

The Homeownership Experience of Households in Bankruptcy

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The views expressed in this article do not necessarily represent those of the Federal Reserve Bank of Philadelphia or the Federal Reserve System.

Abstract

This article provides the first indepth analysis of the homeownership experience of homeowners in bankruptcy. These homeowners are typically seriously delinquent on their mortgages at the time of filing. We measure how often they end up losing their houses in foreclosure, the time between bankruptcy filing and foreclosure sale, and the loss rate for lenders. In particular, we follow homeowners who filed for chapter 13 bankruptcy (Chapter 13, Individual Debt Adjustment, Bankruptcy Code) between 2001 and 2002 in New Castle County, Delaware, from the time of their filing to October 2007. We present three main findings. First, about 27.9 percent of filers lost their houses in foreclosure despite filing for bankruptcy. Second, when compared with debtors who did not file, bankrupt debtors remained in their houses for, on average, 27.7 additional months. Third, most of the lenders suffered losses and the average loss rate was 28.0 percent. Our empirical analysis further suggests that under the assumption that filers' profiles are similar to those in our model, reducing homeowners' mortgage payment burdens (that is, instituting mortgage "cramdowns") will reduce the number of houses that end up in foreclosure. The reduction, however, is likely to be modest.

Introduction

The residential mortgage delinquency rate and foreclosure rate rose dramatically over the past several years as the nation's housing market recession deepened. Millions of people have lost their homes through foreclosure or are on the brink of losing them. As a potential legal last resort to cure delinquent mortgages, personal bankruptcy has now attracted increasing attention from both academics and policymakers. This attention has stimulated substantial debate about the extent of the relief the current bankruptcy system is able to offer to homeowners. On the one hand, filing for bankruptcy automatically stops foreclosure. Moreover, by discharging unsecured debt, bankruptcy leaves borrowers with more available income for mortgage payments and decreases the risk that their homes will be encumbered by judgment liens. Chapter 13 bankruptcy (Chapter 13, Individual Debt Adjustment, Bankruptcy Code) even allows the filer to cure a mortgage arrearage over a period of several years while continuing to make regular mortgage payments in accordance with his or her contract. On the other hand, bankruptcy law does not permit debtors to modify the terms of first mortgages secured by a principal residence. As a result, homeowners who have mortgages that are no longer affordable may find debt relief under the bankruptcy law insufficient.¹ Indeed, although the Housing and Economic Recovery Act of 2008 does not contain direct changes to the current personal bankruptcy laws, proposals to reform these laws to allow for additional mortgage relief were a central part of the debate.²

Before the analysis presented in this article, it has been difficult to talk sensibly about whether the current system provides homeowners with enough protection because we know little about the homeownership experience of bankrupt households. As Jacoby (2007: 331) pointed out, "No one has specifically tracked the outcomes for chapter 13 filers who file for the purpose of saving their homes from foreclosure...." Economic scholars have not traditionally viewed personal bankruptcy, chapter 13 in particular, as a mechanism for protecting mortgage borrowers from mortgage creditors. The existing literature has generally examined the effect of bankruptcy exemptions on mortgage lending (Berkowitz and Hynes, 1999; Chomsisengphet and Elul, 2006; Lin and White, 2001; Pence, 2006). Although some researchers are aware of the role bankruptcy protection plays in a borrower's default and foreclosure decisions, they tended not to incorporate bankruptcy explicitly into their analysis (Ambrose, Buttimer, and Capone, 1997; Capozza and Thomson, 2006). The few exceptions are Bahchieva, Wachter, and Warren (2005) and Long (2005). Bahchieva, Wachter, and Warren (2005) documented the mortgage indebtedness of bankruptcy filers. Long (2005) examined the negative long-term effects of bankruptcy filings on households' access to credit. Spurred by the financial crisis, more researchers are now beginning to examine more closely the relationship between foreclosure and bankruptcy. For example, White and Zhu (2010) built a theoretical

¹ Morgan, Iverson, and Botsch (2008) argued that the 2005 Bankruptcy Abuse Reform (BAR) has actually contributed to the surge in subprime foreclosures that followed its passage. Li, White, and Zhu (2010) found that the 2005 reform act caused mortgage default rates to rise.

² For instance, the Helping Families Save Their Homes in Bankruptcy Act of 2009 proposed to amend the federal bankruptcy law to permit a bankruptcy plan to modify the mortgage of certain debtors and to provide for payment of such a loan at a fixed annual interest rate over a 30-year period. As of August 30, 2010, this bill was being considered in committee. The committee recommended it be considered by the House as a whole and placed it on the legislature's calendar of business for floor consideration.

model to explore households' joint decision of bankruptcy and mortgage default. Levitin and Goodman (2008) studied interest rate variation by property type because the current Bankruptcy Code allows for mortgage stripdown only on non-single-family owner-occupied properties. Li and White (2009) examined the relationship among mortgage default, foreclosure, and bankruptcy. Levitin (2009) tested the hypothesis that permitting modification would have a negative effect on mortgage credit cost or availability and argued that permitting modification of home mortgages in bankruptcy presents the best solution to the foreclosure crisis.

Similarly, despite ample analysis on mortgage foreclosure outcomes (Ambrose, Buttimer, and Capone, 1997; Gerardi, Shapiro, and Willen, 2007; Grover, Smith, and Todd, 2006; Lambrecht, Perraudin, and Satchell, 2003; Pennington-Cross, 2006; Stark, 1997), before this mortgage crisis, few studies tracked bankruptcy outcomes, especially the outcomes of chapter 13 bankruptcy filings. Of those that did, none followed up on homeownership experience during and after bankruptcy (Eraslan, Li, and Sarte, 2007; Norberg and Velkey, 2007).

This article attempts to remedy this gap in the literature. We built a unique data set that enabled us to track the homeownership experience of homeowners who filed for bankruptcy between August 2001 and August 2002 in New Castle County, Delaware, from the time of their filing to October 2007. We constructed three measures of homeownership experience by asking the following questions: How often do people lose their houses to foreclosure during and after bankruptcy? How much time elapses between a bankruptcy filing and the foreclosure sale? What is the recovery rate for lenders in the event that the house does end up in foreclosure? The article has three main findings. First, despite filing for bankruptcy, 28 percent of the filers lost their houses to foreclosure sale by October 2007. The foreclosure sale rates jumped to 41 percent for filers who were 12 months or more delinquent on their mortgage payments at the time of filing. To put these numbers in context, we followed houses that the New Castle County Sheriff's Office listed as being in foreclosure sale but whose owners did not file for bankruptcy between August 1, 2001, and August 1, 2002. We found that roughly 43 percent of these owners had their houses foreclosed by October 2007. The comparison, therefore, suggests that bankruptcy does provide some relief to homeowners and more so to homeowners who missed only a few payments.

Second, compared with homeowners who went into foreclosure without filing for personal bankruptcy, bankrupt debtors remained in their houses for, on average, 28 additional months.³ This second finding confirms earlier findings in the literature: loans that move from delinquency into bankruptcy simply take longer to reach their ultimate resolution, which is foreclosure in the case of mortgage loans (Capozza and Thompson, 2006).⁴

Third, average final sale prices exceeded borrowers' own estimates at the time of filing, resulting largely from the runup in house prices in the early period of our sample. Despite this, most lenders

³ Because most filers for bankruptcy were already seriously delinquent on their mortgages, without bankruptcy filing, it is reasonable to assume that they would be in foreclosure very soon. Indeed, at the time of filing, about 27 percent of households in our sample were already in foreclosure.

⁴ Capozza and Thomson (2007), however, do not distinguish between chapters 7 and 13. By the nature of the system, chapter 13 filers may still be in bankruptcy 8 months after a 90-day delinquency. Thus, the relevance of their continued presence in bankruptcy over an 8-month period is difficult to interpret.

did not collect enough money to cover the total mortgage outstanding and the mortgage arrearage and, therefore, suffered severe losses. After adjusting for inflation and time cost of money using house price growth, we found that the lender lost an average of \$14,165 per home and the median loss was \$8,187. Assuming an additional 20-percent foreclosure fee (administrative fees, trustee commissions, and legal expenses), the loss increased to \$33,516 for the average house price and \$23,156 for the median price. Put in relative terms, lenders lost, on average, 28 percent of the amount that was owed to them, with one-half of them losing more than 31 percent.

To shed light on the current crisis, we identified important borrower, lender, and loan characteristics, as well as local economic factors that affect homeownership outcomes. We then conducted a counterfactual policy analysis. In particular, we found that, under the assumption that the bankrupt homeowners have similar profiles as in our model, policy reforms that “cramdown” mortgage loan obligations by making mortgage payments more affordable under personal bankruptcy will reduce foreclosure rates, but the effects are likely to be modest.

In summary, this article, to the best of our knowledge, represents the first indepth study of the homeownership experience of households in bankruptcy. It is worth noting that our analysis is limited in two important ways. First, although our bankrupt filers look very similar to those identified in other national studies, our results may not be generalized to the nation because our data came solely from Delaware, a state that is not representative of the nation in terms of bankruptcy provisions. In particular, Delaware has relatively strict bankruptcy and foreclosure laws. For example, in the 2001-to-2002 period, Delaware was one of only two states to have no homestead exemption.⁵ Furthermore, Delaware only admits judicial foreclosure with an average processing period of 190 days, among the highest in the nation. Delaware also permits deficiency judgments. We will discuss these differences more in Section 2. Second and more importantly, given the data’s limitation, our policy analysis was conducted under the assumption that after policy changes, bankrupt homeowners will have similar economic profiles as those identified in our article. This assumption certainly does not hold in the current environment, where households are much deeper in debt. We hope, however, that the current ups and downs in the housing market are temporary. Thus, our results can be viewed as those in a stable real estate market.

In the remainder of the article, Section 2 addresses details regarding foreclosure and bankruptcy laws. Section 3 describes bankrupt households’ characteristics. Sections 4 and 5 report on these households’ homeownership experience and the determinants of their homeownership outcomes and resulting policy implications, respectively. Section 6 concludes the discussion.

Institutional Background

Before our statistical analysis, we provide some institutional background concerning state laws that govern mortgage foreclosures and their interaction with federal personal bankruptcy laws.

⁵ Delaware had a wild-card exemption of \$500. After the 2005 reform, the state increased the homestead exemption to \$50,000.

Foreclosure Laws

When a borrower defaults on a home mortgage, the lender may attempt to recover its losses by repossessing and selling the property. State property laws regarding the judicial foreclosure process, statutory rights of redemption, and deficiency judgments govern this act.

Two types of foreclosures are most commonly used. Foreclosure by judicial sale is available in every state, and it is the required method in many, including Delaware.⁶ Within a foreclosure by judicial sale, the mortgaged property is sold under the supervision of a court, with the proceeds going first to satisfy the mortgage, then to satisfy other lien holders, and finally to the borrower. The second type of foreclosure is foreclosure by power of sale. In this type of foreclosure, the mortgage holder is permitted to sell the property without court supervision. Where it is available, foreclosure by power of sale is generally faster than foreclosure by judicial sale. In Delaware, the average process period is 190 days, which is among the longest in the nation.

After the foreclosure sale is complete, the homeowner can still regain the property if his or her state grants a statutory right of redemption. Homeowners can redeem their property for the foreclosure sale price plus foreclosure expenses for up to a year after the sale, depending on the state. In Delaware, the homeowner has no right to redeem his or her property after the confirmation of the sheriff's sale except for tax foreclosure. If the sale proceeds do not pay off the existing mortgage on the property plus costs, most states, including Delaware, allow the lender to collect a deficiency judgment equal to the lender's foreclosure losses against the borrower's other assets. For more details concerning Delaware's foreclosure laws and their comparison with other states' laws, see Li (2009), Table: State Foreclosure Laws—Comparison.

Homeowner Protection Under Bankruptcy Law

The current personal bankruptcy law contains two chapters: chapter 7 and chapter 13. Filing for bankruptcy under either chapter imposes an automatic stay on all collection efforts by lenders, which includes foreclosure that is already in progress. Only the court can lift the stay during bankruptcy or after the bankruptcy case is terminated. The frequency of the two chapters depends heavily upon judicial district.

Chapter 7 discharges filers' unsecured debt but requires them to surrender any assets that exceed state exemptions.⁷ Homeowners who have built up home equity face the risk that the trustee may sell the home and distribute any equity that exceeds the state homestead exemption to creditors. Chapter 7 personal bankruptcy, nevertheless, has implications for mortgage protection. For example, discharging debt under chapter 7 affords borrowers who have not defaulted on their mortgages or who have worked out agreements with their lenders more available income to make their mortgage payments, thus protecting their homes from judgment liens.

⁶ Of the nation's 50 states, only 15 disallow nonjudicial foreclosure; they are Connecticut, Delaware, Florida, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Nevada, New Jersey, North Dakota, Ohio, and South Carolina.

⁷ The federal personal bankruptcy law allows each state to set its own exemptions for various assets. If the filer has assets that exceed his or her corresponding legal exemption level, then he or she has to surrender the difference between his or her assets and the exemption level.

Unlike chapter 7, chapter 13 permits a defaulting mortgage borrower to propose a plan to cure a mortgage arrearage over time while continuing to make regular mortgage payments outside the plan. If the court confirms the plan, the automatic stay will protect the borrower until the plan is completed, the plan fails and the case is dismissed, or the plan is converted to chapter 7. In the latter two cases, lenders will often petition to have the automatic stay removed. A chapter 13 repayment plan typically lasts for 3 to 5 years. Even homeowners with substantial equity can save their homes by making more payments to unsecured creditors instead of selling their houses as they might have to under chapter 7. Therefore, chapter 13 overrides lenders' contractual and legal rights to pursue foreclosure. For the remainder of the article, we concentrate on chapter 13, because it provides the stronger form of mortgagor protection.⁸

Bankrupt Households' Characteristics

Our data come from four different sources. The main data set contains information on all chapter 13 personal bankruptcies that were filed between August 1, 2001, and August 1, 2002, in New Castle County, Delaware. We collected these data using an electronic service that grants public access to case and docket information from federal bankruptcy courts and the U.S. Party/Case Index, commonly known as Public Access to Court Electronic Records, also known as PACER. This service offers bankruptcy court information, including (1) a listing of all parties and participants, including judges, attorneys, and trustees; (2) a chronology of all events entered in the case record; (3) a claims registry; and (4) the types of documents filed for specific cases and imaged copies of these documents.

The docket sheet and court files allowed us to extract important dates that mark the chapter 13 bankruptcy procedure, including the filing date, the confirmation date, and the dismissal or discharge date as well as the filers' financial and income information at the time of filing and the final outcome of their case. The court files included debtor petitions, attorney disclosure forms, statements of financial affairs, chapter 13 plans, and trustee reports. Each debtor's petition contained schedules labeled A through J that explain his or her financial situation, which includes real property ownership; other personal assets in the form of furniture, cash, or insurance; liabilities such as secured debt and unsecured priority debt (taxes); and maintenance expenses.⁹

Using property addresses and owners' names, we linked this bankruptcy data set with a foreclosure sale database that the Sheriff's Office in New Castle County, Delaware, provided. The sheriff's sale data set lists the sale date, plaintiff, defendant, attorney for the plaintiff, mailing address, and outcome of each foreclosure filing from July 2001 to October 2007. We added foreclosure sale price and the price and date of the last sale before foreclosure to this database, using information

⁸ For further discussion of the treatment of homeowners in bankruptcy before 2005, see Bahchieva, Wachter, and Warren (2005); Berkowitz and Hynes (1999); Lin and White (2001); and White (1998).

⁹ The court files are mostly .pdf images from which information cannot be directly extracted using software. We manually collected all of our data by downloading these images and coding them into a database. The data were entered twice and the corresponding entries were crosschecked. The data were also checked against different sources in which the same information was reported. For instance, the summary of schedules provides headline numbers on filers' assets, debts, income, and expenditures, and petition schedules A through J provide the same information in greater detail.

provided by The Reinvestment Fund of Delaware (TRF). Knowing the last sale date before foreclosure enabled us to calculate owners' tenure in their houses. We obtained the sales histories for properties that did not end up in foreclosure sale and for which TRF does not have price information from the New Castle County Recorder of Deeds.

Finally, we obtained local economic and housing market information by merging 2000 Census survey results with our data, using ZIP Codes to match the census data with properties. This information included percentage of people below the poverty line, median family income, median house value, and median monthly housing costs for mortgaged properties. According to the census, housing costs include mortgage payments, real estate taxes, insurance, and utilities and fuels.

Profiles of Bankrupt Households

Between August 1, 2001, and August 1, 2002, 756 households filed for chapter 13 bankruptcy in New Castle County, which was about 70 percent of all chapter 13 bankruptcies filed in Delaware during that period. Of the 756 filers, 611 owned homes at the time of filing. We excluded filers who owned multiple properties from our sample, because many of these filers appeared to be speculators. We also deleted observations with incomplete information on filers' basic income and balance sheets because of filer-reporting or court-recording errors, and we deleted observations with missing housing price information from TRF and the Recorder of Deeds. The final sample has 567 observations. Of the 567 filers, 291 successfully finished repayment plans and obtained discharge,¹⁰ 11 converted to chapter 7 and obtained discharge via that method, and the rest were dismissed under chapter 13.

At the time of filing, bankruptcy filers in our sample had owned their houses for an average of 7.5 years. The median house tenure was 5 years, and about 7.5 percent of the filers had owned their houses for less than 1 year (see exhibit 1.c).¹¹

We created a proxy for the number of months of mortgage delinquency by dividing the total mortgage arrears (including interest) by the reported monthly mortgage expenses, which often included tax payment. According to our calculation, more than 80 percent of the borrowers in our sample were delinquent on their mortgages at the time of filing, with an average length of delinquency of 10 months (see exhibit 1.b).¹² Of filers, 27 percent were already in the foreclosure process, and 11 percent of those filers, or 3 percent of total filers, listed the county government as the plaintiff.

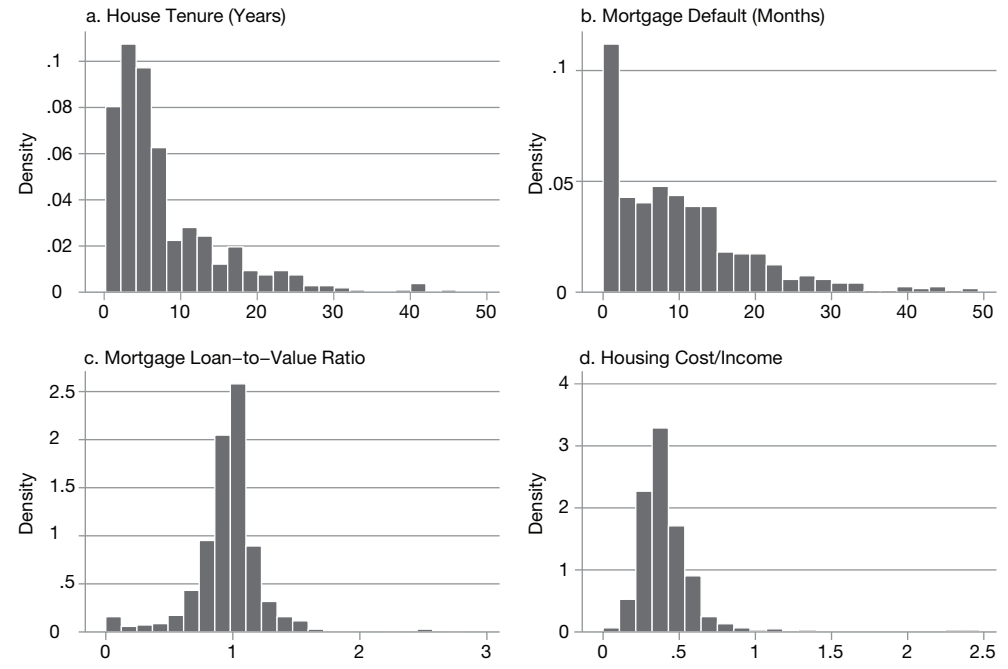
¹⁰ The plan completion rate for our final sample, at 51 percent, is much higher than the 44-percent discharge rate for the whole sample. See Eraslan, Li, and Sarte (2007).

¹¹ For exhibits 1 and 4, the y-axis represents the probability density in percent, and the x-axes are described by their respective subtitles. For example, the x-axis of exhibit 1.a is house tenure in months, exhibit 1.b is months of mortgage delinquency, exhibit 1.c is mortgage loan-to-value ratio, and exhibit 1.d is the ratio of housing cost (defined in the text) and income. Similarly, the x-axis in exhibit 4.a is the number of months between bankruptcy filing and foreclosure sale, exhibit 4.b is the number of months between bankruptcy termination and foreclosure sale, exhibit 4.c is the ratio of sale price to house value, and exhibit 4.d is lenders' loss rate.

¹² Porter (2008) found that mortgage companies often impose unreasonable fees and charges on mortgage claims without borrowers' knowledge. Thus, our calculation of months of mortgage default based on bankruptcy files may overstate the true length of mortgage delinquency.

Exhibit 1

Housing Profiles of Bankrupt Homeowners



In New Castle County, local governments can foreclose if the homeowner fails to pay taxes, incurs severely high sewer and water costs, or incurs other fees such as vacancy fees and mitigation costs.¹³ Redemption rights are denied to foreclosed homeowners except for tax lien foreclosures.

Mortgage borrowing at the point of filing approached or exceeded the value of most bankrupt homeowners' homes. The average mortgage loan-to-value (LTV) ratio was 0.97, and close to one-half of the filers had mortgage debt equal to or in excess of the estimated value of their home at the time of filing (see exhibit 1.c). Even for those who had lived in their current houses for more than 10 years, the average mortgage LTV was 0.94, contrary to expectations.¹⁴ These data imply that high mortgage LTVs among bankrupt homeowners are not entirely attributable to high LTVs at the onset or brief tenure because exotic mortgage contracts, such as interest-only and reverse mortgages, have become popular only recently. These homeowners must have refinanced and increased the outstanding principal on their mortgages before they filed for bankruptcy. Most of the

¹³ Some local governments sell their rights to lenders to collect on tax liens. Often, from the public records data, we cannot tell those sales apart from those tax lien foreclosures initiated by the government. Each bank or tax official has his or her own way of handling a tax lien auction or sale. In New Castle County, the county sheriff's office handles all foreclosures.

¹⁴ When a homeowner purchases a house with a mortgage downpayment of 20 percent, in 10 years, he or she will accumulate home equity exceeding 20 percent of the house value, assuming that he or she makes his or her monthly mortgage payment and the house value does not depreciate substantially. In other words, the mortgage loan-to-value ratio will be lower than 80 percent.

filers' debt was in mortgages: 71 percent for the mean filer and 74 percent for the median, which is comparable to the national average reported by the Federal Reserve's 2001 Survey of Consumer Finances.

We calculated a debtor's housing cost as a combination of four expenses: mortgage payment, property tax payment, insurance payment, and utility payment. Payments that were included in the utility expense were electricity, gas or oil, water, and sewer. To arrive at a measurement of housing affordability, we divided housing cost by households' combined income. We plotted the distribution of this housing affordability measurement in exhibit 1.d. We deem a household to be living in unaffordable housing if it commits more than 50 percent of its income to housing costs. According to our calculation, about 19 percent had unaffordable housing costs. These numbers are comparable to those reported in Eggum, Porter, and Twomey (2008). For the nation as a whole, 12 percent of homeowners have unaffordable housing costs. Finally, mortgage arrears accounted for about one-third of total debt in default, with total debt in default calculated as the sum of mortgage arrears and unsecured priority and nonpriority debt.

To identify subprime loans, we employed a commonly used methodology, using a 2001 U.S. Department of Housing and Urban Development (HUD) listing that classifies lenders as generally making either prime or subprime loans (see www.huduser.org/datasets/manu.html).¹⁵ According to this classification, subprime lenders originate or service about 15 percent of our mortgage loans. We further distinguished lenders as local or nonlocal by defining local lenders as those with headquarters in Delaware, Pennsylvania, or Washington, D.C. According to our classification, about 8.1 percent of the lenders are local.

Exhibit 2 summarizes information on borrowers' mortgage debt. It also contains information related to borrowers' demographics, income, assets, and liabilities. Compared with other Delaware residents, borrowers in our sample are less likely to be married, with only 43 percent of the sample being recorded as married versus 54 percent for overall Delaware households. The average household size is 2.75, which is larger than the state average of 2.54. Filers have stayed with their current job for an average of 5 years, but more than one-half have stayed with the current job for less than 1 year. Approximately 16 percent of the filers list alimony as part of either their monthly income or monthly expenses, suggesting a recent divorce.¹⁶ About 4 percent have experienced a recent unemployment spell.¹⁷ In addition, one-fourth of the filers have previous bankruptcy experience.

As expected, the level of these borrowers' indebtedness is striking when compared with national statistics calculated from the 2001 Survey of Consumer Finances. Specifically, the bankrupt homeowners' total debt has a median of \$129,399, around nine times the national median indebtedness of homeowners, and their median total financial and nonfinancial assets are \$114,901, about 84

¹⁵ The methodology, although imperfect, is used by the Federal Reserve and Harvard University's Joint Center for Housing Studies, among others.

¹⁶ Because many divorces do not result in alimony, our measurement of recent divorce provides only a lower bound of actual divorces and is, therefore, subject to measurement error.

¹⁷ In Delaware, in 2001 and 2002, the unemployment rate was about 5 percent. One requirement of chapter 13 bankruptcy is that filers have a regular job for a meaningful repayment plan.

Exhibit 2

Data Summary: Profiles of Bankruptcy Filers

Variable	Mean	Median	Standard Deviation
Mortgages			
House tenure (years)	7.52	5.07	7.34
Already in foreclosure process (%)	27.2		44.5
Already in tax lien foreclosure (%)	2.8		16.6
Months of mortgage delinquency	9.81	8.38	9.12
Mortgage loan-to-value ratio at time of filing (%)	97.2	98.6	32.5
Mortgage debt/total debt (%)	70.6	74.2	17.8
Monthly housing cost/income (%)	40.7	38.1	19.3
Mortgage arrearage/debt in default (%)	34.7	29.7	29.5
Subprime mortgage lender (%)	14.8		35.6
Local lender (%)	8.1		27.3
Demographics			
Married (%)	43.0		49.6
Household size	2.75	2.50	1.58
Job tenure (years, current job)	5.2	1	8.1
Recently divorced (%)	16.4		37.1
Experienced unemployment spell (%)	3.7		18.9
Borrower hired bankruptcy attorney (%)	96.8	1.00	17.5
Previous bankruptcy experience (%)	24.9		43.2
Income and finance			
Household monthly income (\$)	2,988	2,692	1,409
Total assets (\$)	135,356	114,901	96,479
Total liabilities (\$)	153,306	129,399	94,886
Total debt in default (\$)	43,777	30,867	52,619
Total unsecured debt (\$)	27,671	13,733	46,606
Medical debt/total debt in default > 0.10 (%)	7.6	26.5	0

percent of the corresponding national median. Their median unsecured debt is \$13,733, compared with a national median of \$0 for homeowners.

Our filers, however, are very similar to those filers who are homeowners as identified in the 2001 Consumer Bankruptcy Project and reported in Lawless et al. (2008). For example, the median annual income in our sample is \$32,304 compared with a median income of about \$34,000 in Lawless et al.’s sample of chapter 13 filers who are mostly homeowners. The median home value at the time of filing in our sample is \$100,800 compared with their national sample of \$103,700. The median mortgage debt is \$100,000 compared with their \$91,600.

We estimated a lower bound for medical debts by flagging keywords such as “health,” “medical,” and “Labcorp” that are listed either as the debt type or the associated creditor. This lower bound estimate comes to \$1,141 for the average filer and \$2,915 for the average filer who reported positive medical debt. More than one-third of the borrowers reported positive medical debts, and nearly 8 percent of filers have medical debt at more than 10 percent of their total debt in default. Most of the filers in our data had hired bankruptcy attorneys.

Filers in our sample live in areas spanning 27 five-digit ZIP Codes. Economic conditions differ substantially across the regions. For example, average household annual income is \$17,679 in the poorest neighborhood and \$105,971 in the richest neighborhood. Similarly, the proportion of families living below the poverty line ranges from 0.9 to 24.1 percent. Median home values also vary substantially, from \$71,100 to \$415,200. Median housing costs for mortgaged properties range from \$858 to \$2,385 a month. As mentioned previously, housing costs include mortgage payment, property tax, insurance, and utilities. We calculated the ratio of the filer's estimated home value and the local median home value. Similarly, we calculated filers' income relative to the regional median. Finally, we calculate, for each ZIP Code, the ratio of median housing costs to median home value. All these measures are meant to capture local homebuying and mortgage-lending conditions, which determine how long it takes to auction a house and for how much it will sell.

The Homeownership Experience of Bankrupt Households

We constructed three quantitative measures to capture the homeownership experience of bankruptcy filers. These are—

- 1. House tenure.** For the purpose of this study, we defined house tenure as whether borrowers lost their current houses to foreclosure during the period of our observation. Few households sold their houses voluntarily within chapter 13 plans. We thus treated debtors who sold voluntarily the same as those who remained homeowners through the end of our sample period. Note that our house tenure definition refers to parting with ownership of a particular property. This parting need not be construed as a permanent return to the rental sector.
- 2. Time to foreclosure.** For those whose homes ended up being sold in foreclosure, we measured the time to foreclosure by calculating the gap between the foreclosure sale date and the bankruptcy filing date for those who filed for bankruptcy. For homeowners who did not file for bankruptcy, time to foreclosure is defined as the difference between the foreclosure sale date and the foreclosure initiation date.
- 3. Lender loss rate.** We defined lenders' losses as the difference between the mortgage plus arrearage outstanding and the sale price adjusted for inflation and house price growth. Lender loss rate is the ratio of the losses and mortgage outstanding. We used the sheriff's sale price as the foreclosure sale price if the house was sold to a third party. If the sale was a lender buy-back, we use the price at which the lender subsequently sold the house to a third party. In a few cases, we observed a symbolic \$10 sale price when the lender sold its repossessed house to another institution. We excluded these cases from our analysis of sale prices.

Exhibit 3 presents summary statistics of these three quantitative measures. About 28 percent of debtors lost their houses to foreclosure despite filing for bankruptcy. The foreclosure sale rate rose to 41 percent for those who had been delinquent on their mortgages for 12 months or more. We examined homeowners whose houses were listed as in foreclosure sale between August 1, 2001, and August 1, 2002, and who did not file for bankruptcy, although they are not directly comparable. We found that 43 percent of this group lost their houses to foreclosure by October 2007. Most of the auction sales were lender buy-backs (that is, the sheriff's auction did not generate a third-party sale) although most of the lender buy-back properties were sold to third parties within 1 year.

Exhibit 3

Data Summary: Homeownership Experience of Households in Bankruptcy

Variable	Mean	Median	Standard Deviation
House tenure: losing houses to foreclosure (%)	27.9		45.4
Lender buy-back (%)	18.7		39.0
Third-party sale (%)	9.2		28.9
Bankruptcy filing to foreclosure sale (months)	27.7	24.8	13.4
Filers 6 months or more delinquent at filing	27.3	24.7	13.5
Filers 1 year or more delinquent at filing	26.4	24.8	12.4
Foreclosure sale before the termination of bankruptcy (%)	14.1		34.8
Foreclosure sale price (2001 price, \$)	97,241	90,256	53,707
Lender buy-back (subsequently sold to third party)	99,165	87,171	55,248
Third-party sale	93,732	96,277	51,123
After adjusting for inflation and house price growth			
Sale price/estimated market value at filing	0.91	0.89	0.40
Lender loss/mortgage outstanding at filing	0.28	0.31	0.32

The time-to-sale measurement of bankruptcy filers’ homeownership experience captures the tension between borrowers and lenders in foreclosure sales. When the ultimate outcome is foreclosure sale, the longer a homeowner stays in his or her house without making proper payments, the more benefits the homeowner enjoys and the greater cost the lender bears. In our sample, the average time between bankruptcy filing and foreclosure sale is about 28 months. On balance, the longer a filer has been delinquent at the time of bankruptcy filing, the shorter the time to foreclosure. However, even for filers who were already 1 year delinquent on their mortgage payments at the time of filing and who, without filing for bankruptcy, would most likely be in foreclosure already, the average foreclosure sale did not occur for 26 months. This time to foreclosure is 10 months longer than the average foreclosure sale length, defined as the days between the first foreclosure notice and the eventual sale recorded by the Sheriff’s Office between 2001 and 2007.¹⁸ This finding is consistent with Capozza and Thomson (2006), who, starting in 2001, tracked a sample of seriously delinquent subprime mortgages for 8 months and found that loans that move from delinquency to bankruptcy ultimately resolve in foreclosure and eventual disposition of the real estate collateral (Real Estate Owned, or REO), but the time to get there can be quite extended. About 86 of the foreclosures occurred after the termination of the bankruptcy cases.

Foreclosed houses in our sample sold for, on average, \$97,241 in 2001 dollars, less than the average \$121,149 for which other foreclosed houses were sold between 2001 and 2007 in New Castle County. Third-party sales generated higher median prices but lower average prices than lender buy-backs. A longer time to sale is also associated with a lower sale price; the correlation coefficient of the gap between bankruptcy filing and foreclosure sale and the final foreclosure sale price to third parties adjusted for inflation and house price growth is -0.16.

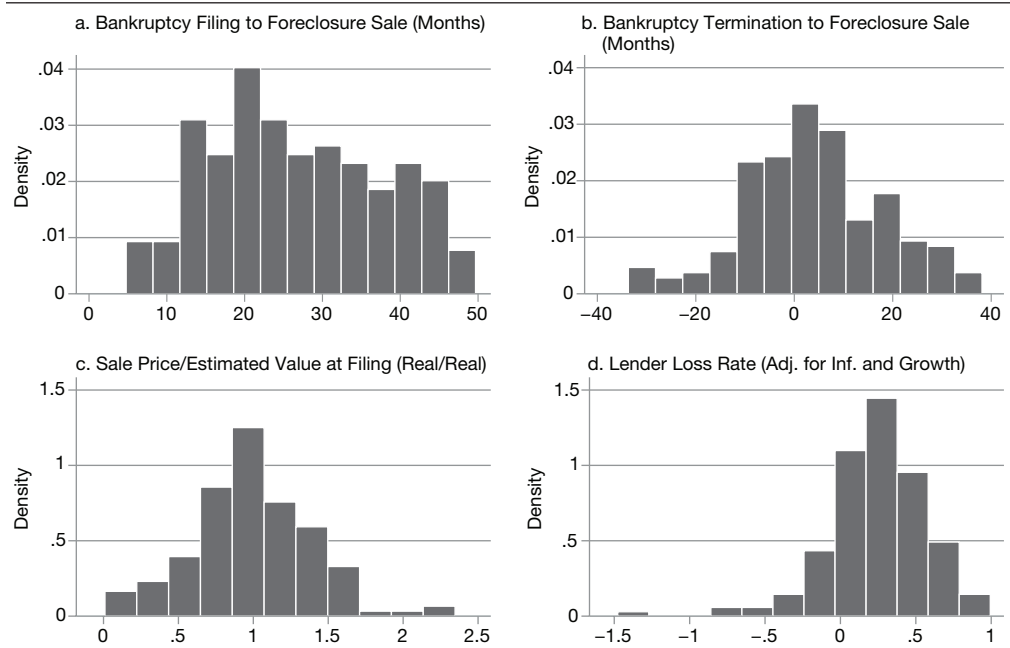
¹⁸ To isolate the worst of the nonfiling homeowners to see if they look more like filing homeowners, we studied the foreclosure length at the 75th percentile for our nonfiling homeowners. The length of the foreclosure is 20 months, which is still one-half year shorter than the foreclosure length of our bankruptcy sample.

Finally, in nominal terms, the foreclosure sale price generally exceeded the estimates that owners made when they filed for bankruptcy because of the overall run-up in house prices during that period.¹⁹ After we adjusted for house price growth using the Office of Federal Housing Enterprise Oversight (OFHEO) house price index, the real sale price amounts to about 91 percent of what homeowners estimated when they filed for bankruptcy. Assuming a 20-percent foreclosure cost,²⁰ we calculated lenders lost, on average, 28 percent of the face value of their debt, and the median loss rate is 31 percent. In absolute terms, the loss was \$33,516 for the average house price and \$23,156 for the median price.

Panels a, b, c, and d of exhibit 4 chart the distribution of the time between foreclosure sale and bankruptcy filing and between foreclosure sale and bankruptcy termination, as well as the ratio of sale price to estimated property value at the time of bankruptcy filing, adjusted for inflation and house price growth and adjusted for lender loss rate.

Exhibit 4

Homeownership Experience of Bankruptcy Filers



¹⁹ Grover, Smith, and Todd (2006) also found in their 2002 sample of mortgage foreclosures in Hennepin and Ramsey Counties, Minnesota, that the strong and appreciating housing market in the early 2000s had a positive effect on the sheriff's foreclosure sale price. Contrary to our findings in the bankruptcy sample, however, they found that most foreclosed properties were sold for more than the outstanding amount due on the mortgage for the foreclosure sample.

²⁰ Stark (1997) found that the costs amounted to 19.1 percent of the final judgment amount—the amount mortgage borrowers owed to lenders—in 1993 foreclosure sales cases and 18.43 percent of the final judgment in the 1994 sale cases.

Empirical Analysis and Policy Implications

In this section, we analyze circumstances related to the loan, borrower, and lender that affect the probability that a certain homeownership result will occur. We then conduct a policy analysis using our empirical model.

Estimation Results

In this subsection, we present the results of our estimation of the three measures of households' homeownership experience after filing for bankruptcy.

Foreclosure Outcome

The first-stage estimation is a Probit estimation of a foreclosure outcome; we estimated the probability that a filer's house would be foreclosed on during our sample period. Our explanatory variables included the following:

- Information on debtors' housing situations at filing as characterized by whether the filer has been more than 1 year delinquent on his or her mortgage.
- Mortgage LTV.
- Whether the house is unaffordable (mortgage-debt-service ratio exceeds 50 percent).
- House tenure.
- Whether the filer was already in foreclosure at the time of bankruptcy filing and, if so, whether it was a tax lien foreclosure.
- Whether the mortgage was lent by a lender classified as subprime.
- Whether mortgage lenders are local.
- Household characteristics, such as previous bankruptcy experience, whether filer hired an attorney, job tenure, marital status, household size, and adverse events the filer may have experienced, such as a recent divorce or unemployment spell.
- Income and financial information, summarized by whether the ratio of medical debt to total debt in default exceeds 10 percent, debt in default as a portion of monthly income, assets relative to total debt, and mortgage arrearage relative to total debt in default.

We also included local economic information, such as filers' income relative to local median income, filers' house value relative to the local median house value, the percent of households living in poverty, and local housing maintenance costs (local median housing costs relative to the local median house value for mortgaged properties).

Finally, we introduced two additional variables to capture filers' expectations regarding local house price and unemployment rate growth rate over the next 5 years at the time of filing. In particular, we used the house price index constructed for Delaware by OFHEO at the annual frequency and the household unemployment rate for New Castle County from the Bureau of Labor Statistics

at the quarterly frequency and a simple (rolling) autoregressive forecast model with four lags as households' forecast model. Thus, filers update their house price forecast annually and their unemployment rate forecast quarterly. Note that we adopted different forecasting frequencies for the two series to avoid perfect collinearity of the two variables. Households that filed for bankruptcy in 2002 expected a higher house price growth rate going forward than those that filed in 2001, which is consistent with ex post movements in house prices at that time. The expectation of unemployment rate growth has no clear quarterly pattern.

Exhibit 5 shows the results of the first-stage estimation. As expected, households that have been delinquent on their mortgages for more than a year and households whose mortgage debt service exceeds 50 percent of their income are more likely to have their houses foreclosed. In particular, the foreclosure probability increases by 17 percentage points if the filer has been more than a year delinquent on mortgages and by 10 percentage points if the house was unaffordable. A house that was already in foreclosure for tax reasons is also more likely to be foreclosed. The probability of foreclosure decreases with house tenure; that is, the longer a household has owned its home, the less likely the house will be foreclosed. It also decreases significantly (by 24 percentage points) if

Exhibit 5

Probit Estimation Result: Foreclosure Outcome

Variable	Estimate	Standard Deviation	Marginal Effect
More than 1 year delinquent on mortgage at filing	0.294*	0.169	0.172
Mortgage loan-to-value ratio	-0.267	1.056	-0.085
Mortgage loan-to-value ratio squared	0.253	0.352	0.081
Housing unaffordable	0.294*	0.168	0.099
House tenure	-0.016*	0.009	-0.005
Already in foreclosure (including tax lien) at filing	0.040	0.142	0.013
Already in tax lien foreclosure at filing	0.676*	0.362	0.250
Subprime mortgage lender	0.060	0.177	0.020
Local lender	-0.202	0.232	-0.060
Previous bankruptcy experience	-0.160	0.154	-0.050
Filer hired attorney	-0.652**	0.328	-0.240
Job tenure	0.002	0.008	0.001
Married	-0.255	0.168	-0.080
Household size	0.016	0.049	0.005
Recently divorced	0.174	0.163	0.058
Unemployment experience	0.559	0.324	0.100
Medical debt exceeds 10% of total debt	0.079	0.230	0.026
Total debt in default/income	0.006	0.004	0.002
Asset/total debt	-0.346	0.433	-0.110
Mortgage arrearage/total debt in default	1.421**	0.614	0.453
Income/local median household income (%)	0.001	0.262	0.001
House value/local median house value (%)	-0.110	0.169	-0.035
Local household living below poverty line (%)	-0.007	0.019	-0.002
Local median annual housing cost/median home value (%)	0.219**	0.096	0.070
Estimated state house price growth rate for the next 5 years	-0.271	0.388	-0.087
Estimated county unemployment rate growth rate for the next 5 years	-0.053	0.054	-0.017

Notes: Dependent variable: 1 if house foreclosed and 0 otherwise. Number of observations: 567. Pseudo R-square: 0.140.

* Indicates significance at the 10-percent level. ** Indicates significance at the 5-percent level.

For dummy variables, marginal effects are calculated for discrete change from 0 to 1.

the filer has hired an attorney. Adverse events, such as unemployment, on the other hand, increase the likelihood of foreclosure significantly. Among financial and income variables, mortgage arrearage relative to total debt in default increases the probability of foreclosure. None of the regional economic variables matter, with the exception of housing costs: in areas with higher local housing costs—measured as the sum of mortgage payment, property tax, utilities, and insurance—it is more likely that the filer will lose his or her house to foreclosure.

Time to Sale

Exhibit 6 reports our second-stage estimation results concerning the time between foreclosure sale and bankruptcy filing. We present results with and without the Heckman selection bias adjustment (Heckman, 1979), and they look similar for variables of significance. Explanatory variables at this stage include, at the time of bankruptcy filing—

- Whether the filer has been delinquent on his or her mortgage payment for more than a year.
- His or her mortgage LTV ratio.
- Whether his or her house is unaffordable, as defined by HUD.
- Whether the house was in foreclosure and, if so, whether it was a tax lien foreclosure.
- Whether the filer hired an attorney.
- Whether the lender is a subprime mortgage lender.

Exhibit 6

Heckman Two-Step Estimation Result: Foreclosure Time

Variable	With Adjustment		Without Adjustment	
	Estimate	Standard Deviation	Estimate	Standard Deviation
More than 1 year delinquent on mortgage at filing	2.224	3.572	- 3.466	2.410
Mortgage loan-to-value ratio	5.733	3.824	- 6.454	8.250
Mortgage loan-to-value ratio squared	0.313	2.217	1.849	1.841
Housing unaffordable	2.969	3.642	- 0.931	2.919
Already in foreclosure at filing	1.396	5.522	0.136	2.485
Tax lien foreclosure	13.49**	6.858	7.833	5.593
Filer hired attorney	0.956	6.295	8.046**	4.800
Subprime mortgage	7.088**	3.686	6.860**	3.452
Lender local	1.396	5.522	4.648	4.854
Income/local median household income	- 5.419	4.870	- 2.039	4.306
House value/local median house value	- 105.588	81.128	- 83.843	76.002
Local household living below poverty line	0.232	0.490	0.163	0.446
Local median annual housing cost/median home value	5.411**	2.320	2.886*	1.682
Estimated state house price growth rate (annual, %)	- 13.765*	7.788	- 12.446*	7.109
Estimated county unemployment rate growth rate (annual, %)	- 1.386	1.089	- 0.859	0.968
Mills ratio	15.114**	6.363		

Notes: Dependent variable: foreclosure sale date minus bankruptcy filing date. Number of observations: 553. Observations: 146. χ -square: 35.65. Adj. R-squared: 0.141.

* Indicates significance at the 10-percent level. ** Indicates significance at the 5-percent level.

- Whether the lender is headquartered in Delaware, Pennsylvania, or Washington, D.C.
- Local ZIP Code-level economic information summarized by the filer's income relative to the local median household income.
- The filer's estimated house values relative to the median local house value, local poverty rate, and local housing costs as a percentage of median house value.
- The filer's expectation of future house price and unemployment rate movement at the time of filing.

The other variables regarding filers' income and financial information and demographics affect the time to sale only through their effect on the probability of the house being foreclosed.²¹

Among all these variables, the ones that explain the time to sale at the 5- or 10-percent statistical significance levels are—

- Whether the foreclosure was initiated by the county government because of tax delinquencies.
- Whether the mortgage is subprime.
- Local housing affordability as measured by loan median annual housing cost relative to median house value for houses with mortgages.
- The estimated house price growth rate over the next 5 years.

Tax lien foreclosures substantially lengthen the time between the bankruptcy filing and the foreclosure sale (by about 13 months). This is because tax lien foreclosure in Delaware is the only foreclosure that provides borrowers redemption rights for up to a year. The presence of redemption rights complicates the foreclosure process and discourages potential buyers from purchasing the property. It also takes longer to foreclose houses in areas with higher housing costs and houses with subprime mortgages. By contrast, foreclosed houses sell faster at times when households expect higher housing price growth.

Lender Loss Rate

Exhibit 7 presents the second-stage estimation results regarding lenders' loss rate. Remember that the loss rate equals the sum of the sales price adjusted for inflation, local house price appreciation, and transaction cost, minus mortgage outstanding, all as a proportion of mortgage outstanding. Note also that, for lender buy-backs, we used the price at which the lender subsequently sold the property to a third party. In the event that the sale price was booked at a symbolic \$10 or less, we excluded the observation from our estimation.

The explanatory variables in the second stage are exactly the same as those used to estimate time to sale. To reiterate, the variables included at bankruptcy filing are whether filers have been late on their mortgage payment for more than a year; mortgage LTV ratio; whether housing cost exceeds

²¹ We exclude homeowners' income and finance variables in our second-stage estimation to achieve identification. These household-specific variables affect the time to sale mainly through their influence on whether the house will be foreclosed in the first place.

Exhibit 7

Heckman Two-Step Estimation Result: Lender Loss Rate

Variable	With Adjustment		Without Adjustment	
	Estimate	Standard Deviation	Estimate	Standard Deviation
More than 1 year delinquent on mortgage at filing	- 0.083	0.082	- 0.014	0.048
Mortgage loan-to-value ratio	0.570**	0.222	0.959**	0.174
Mortgage loan-to-value ratio squared	- 0.094**	0.046	- 0.159**	0.039
Housing unaffordable	- 0.103	0.079	- 0.056	0.058
Already in foreclosure (including tax lien) at filing	- 0.023	0.063	- 0.007	0.048
Already in tax lien foreclosure	- 0.014	0.143	0.088	0.111
Filer hired attorney	0.032	0.131	- 0.065	0.100
Subprime mortgage	0.083	0.082	0.082	0.070
Lender local	- 0.206**	0.106	- 0.220**	0.089
Income/local median household income	0.054	0.101	- 0.117	0.086
House value/local median house value	0.171**	0.063	0.231**	0.050
Local household living below poverty line	0.019*	0.011	0.009	0.009
Local median annual housing cost/median home value (%)	- 0.092	0.061	- 0.021	0.036
Estimated state house price growth rate (annual, %)	- 0.205	0.167	- 0.209	0.143
Estimated county unemployment growth rate (annual, %)	0.013	0.022	0.005	0.019
Mills ratio	- 0.166	0.151		

Notes: Dependent variable: sale price adjusted for inflation, local house price appreciation and transaction cost, and net of mortgage outstanding/mortgage outstanding. Number of observations: 553. Observations: 146. χ -square: 49.85. Adj. R-squared: 0.306.

* Indicates significance at the 10-percent level. ** Indicates significance at the 5-percent level.

50 percent of household income; whether the household was already in foreclosure and, if so, whether it was a tax lien foreclosure; whether the filer hired an attorney; the same lender information that was used in the first stage, including whether the lender is a subprime mortgage lender and whether the lender is headquartered in Delaware, Pennsylvania, or Washington, D.C.; lender and local ZIP Code-level economic information summarized by filers' income relative to the local median household income; filers' estimated house values relative to the median local house value; the local poverty rate; and local housing costs as a percentage of median house value.

The results appear similar with and without the Heckman selection bias adjustment (Heckman, 1979) for significant explanatory variables. As expected, lenders incur larger losses with houses that have higher mortgage LTV ratios, although the increase in loss rate declines with LTV ratios. Local lenders are able to fetch a higher relative price, likely because of their familiarity with local market conditions. In terms of local market conditions, foreclosure sales also cause large losses in areas with more households living below the poverty line.

Policy Implications

In response to the housing crisis, many suggested repealing the antimodification provision of the Bankruptcy Code to improve bankruptcy relief and thus help families struggling with unaffordable home loans. For example, one proposal would allow federal judges to lengthen terms, cut interest

rates, and reduce mortgage balances of homeowners in bankruptcy.²² A complete analysis of the effect of such a reform bill would require a structural model that deals explicitly with the feedback effect. In other words, the analysis must consider that households will respond to such a bill by changing their portfolios, by altering their bankruptcy filing decisions, and even by adjusting their labor supply.

Without such a structural model and the appropriate data that would allow us to control for these effects, we used our data and our analysis to make some inferences. Remember that the analysis we undertook has limitations. First, our data came only from Delaware. As we have noted in the introduction and the section on institutional background, Delaware is not representative of the nation, either in terms of its bankruptcy law or its economic characteristics, such as demographics and industry distribution. Second, our analysis assumed that the change in the law does not alter the characteristics of those who file for bankruptcy under chapter 13. This assumption certainly does not apply in the current economic environment. For example, in our sample, at the time of filing, 43 percent of the homeowners had a mortgage LTV ratio that exceeded 1 (that is, these households owed more than the value of their house); 10 percent of the filers had mortgage LTV ratios of more than 1.20. In the current environment, these numbers are much higher. That said, today's real estate market is likely to be unusual even from a historical perspective. We are unlikely to see such an extreme boom-bust in the near future. In a way, our analysis can be viewed as the effect of cramdown in a stable real estate market.

Keeping the two limitations of our analysis in mind, we now turn to our empirical model to estimate the short-run effect of several reforms. About 28 percent of homeowners eventually lost their houses to foreclosure sales. About 20 percent of the homeowners in our data have unaffordable mortgages (that is, the monthly mortgage payment, plus tax and utility costs, exceeds 50 percent of their monthly income). If we reduced these households' mortgage burdens so that the monthly payment-to-income ratio fell below 50 percent without changing all the other variables, the foreclosure rate fell by 2 percentage points ($0.20 * 0.10$ [the marginal effect of the dummy variable that indicates that the mortgage payment-to-income ratio is below 50 percent from exhibit 5]=0.02), from 28 to 26 percent. By comparison, dealing with borrowers early in their delinquency proves more effective at reducing foreclosures. For example, in a sample of homeowners who resemble our data sample except that no homeowner has been more than 1 year delinquent on his or her mortgage payment, the total foreclosure rate will be reduced by 6 percentage points. 34 percent of the filers are more than 1 year late on their mortgage, and the marginal effect of being more than 1 year delinquent on a mortgage in foreclosure is 0.172 (exhibit 5), so the default rate will be reduced by $0.34 * 0.172 = 0.06$. The proposed reform is likely to have little direct effect on foreclosure sale time because it depends heavily on the conditions of local housing markets. The mortgage LTV ratio alters the effect on lenders' loss rates significantly. The more important question here is, "Who will bear the cost of the lower mortgage payment or lower mortgage obligation—the taxpayer or lenders themselves?"

²² H.R. 200, Helping Families Save Their Homes in Bankruptcy Act of 2009. Available at <http://thomas.loc.gov/>.

As we stressed previously, our policy analysis is conducted under strong assumptions (for example, we assume that after policy changes, filers' profiles remain unchanged). A complete assessment of the reform bill obviously requires a structural model that takes into account not only borrowers' response to the new incentives but also lenders' ability—or lack thereof—to pass all or some of the potential costs back to the borrowers in the form of higher interest rates or smaller loans, or both.

Conclusions

In this article, we constructed a unique data set that tracks the homeownership experience of chapter 13 bankruptcy filers for 5 to 6 years after their initial filings. We found that about 28 percent of filers lost their houses to foreclosure. Confirming the conventional belief, filing for bankruptcy adds a little more than a year to a normal foreclosure process. Although foreclosure sale price, in nominal terms, exceeds a filer's own estimates at filing, about 65 percent of lenders still lost money, and the average loss amounted to 28 percent of what was owed to the mortgage lender. Our results, therefore, suggest that personal bankruptcy appears to provide homeowners with additional breathing room to try to cure their delinquent mortgages and, thus, to keep their houses.

Preliminary policy analysis indicates that, assuming that bankruptcy homeowners' characteristics remain unchanged, policy reforms that cram down mortgage loan obligations by making mortgage payments more affordable or reducing total mortgage obligations will reduce foreclosure rates. The effects, however, are likely to be modest. Helping homeowners before they are too far behind on their mortgage payments, on the other hand, has the most effect.

Obviously, a complete assessment of the proposed policy changes would require more detailed national data and further structural analysis. We leave that to future research.

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References

- Ambrose, Brent W., Richard J. Buttimer, Jr., and Charles A. Capone, Jr. 1997. "Pricing Mortgage Default and Foreclosure Delay," *Journal of Money, Credit, and Banking* 29 (3): 314–325.
- Bahchieva, Raisa, Susan Wachter, and Elizabeth Warren. 2005. "Mortgage Debt, Bankruptcy, and the Sustainability of Homeownership." In *Credit Markets for the Poor*, edited by Patrick Bolton and Howard Rosenthal. New York: Russell Sage Foundation.
- Berkowitz, Jeremy, and Richard Hynes. 1999. "Bankruptcy Exemptions and the Market for Mortgage Loans," *Journal of Law and Economics* 42: 809–830.
- Capozza, Dennis, and Thomas Thomson. 2006. "Subprime Transitions: Lingering or Malingering in Default," *Journal of Real Estate Finance and Economics* 33 (3): 241–258.
- Chomsisengphet, Souphala, and Ronel Elul. 2006. "Bankruptcy Exemptions, Credit History, and the Mortgage Market," *Journal of Urban Economics* 5: 171–188.
- Eggum, John P., Katie Porter, and Tara Twomey. 2008. "Saving Homes in Bankruptcy: Housing Affordability and Loan Modification," *Utah Law Review*: 1123.
- Eraslan, Hulya, Wenli Li, and Pierre-Daniel Sarte. 2007. *The Anatomy of U.S. Personal Bankruptcy Under Chapter 13*. Working paper 07-31. Philadelphia, PA: Federal Reserve Bank of Philadelphia.
- Gerardi, Kristopher, Adam Hale Shapiro, and Paul S. Willen. 2007. *Subprime Outcomes: Risky Mortgages, Homeownership Experiences, and Foreclosures*. Working paper 07-15. Federal Reserve Bank of Boston.
- Grover, Michael, Laura Smith, and Richard M. Todd. 2006. *Targeting Foreclosure Interventions: An Analysis of Neighborhood Characteristics Associated With High Foreclosure Rates in Two Minnesota Counties*. Report prepared for Federal Reserve Bank of Minneapolis Community Affairs.
- Heckman, James J. 1979. "Sample Selection Bias as a Specification Error," *Econometrica* 47 (1): 153–161.
- Jacoby, Melissa. 2007. "Bankruptcy Reform and Homeownership Risk," *University of Illinois Law Review* 323 (1): 323–346.
- Lambrecht, Bart M., William R.M. Perraudin, and Steven Satchell. 2003. "Mortgage Default and Possession Under Recourse: A Competing Hazards Approach," *Journal of Money, Credit, and Banking* 35 (3): 425–442.
- Lawless, Robert M., Angela K. Littwin, Katherine M. Porter, John A.E. Pottow, Deborah K. Thorne, and Elizabeth Warren. 2008. "Did Bankruptcy Reform Fail? An Empirical Study of Consumer Debtors," *American Bankruptcy Law Journal* 82: 349–405.
- Levitin, Adam. 2009. "Resolving the Foreclosure Crisis: Modification of Mortgages in Bankruptcy," *Wisconsin Law Review*: 565–655.

Levitin, Adam, and Joshua Goodman. 2008. The Effect of Bankruptcy Strip-Down on Mortgage Markets. Georgetown University Law Center Business, Economics and Regulatory Policy working paper series 1087816. Washington, DC: Georgetown University Law Center.

Li, Wenli. 2009. "Residential Housing and Personal Bankruptcy," *Economic Quarterly, Federal Reserve Bank of Philadelphia*: 19–29.

Li, Wenli, and Michelle White. 2009. Mortgage Default, Foreclosure, and Bankruptcy. National Bureau of Economic Research (NBER) working paper 15472.

Li, Wenli, Michelle White, and Ning Zhu. 2010. Did Bankruptcy Reform Cause Mortgage Default Rates to Rise? The Federal Reserve Bank of Philadelphia working paper 10-5.

Lin, Emily Y., and Michelle J. White. 2001. "Bankruptcy and the Market for Mortgage and Home Improvement Loans," *Journal of Urban Economics* 50: 138–162.

Long, Cheryl. 2005. Negative Effects of Bankruptcy for Home Owners: Reduced Access to Credit and Lost Option Value. Unpublished.

Morgan, Donald, Benjamin Iverson, and Matthew Botsch. 2008. *Seismic Effects of the Bankruptcy Reform*. Staff report 358. New York: Federal Reserve Bank of New York.

Norberg, Scott, and Andrew Velkey. 2007. "Debtor Discharge and Creditor Repayment in Chapter 13," *Creighton Law Review* 39 (3): 473–560.

Pence, Karen. 2006. "Foreclosing on Opportunity: State Laws and Mortgage Credit," *Review of Economics and Statistics* 88: 177–182.

Pennington-Cross, Anthony. 2006. The Duration of Foreclosures in the Subprime Mortgage Market: A Competing Risks Model With Mixing. Working paper 2006-027. St. Louis: Federal Reserve Bank of St. Louis.

Porter, Katherine. 2008. "Misbehavior and Mistake in Bankruptcy Mortgage Claims," *Texas Law Review*: 121.

Stark, Debra P. 1997. "Facing the Facts: An Empirical Study of the Fairness and Efficiency of Foreclosures and a Proposal for Reform," *University of Michigan Journal of Law Reform* 30: 639–688.

White, Michelle J. 1998. "Why Don't More Households File for Bankruptcy?" *Journal of Law, Economics and Organization* 14: 205–231.

White, Michelle J., and Ning Zhu. 2010. "Saving Your Home in Chapter 13 Bankruptcy," *Journal of Legal Studies*: 33–62.