	0.01157***	0.21856	0.01088***
LN(BLDNG AREA)	0.46189	0.01668***	0.41050	0.01566***
AGE	–0.00205	0.00017***	–0.00210	0.00016***
# of BEDROOMS	0.00711	0.00562	0.01609	0.00526***
TWO STORY+ ?	–0.03792	0.00879***	–0.04633	0.00822***
MASONRY?	–0.01300	0.00863	0.00445	0.00808
FRAME/MASONRY?	–0.01795	0.01285	–0.00589	0.01202
SLAB?	0.02307	0.01017**	0.01771	0.00951*
BASMNT FINSHED?	0.01476	0.00809*	0.01199	0.00756
FULLATTIC?	–0.00301	0.00908	–0.00826	0.00849
PARTIAL ATTIC?	0.02498	0.01041**	0.00939	0.00974
ATTICFINISHED?	0.01077	0.01090	0.00385	0.01020
CENTRAL AIR?	0.02882	0.00897***	0.01686	0.00839**
1-CAR GARAGE?	0.03690	0.00859***	0.02222	0.00804***
2-CAR GARAGE?	0.07122	0.00843***	0.05355	0.00789***
FIREPLACE?	0.12510	0.01184***	0.08725	0.01112***
RAIL W/IN 1/8 ML?	–0.01845	0.00785***	–0.02662	0.00735***
MILES TO EL TRAIN	–0.04954	0.00567***	–0.04948	0.00530***
MILES TO HIWAY	0.00621	0.00367*	0.01130	0.00344***
APRL_JUN?	0.04891	0.00927***	0.04941	0.00867***
JULY_SEP?	0.07850	0.00921***	0.07393	0.00861***
OCT_DEC?	0.07465	0.01019***	0.07359	0.00953***
LATITUDE	2.22553	0.15494***	1.47511	0.14629***
LONGITUDE	–2.59858	0.23966***	–2.02806	0.22463***
LAT*LAT	–3.31249	0.77186***	0.88124	0.73055
LONG*LONG	5.52803	1.47679***	9.88299	1.38592***
LAT*LONG	–13.08793	1.43754***	–11.86481	1.34465***
POPDENSITY	3.649E-06	6.288E-07***	3.633E-06	5.880E-07***
LOWINCOME	–0.53197	0.02574***	–0.26993	0.02509***
MODINCONE	–0.37888	0.01624***	–0.13476	0.01654***
MIDDLEINCOME	–0.20987	0.01065***	–0.03843	0.01097***
PPUBASSISTNCE	–1.42312	0.13112***	–1.01365	0.12310***
PPOWNOCC	–0.34445	0.03045***	–0.21342	0.02869***
VCRIME/CAPITA	–3.71817	0.66097***	–3.15170	0.61826***
PPBLACK	–0.41891	0.02535***	–0.25280	0.02412***
PPHISPANIC	–0.43438	0.02405***	–0.21386	0.02326***
CNVL_1/8	–0.01136	0.00291***	–0.00907	0.00272***
CNVL_1/8-1/4	–0.00325	0.00158**	–0.00189	0.00148

Table 2. Regression Results for Estimation of Single-Family Property Values *Continued*

	Without Tract Median Property Value		With Tract Median Property Value	
	Coefficient	Standard Error	Coefficient	Standard Error
GOV_1/8	–0.00299	0.00422	–0.00331	0.00394
GOV_1/8-1/4	0.00063	0.00233	–0.00131	0.00217
OTHER_1/8	–0.05745	0.01042***	–0.04672	0.00975***
OTHER_1/8-1/4	–0.01618	0.00592***	–0.01015	0.00554*
Median home value			2.963E-06	7.977E-08***
R^2	0.727		0.761	
N = 9,642				

Note: The dependent variable is the natural log of the sales price of a single-family property.
*$p < 0.10$. **$p < 0.05$. ***$p < 0.01$.

not all, property characteristics are measured by dummy variables, with a 1 indicating the presence of the feature (e.g., masonry construction) and a zero indicating its absence. (Dummy variables are followed by a question mark.) An increase in the square footage of the home itself, or the land, results in increased value. Other things being equal, single-story buildings are more valuable than multistory ones. Amenities such as a finished basement, central air conditioning, a fireplace, and a one- or two-car garage add value. On the one hand, being located within a block or so of a railroad track reduces property values, while on the other, value declines as the distance from an elevated train or subway stop increases. The regression also controls for seasonality effects on prices, which prove to be significant.

Neighborhood characteristics prove to be quite significant predictors of property values. Lower incomes among residents, higher percentages of residents on public assistance, and higher levels of violent crime are among the variables that have negative effects on property values.

Four variables are included to control for the possibility that the impacts of the neighborhood and property characteristics on value vary across space. It may be that the attributes of a property contribute differently to value in some parts of the city as opposed to others. This phenomenon, sometimes called spatial submarket segmentation, can be accounted for by an econometric technique that controls for spatial location throughout the city.[1]

[1] This technique is referred to as spatial contextual expansion with quadratic trend. See Galster et al. (2004).

This method entails including the latitude, the longitude, the latitude squared, the longitude squared, and the product of the latitude and longitude as independent variables. They are generally highly significant, indicating the presence of spatial submarkets within the city.

The variables that indicate the effect of foreclosures on property values are the last six in the first regression (CNVL_1/8 through OTHER_1/8-1/4). The results of the first model indicate that nearby foreclosures generally have significant, negative effects on property values. However, the results for foreclosures of government-guaranteed loans are not significant, and the sign is somewhat ambiguous. Moreover, while the magnitude of the coefficients for the multifamily and commercial foreclosures combined is somewhat larger than for single-family foreclosures, table 1 shows that the incidence of such foreclosures is much lower, so that as a group, they are less important than single-family foreclosures.

When other things are held constant, for each additional conventional foreclosure within an eighth of a mile of a house, property value is expected to decrease by 1.136 percent. Given an average sales price of $164,599 for homes in the city, this amounts to a decrease in value of approximately $1,870 per property because of a single foreclosure within an eighth of a mile. For foreclosures in the band from an eighth to a quarter of a mile from a property, the effect is 0.325 percent per foreclosure. The marginal effect of a multifamily or commercial foreclosure is somewhat larger than the effect of a conventional single-family foreclosure simply because these buildings tend to be much larger and therefore have significantly more capacity for physical disorder.

In the second, expanded regression, most variables that were significant in the first regression remain so and tend to carry the same sign. In this more conservative estimate, the coefficient on conventional foreclosures within an eighth of a mile is somewhat smaller, but the impact of an additional foreclosure on property value remains close to a 1 percent reduction (0.9 percent). In this specification, the effect of foreclosures in the second band (an eighth to a quarter of a mile) remains negative, but becomes statistically insignificant. Government foreclosures are still statistically insignificant.

It is important to point out that the methods used in this analysis have certain limitations. First, while we have included a wide variety of structural and neighborhood characteristics, especially those that are found to be important in the literature on property values, the data on structural characteristics are limited by what the county assessor collects and reports. Second, while we did run a model using a regular, nonlogged version of sales prices and found similar results, there are other possible sensitivities to functional form that might be worth additional exploration. In particular, problems of multicollin-

earity prohibited us from testing for interactions between neighborhood attributes such as race and income. A larger, broader data set might reduce such problems.

Finally, there remains a possibility that the negative relationship between foreclosures and property values is as much the effect of property values on foreclosures as the other way around. If the lower value of the observed property (the centroid in figure 3) is highly correlated with those of nearby properties, then we may be measuring the impact of lower value on the likelihood of foreclosure. Other things being equal, a lower property value and, more important, lower owner equity are likely to positively affect the probability of foreclosure because the owner has less equity at risk.

We attempt to minimize the problem of reverse causation in two ways. First, the spatial structure of our model, as illustrated by figure 3, measures the effects of surrounding foreclosures on the value of a single property at the central focus of the foreclosures. Second—and related to the first point—is the addition of neighborhood median property value as an additional independent variable. Because nearby property values may affect foreclosures in areas A and B in figure 3, we control for such values, although perhaps imperfectly, via the median tract value.

The use of the median home value for the tract is by no means a perfect method for dealing with the potential endogeneity of the nearby foreclosures. Our data on nearby property values are measured at the census-tract level, which is larger than the eighth of a mile radius around each property. However, it was the best method available. We could not identify any appropriate instruments with which to address endogeneity via an instrumental variables approach. In addition, change-over-time analysis was precluded by the limited sales and property data available. Future research should aim to address these limitations.

Effects of foreclosures on property values in low- and moderate-income tracts

Given that low- and moderate-income neighborhoods experience a substantially higher level of foreclosures and given that such foreclosures may be more likely in vacant, abandoned, or blighted property than in property in more affluent areas, it is useful to determine whether the effects of foreclosures in such neighborhoods differ from the effects for all transactions. To do this, we estimate equation (1), both the basic and expanded versions, for only the 2,265 property transactions in low- and moderate-income tracts in the city.

As seen in table 3, the results of the regression without median home value indicate that for each additional foreclosure within an eighth of a mile of a

Table 3. Regression Results for Estimation of Single-Family Property Values: Low and Moderate-Income Tracts Only

	Without Tract Median Property Value		With Tract Median Property Value	
	Coefficient	Standard Error	Coefficient	Standard Error
(Constant)	7.37096	0.34354***	6.99667	0.32539***
LN(LAND AREA)	0.30429	0.03274***	0.31818	0.03095***
LN(BLDNG AREA)	0.38210	0.04555***	0.26966	0.04358***
AGE	–0.00259	0.00042***	–0.00249	0.00040***
# of BEDROOMS	0.00451	0.01480	0.01623	0.01400
TWO STORY+ ?	–0.02011	0.02771	–0.02561	0.02619
MASONRY?	0.05343	0.02370**	0.05471	0.02239**
FRAME/MASONRY?	0.06078	0.03804	0.05468	0.03594
SLAB?	0.06074	0.02743**	0.04441	0.02594*
BASMNT FINSHED?	0.00628	0.02452	0.00517	0.02317
FULLATTIC?	–0.01264	0.02568	–0.02741	0.02428
PARTIAL ATTIC?	0.07808	0.03145**	0.03821	0.02982
ATTICFINISHED?	0.03305	0.03073	0.01771	0.02905
CENTRAL AIR?	0.05745	0.03678	0.05179	0.03475
1-CAR GARAGE?	0.04872	0.02279***	0.03378	0.02155
2-CAR GARAGE?	0.05765	0.02303***	0.04827	0.02177**
FIREPLACE?	0.20408	0.04046***	0.14086	0.03843***
RAIL W/IN 1/8 ML?	–0.07384	0.02051***	–0.05962	0.01939***
MILES TO EL TRAIN	–0.04295	0.01880**	–0.04099	0.01776**
MILES TO HIWAY	–0.03628	0.01670**	0.01183	0.01605
APRL_JUN?	0.06782	0.02606***	0.05872	0.02462**
JULY_SEP?	0.09813	0.02599***	0.08662	0.02456***
OCT_DEC?	0.08820	0.02754***	0.07850	0.02603***
LATITUDE	2.63795	0.58542***	1.96816	0.55464***
LONGITUDE	–0.22046	0.89249	–1.06925	0.84485
LAT*LAT	4.17514	2.53047*	6.58625	2.39543***
LONG*LONG	–2.65742	6.13045	7.36781	5.82458
LAT*LONG	–4.68975	7.56949	–10.11835	7.15967
POPDENSITY	–5.522E-07	1.310E-06	8.400E-07	1.241E-06
LOWINCOME	–0.06440	0.03031**	–0.08024	0.02866***
PPUBASSISTNCE	–0.35926	0.24600	0.19156	0.23485
PPOWNOCC	–0.07457	0.09109	0.03952	0.08634
VCRIME/CAPITA	–4.92566	1.24905***	–3.72182	1.18244***
PPBLACK	–0.77435	0.08212***	–0.49459	0.07945***
PPHISPANIC	–0.66048	0.08150***	–0.36556	0.07908***
CNVL_1/8	–0.01792	0.00594***	–0.01442	0.00561***
CNVL_1/8-1/4	–0.00033	0.00321	0.00045	0.00304
GOV_1/8	0.00709	0.00810	0.00446	0.00766

Table 3. Regression Results for Estimation of Single-Family Property Values: Low and Moderate-Income Tracts Only *Continued*

	Without Tract Median Property Value		With Tract Median Property Value	
	Coefficient	Standard Error	Coefficient	Standard Error
GOV_1/8-1/4	0.00500	0.00466	0.00175	0.00440
OTHER_1/8	–0.03761	0.02242*	–0.02923	0.02119
OTHER_1/8-1/4	–0.01350	0.01213	–0.00981	0.01146
Median home value			4.098E-06	2.502E-07***
R^2	0.538		0.588	
N = 2,265				

Note: The dependent variable is the natural log of the sales price of a single-family property.
*$p < 0.10$. **$p < 0.05$. ***$p < 0.01$.

house, property value drops by almost 1.8 percent. The average selling price in low- and moderate-income tracts is $111,002, so this effect amounts to approximately $1,989 for such a property. The more conservative estimate of the effect of close-in foreclosures, obtained in the expanded regression with median tract value included, is 1.44 percent or about $1,600 for the average property.

Summing up the effects of foreclosures and property values

The marginal impact on property values from one additional foreclosure on one nearby property can be used to estimate the cumulative effects of increased foreclosures on single-family property values throughout the city. We begin by estimating the impact of foreclosures at the tract level. For each tract, the impact of conventional single-family (one- to four-unit) foreclosures on the value of single-family (one- to four-unit) buildings is calculated. (These estimates do not include any effects on the value of condominiums, multifamily rental properties, or commercial properties.) We use the marginal effects (coefficient values) from table 2. For each tract, the cumulative effect of 1997 and 1998 foreclosures on property values within a quarter of a mile is then estimated as follows:

> Cumulative tract-level decline in the values of single-family properties = [Number of foreclosures in the tract]*[median home value in the tract]*[(average number of single-family properties in the ring with the ⅛-mile radius)*(1.136% value effect) + (average number of single-family properties in the rings with the ⅛-mile and ¼-mile radii)*(0.325% value effect)] (2)

The rings are assumed to have the same single-family housing densities as the tract as a whole.[2] Because foreclosures are more likely to occur in those parts of tracts where owner-occupied housing is denser, this assumption yields a conservative estimate of the number of homes that are close to foreclosures.

To provide an even more conservative estimate of the impact of foreclosures on property values, we also performed another calculation that assumes first that there is no effect on properties more than an eighth of a mile from a foreclosure and second that the effect on properties within an eighth of a mile is the smaller 0.907 percent effect shown in the expanded (right-hand side) results of table 2.

Equation (2) and its more conservative counterpart are calculated for every census tract in Chicago. The aggregate impact of foreclosures on one- to four-unit single-family properties in Chicago alone is then estimated by summing these values for all tracts. Under the less conservative assumption, the cumulative impact is estimated to exceed $1.39 billion. The more conservative assumption yields an impact of more than $598 million. Given that there were 3,750 conventional single-family foreclosures in the city in 1997 and 1998, this corresponds to average losses of between $159,000 and $371,000 per foreclosure.

Again, these estimates are only for the effects of 1997 and 1998 foreclosures. Levels have risen considerably since then. Also, these figures do not reflect the effects of foreclosures on all properties, particularly on condominiums, multifamily rental properties, and commercial buildings.

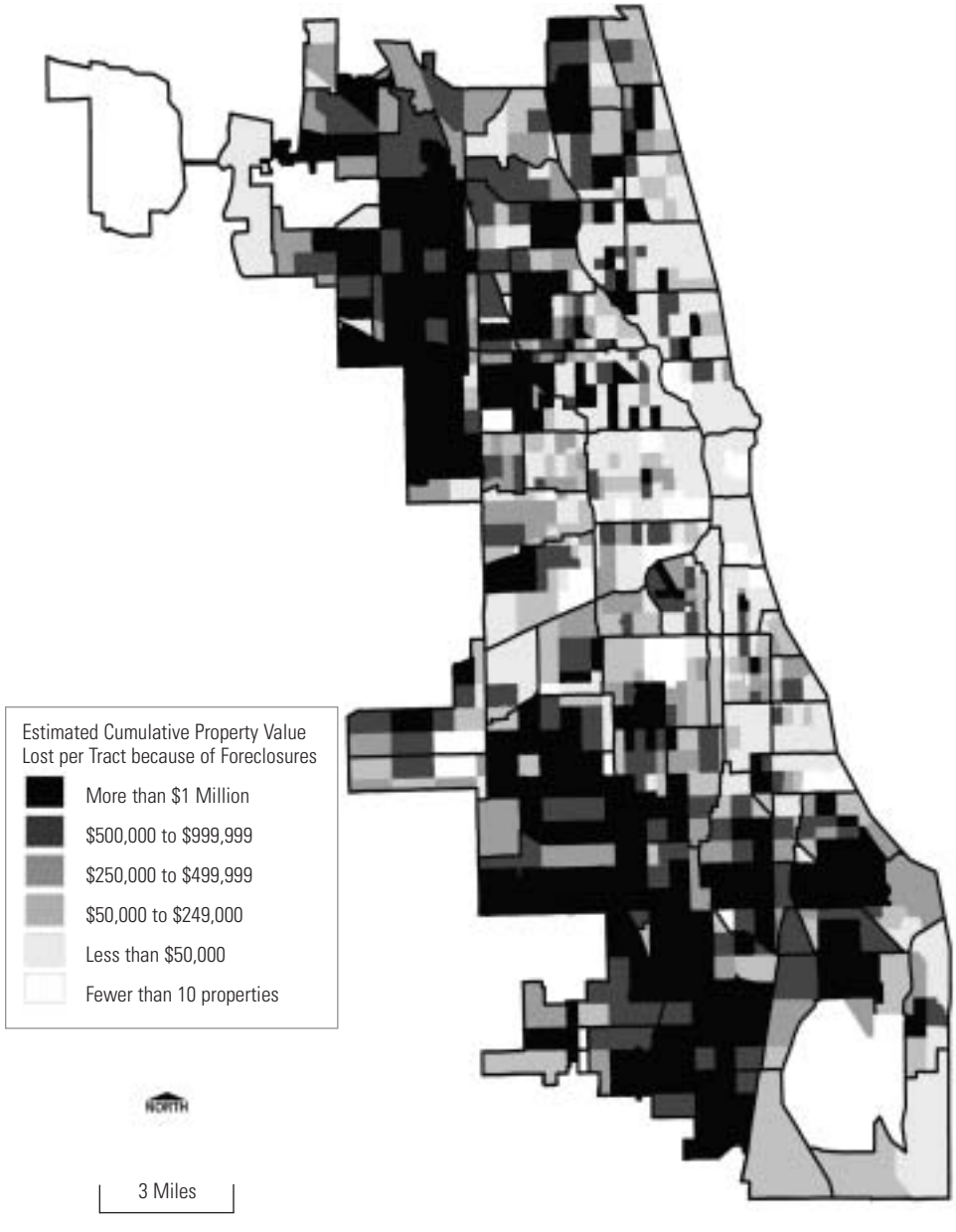
Figure 4 uses the more conservative figure to plot the estimated loss in the value of single-family properties by census tract because of 1997 and 1998 conventional single-family foreclosures. It shows that tracts with the highest levels of lost value tend to be in the south, southwest, and northwest parts of the city. Given the fact that these communities tend to be highly residential and contain mostly detached, single-family homes, this is not surprising. The building stock of neighborhoods closer to the lake and the central city tends to be more dominated by large, multifamily residential buildings and large commercial and industrial structures.

Policy implications and discussion

Foreclosures, particularly in lower-income neighborhoods, can lead to vacant, boarded-up, or abandoned properties that in turn contribute to physi-

[2] The inner ring has an area of 0.04908 square miles, while the outer ring has an area of 0.14727 square miles. The number of properties in these rings is estimated by multiplying the density of the properties in the tract by the corresponding area.

Figure 4. Cumulative Effect of 1997–1998 Foreclosures on Single-Family Property Values, City of Chicago



cal disorder in a community—disorder that can create a haven for criminal activity, discourage the formation of social capital, and lead to more disinvestment. Since foreclosures lead to such negative effects, we would expect them to also lead to lower property values in their immediate vicinity, especially for residential property.

Our findings demonstrate that conventional foreclosures have a statistically and economically significant effect on property values. We provide a relatively conservative measure of such effects by estimating only the effects on single-family properties and excluding condominiums, multifamily rental properties, and commercial buildings. The magnitude of the impact for Chicago is between $598 million and $1.39 billion.

These findings have implications for the regulation of subprime mortgage lending, the regulation of the growing segment of exotic mortgage products in the prime market, and policies that aim to expand homeownership to include a broader segment of lower-income households. There are also implications for community reinvestment policy and foreclosure law itself.

First, our findings have clear implications for the regulation of subprime mortgage lending. A variety of recent research demonstrates that foreclosures have been increasingly driven by subprime lending (Goldstein et al. 2005; Immergluck and Smith 2005; Quercia, Stegman, and Davis 2005). Moreover, such foreclosures are exacerbated by the highly concentrated nature of subprime lending in neighborhoods with large minority populations.

If policy makers are to make wise decisions about whether and how much to regulate subprime lending, they must consider not only any benefits or costs that might accrue to the lenders or borrowers who are directly involved, but also the significant costs of foreclosures borne by communities. Most of the residents of the affected communities—many of them lower-income and working-class neighborhoods—have no direct role in the foreclosures occurring around them. There are, of course, strong arguments for regulating market activity when poorly informed or unsophisticated borrowers are harmed by particular lending products or practices. The history of federal and state policy is full of precedents for protecting vulnerable citizens in economic transactions, especially ones as important as mortgage loans. However, when a certain outcome is shown to hurt parties external to the transaction, the arguments for policy intervention and for more direct policy intervention (e.g., limiting or outlawing certain practices versus simply requiring disclosure) become even more robust. Justification no longer depends on the limited financial literacy or impaired understanding of the borrowers. The substantial neighborhood harm caused by high-risk lending should be considered an important cost, regardless of the borrower's ability to make an informed financial decision.

Second, the negative impact of foreclosures on neighborhoods and cities also has implications for the regulation of the exotic, higher-risk prime mortgage products that have grown increasingly popular over the past few years. Interest-only loans, negative amortization products, and combinations of these and other higher-risk loan terms can increase the risk of default even for borrowers with strong credit histories. Moreover, the experience of the subprime market has shown that some of this risk may not be well understood until such loans are exposed to increasing interest rates, a weaker economy, or other adverse conditions.

Third, as Schwartz (2006) and others have argued, U.S. federal housing policy over the past 10 or 15 years has increasingly focused on expanding homeownership opportunities for lower-income and minority households. While this is a laudable goal from several perspectives, one risk of pushing homeownership too hard is that such policies may encourage higher-risk lending and borrowing to the point where costs outweigh benefits. Moreover, the distribution of the costs of higher-risk lending may be disproportionately borne by certain communities or neighborhoods. Of course, the challenge is to develop regulatory regimes that reduce such costs while preserving as many of the benefits of increased homeownership opportunities as possible. In the end, however, some limits on access to homeownership may have to be tolerated if concentrated foreclosures and their impacts are to be held to tolerable levels. The neighborhood costs of foreclosures we have noted suggest that policy makers would be wise to emphasize the sustainability and preservation of homeownership as much as its short-term growth.

Community reinvestment policy can be used to encourage lenders to address the problem of concentrated foreclosures. A number of activities that can be rewarded under the Community Reinvestment Act (CRA) could prove helpful in reducing foreclosures, especially those concentrated in lower-income areas. First, banks can be rewarded in their CRA examinations for offering or participating in the various types of anti–predatory lending programs being offered around the country. Such programs are usually organized by neighborhood-based community development organizations (Higgins 2005). Among those receiving the most attention is the NORMAL program of Chicago's Neighborhood Housing Services. In this program, borrowers at severe risk of foreclosure are provided with more affordable loans to refinance a predatory loan. To compensate for any predatory terms or fees, the payoff to the original lender is less than the outstanding balance. Banks can also receive credit under the CRA Investment or Service Test for supporting foreclosure prevention programs, including postpurchase counseling.

Second, CRA regulators can encourage more responsible lending and thus reduce local foreclosure rates by considering not only the quantity of lending that banks and their affiliates make in lower-income and minority neighborhoods, but also the nature and performance of those loans in bringing about sustainable homeownership. Of course, care should be taken not to adopt practices that might inadvertently discourage responsible lending in lower-income communities.

Reducing high and concentrated foreclosures is a policy objective that will serve the interests not only of consumers and neighborhoods, but of the mortgage banking industry as well. Such an objective is a natural target of bank regulatory policy in that it combines reinvestment and safety and soundness goals. For banks that make loans in impacted communities, concentrated foreclosures could adversely affect their lending markets and their collateral base by depressing property values.

Finally, the impact of foreclosures on property values and neighborhood vitality generally suggests that the nature of the default and foreclosure process itself should be considered. For example, the time that elapses between filing the foreclosure notice and the completed foreclosure sale varies greatly across states. In some states, such as Texas and Georgia, foreclosure periods can be as short as 25 to 35 days, while in others, they can last more than a year. In studying the costs of foreclosures to municipal governments, Apgar and Duda (2005) suggest that streamlining might reduce the negative effects of foreclosures by reducing opportunities for property deterioration and vandalism. Given the potential costs to individual homeowners, more research is needed to determine whether speedier or simpler foreclosure processes are likely to have the desired effects.

This article represents an initial attempt to measure the likely costs of foreclosures on neighborhood property values. More work is needed, including the development of larger databases that include more robust sales data over time. Moreover, additional program and policy development work is needed to identify the most promising methods to reduce foreclosures and to limit the negative impacts of mortgage defaults on neighborhoods and communities. Notwithstanding the need for additional research and program development, the existing evidence on the personal and social costs of foreclosures strongly suggests that policy makers should act aggressively in the near term to stem the continuing problem of high levels of foreclosures that plague so many communities around the country.

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References

Apgar, William, and Mark Duda. 2005. *Collateral Damage: The Municipal Impact of Today's Mortgage Foreclosure Boom*. Washington, DC: Homeownership Preservation Foundation. World Wide Web page <http://www.hpfonline.org/images/Apgar-Duda%20Study%20Final.pdf> (accessed May 11).

Cutts, Amy Crews, and Richard K. Green. 2004. *Innovative Servicing Technology: Smart Enough to Keep People in Their Houses?* Freddie Mac Working Paper No. 04–03. Washington, DC: Freddie Mac. World Wide Web page <http://www.freddiemac.com/news/pdf/fmwp_0403_servicing.pdf> (accessed August 12, 2005).

Ding, Chengri, Robert Simons, and Esmail Baku. 2000. The Effect of Residential Investment on Nearby Property Values: Evidence from Cleveland, Ohio. *Journal of Real Estate Research* 19:23–48.

Federal Deposit Insurance Corporation. 2004. *Economic Conditions and Emerging Risks in Banking*. April 26. World Wide Web page <http://www.fdic.gov/deposit/insurance/risk/ecerb.pdf> (accessed January 6, 2005).

Galster, George, Kenneth Temkin, Chris Walker, and Noah Sawyer. 2004. Measuring the Impacts of Community Development Initiatives: A New Application of the Adjusted Interrupted Time-Series Method. *Evaluation Review* 28(6):502–38.

Goldstein, Ira, Maggie McCullough, Al Parker, and Daniel Urevick-Ackelsberg. 2005. *Mortgage Foreclosure Filings in Pennsylvania*. Philadelphia: Reinvestment Fund. World Wide Web page <http://www.trfund.com/policy/PA_Foreclosures.htm> (accessed August 10).

Higgins, Lindley. 2005. *Effective Community-Based Strategies for Preventing Foreclosures*. Neighborworks America. World Wide Web page <http://www.nw.org/network/pubs/studies/documents/foreclosureReport092905.pdf> (accessed December 30).

Immergluck, Dan, and Geoff Smith. 2005. Measuring the Effects of Subprime Lending on Neighborhood Foreclosures: Evidence from Chicago. *Urban Affairs Review* 40:362–89.

Immergluck, Dan, and Geoff Smith. 2005. *There Goes the Neighborhood: The Effect of Single-Family Mortgage Foreclosures on Property Values*. Working paper. Woodstock Institute.

Immergluck, Dan, and Geoff Smith. 2006. The Impact of Single-Family Mortgage Foreclosures on Neighborhood Crime. *Housing Studies*, forthcoming.

Kelling, George, and Catherine Coles. 1996. *Fixing Broken Windows: Restoring Order and Reducing Crime in Our Communities*. New York: Touchstone.

Moreno, Anne. 1995. *The Cost-Effectiveness of Mortgage Foreclosure Prevention*. Minneapolis: Family Housing Fund.

National Association of Realtors, Research Division. 2004. *Rising Foreclosure Rates in Indiana: An Explanatory Analysis of Contributing Factors*. March. World Wide Web page <http://www.mibor.com/_pdfs/ForeclosureStudy2004.pdf> (accessed August 25, 2005).

Quercia, Roberto, Michael Stegman, and Walter Davis. 2005. The Impact of Predatory Loan Terms on Subprime Foreclosures: The Special Case of Prepayment Penalties and Balloon Payments. University of North Carolina–Chapel Hill, Center for Community Capitalism.

Schwartz, Alex. 2006. *Housing Policy in the United States: An Introduction*. New York: Routledge.

Shlay, Anne B., and Gordon Whitman. 2004. *Research for Democracy: Linking Community Organizing and Research to Leverage Blight Policy*. World Wide Web page <http://comm-org.wisc.edu/papers2004/shlay/shlay.htm> (accessed July 15, 2005).

Skogan, Wesley. 1990. *Disorder and Decline: Crime and the Spiral of Decay in American Neighborhoods*. Berkeley, CA: University of California Press.

Wilson, James Q., and George Kelling. 1982. Broken Windows: The Police and Neighborhood Safety. *Atlantic*, March, pp. 29–38.