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Saving Your Home in Chapter 13 Bankruptcy

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ABSTRACT

This paper examines how filing for bankruptcy under Chapter 13 helps financially distressed homeowners. We develop a model of debtors' decisions to default on their mortgages and file for bankruptcy and evaluate it using a new data set of debtors who filed for bankruptcy under Chapter 13 in 2006. We also examine the effect of introducing cram down of residential mortgages in Chapter 13, which would reduce the total amount that debtors owe. We find that 96 percent of Chapter 13 filers are homeowners and 79 percent of filers repay mortgage debt in their repayment plans, while just 9 percent of filers replay only unsecured debt in their plans. Thus, filers use Chapter 13 almost exclusively as a save-your-home procedure. Under current law, only about 1 percent of Chapter 13 filers who would otherwise have defaulted save their homes, but this fraction would increase to 10 percent if cram down were introduced. We estimate that the cost to lenders of cram down would be $264,000 per home saved and $30 billion in total.

INTRODUCTION

This paper has three goals. First, it examines how filing for bankruptcy under Chapter 13 helps financially distressed debtors save their homes. Chapter 13 helps debtors save their homes by stopping foreclosure, giving them extra time to repay mortgage arrears, and increasing their ability to repay their mortgages by discharging some or all of their

unsecured debt. Second, this paper presents new evidence that nearly all debtors who use Chapter 13 are homeowners who wish to save their homes. This is despite the fact that a major bankruptcy reform adopted in 2005 was intended to force bankruptcy filers with higher incomes to repay some of their unsecured debt in Chapter 13.[1]

Third, this paper investigates how bankruptcy can be used to address the foreclosure crisis by allowing bankruptcy judges to "cram down" (partially forgive) mortgage debt in Chapter 13 when debtors' mortgages exceed the value of their homes. The mortgage crisis has caused and continues to cause many homeowners to lose their homes. Housing pundits estimate that 2–3 million homeowners have lost their homes to foreclosure since 2007 and that an additional 2 million are in default. An additional 14 million homeowners are current on their mortgage payments but might default because their mortgages are under water (Zandi 2008; Center for Responsible Lending 2008; Stolberg and Andrews 2009). Foreclosures are very costly to both borrowers and lenders. Borrowers must bear the cost of relocating—their children must change schools, they lose their neighborhood ties, and some become homeless. Lenders lose because the transactions costs of foreclosure are high and homes decrease in value while waiting to be resold. Foreclosures also harm neighborhoods because foreclosed homes cause blight, and they harm localities by reducing property tax payments and squeezing local governments' budgets.[2] Foreclosures also lead to yet more foreclosures by pushing down home prices, making it more difficult for homeowners to refinance and encouraging additional defaults.

Because foreclosure is costly to both borrowers and lenders, it would be in their joint interest to deal with the mortgage crisis by renegotiating mortgages rather than opting for default and foreclosure. However, very few renegotiations have in fact occurred; reports from Moody's indicate that, of subprime loans coming up for interest rate increases, only 1 percent were renegotiated in 2007 (Drucker and Fricke 2007) and 3.5

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1. The 2005 bankruptcy reform (Bankruptcy Abuse Prevention and Consumer Protection Act, Pub. L. No. 109-8, 119 Stat. 23) instituted a means test that prevents higher income debtors from filing under Chapter 7, where their unsecured debts would be discharged. Mann (2007) discusses the role of credit card lenders in writing and lobbying for the 2005 reform, and White (2007b) discusses its economic effects.

2. Pew Charitable Trusts (2008) estimates that foreclosures have caused the aggregate value of nearby homes to decrease by around $350 billion.

percent in 2008 (U.S. Senate 2008).[3] This is in part because most mortgages have been repackaged into mortgage-backed securities, where ownership is divided among multiple security holders who have divergent interests. As a result, lenders are unlikely to agree on changes in the payment terms.[4] In addition, all mortgages have a servicer who acts on behalf of security holders, but mortgage-servicing contracts compensate servicers only for the costs of foreclosing, not for the costs of renegotiating. These contracts also limit or prohibit servicers from changing the terms of the underlying mortgages.[5] Another problem is that many homes in default have second mortgages, and second-mortgage holders can prevent modification or refinancing of first mortgages until the second mortgage is paid off. Because many second mortgages are now worthless, lenders' best strategy is block modifications and refinancing unless they are paid for giving up their claims.

Both the Bush and Obama administrations initiated programs intended to encourage renegotiation of mortgages. However, getting servicers and lenders to participate in these programs has been a major stumbling block. The Bush administration's programs were voluntary on the part of servicers and lenders, who refused to participate.[6] The Obama administration's programs are designed to encourage servicers and lenders to participate by paying them for each modified mortgage. Second-mortgage holders are also compensated if they agree to modi-

3. Even when renegotiation occurs, lenders often just add the arrears to the mortgage, so debtors' payments increase rather than decrease. See Drucker and Fricke (2007) and Zandi (2008).

4. Mortgage-backed securities divide mortgages among multiple owners whose claims have different priorities. This means that any change in terms is likely to make one group of security holders better off and others worse off.

5. Servicers keep late fees and penalties imposed on debtors in default, which means that servicers gain from foreclosing if they can collect the fees, and they have little incentive to renegotiate if doing so means that the fees are dropped. See Porter (2008) for a study of fees imposed by mortgage lenders on debtors in bankruptcy.

6. Bush administration programs included Hope Now, which encouraged voluntary renegotiation, and Hope for Homeowners, under which the federal government would provide new, fixed-rate, 30-year mortgages to replace subprime mortgages if lenders agreed to accept 85 percent of the current market value of the house. Virtually no renegotiations occurred under these programs (Associated Press 2008). The Obama administration program, Home Affordable Modification, calls for lenders to reduce debtors' mortgage payments to 38 percent of their incomes, in which case the federal government will match additional reductions dollar for dollar to bring the payments down to 31 percent of debtors' income. Another Obama administration program offers new, low-interest mortgages to homeowners, as long as their current mortgages are no more than 5 percent under water and are held by Fannie Mae or Freddie Mac. See Andrews (2009) and U.S. Department of the Treasury (2009) for discussion.

fications of first mortgages. These programs may still fail, however, because they do not address the preference of first-mortgage holders for foreclosure over renegotiation. First-mortgage holders generally do not favor programs to modify mortgages because they predict that these programs will encourage many homeowners to demand modifications when they otherwise would repay their mortgages in full. Lenders face a mix of distressed debtors who apply for mortgage modifications because they cannot afford their mortgage payments and strategic debtors who apply but would otherwise pay their mortgages in full. Because lenders cannot perfectly identify individual debtors' types, they gain from adopting a tough bargaining stance in which they never (or rarely) modify mortgages, to discourage strategic debtors from applying. However, when lenders adopt a tough bargaining stance, the result is that distressed debtors end up in foreclosure.[7]

In contrast, changing bankruptcy law so that bankruptcy judges could cram down mortgages in Chapter 13 would prevent foreclosures even when servicers or lenders refuse to modify mortgages. It would, therefore, complement the new government programs to address the housing crisis. The Obama administration has endorsed cram down in bankruptcy for debtors who "have run out of options" (U.S. Department of the Treasury 2009, p. 7).

In this paper, we first discuss the treatment of homeowners in Chapter 13 bankruptcy under current law. Then we develop a combined model of debtors' decisions to default on their mortgages and to file for bankruptcy under Chapter 13. The model is first used to examine the effect of a new (and probably unintended) subsidy to homeowners from unsecured creditors that was a result of the 2005 bankruptcy reforms. This subsidy reduces debtors' obligation to repay credit card and other unsecured debt by a dollar for each additional dollar of mortgage debt. We refer to it as the credit card subsidy, because most unsecured debt is credit card debt. The model is then used to examine the effect of introducing mortgage cram down in bankruptcy. We evaluate the model's predictions using a new data set of debtors who filed for bankruptcy under Chapter 13 in 2006. The final section of the paper discusses policy implications.

7. See Foote, Gerardi, and Willen (2008) for a study of Massachusetts housing markets during the downturn of the early 1990s. The authors found that less than 10 percent of debtors with underwater mortgages actually defaulted, presumably because lenders refused to modify their mortgages. See White (1998) for a similar model applied to debtors' bankruptcy decisions.

The most important result of this paper is that Chapter 13 functions as a "save your home" bankruptcy procedure, as shown by the fact that 96 percent of Chapter 13 filers are homeowners and 77 percent of debtors file under Chapter 13 voluntarily instead of being forced to do so. Among debtors who file for Chapter 13 repayment plans, 79 percent repay mortgage arrears and 45 percent repay car loans (some repay both), whereas just 9 percent repay only unsecured debt. Although nearly all debtors who file under Chapter 13 do so to save their homes, our model suggests that the credit card subsidy causes less than 1 percent of them to save their homes when they would otherwise have defaulted. However, if cram down of mortgages in Chapter 13 were introduced, our model predicts that there would be a 10-fold increase in the number of Chapter 13 filers who save their homes. This is because the average cram-down subsidy of $134,000 in present-value terms is much larger than the average credit card subsidy of $10,000.

1. TREATMENT OF HOMEOWNERS IN BANKRUPTCY: CURRENT LAW AND PROPOSED REFORMS

How does filing for bankruptcy help financially distressed homeowners save their homes? Filing for bankruptcy does not help homeowners directly because, under current law, they must either repay their mortgages in full or give up their homes, whether or not they file.[8] Nonetheless, bankruptcy helps homeowners in several ways. First, when debtors file under Chapter 13, mortgage lenders are stayed (prevented) from foreclosing during the bankruptcy procedure. Debtors can retain their homes by repaying the arrears on their mortgages—including past-due interest, principal, and penalty payments—as part of a repayment plan that usually lasts for 5 years. They must also pay interest on the arrears and make all the normal mortgage payments that are due during the plan. Once the arrears are paid, the original mortgage contract is reinstated. Thus, Chapter 13 gives financially stressed debtors breathing space to

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8. Prior to 1993, bankruptcy judges had the power to cram down mortgage loans. The prohibition on cram down of mortgages in bankruptcy is based on the Supreme Court's decision in *Nobleman v. American Savings Bank* (508 U.S. 324 [1993]) and on 11 U.S.C. sec. 1322(b)(2), which prevents bankruptcy judges from discharging any mortgage debt secured only by a primary residence, even if the value of the house is below the mortgage principal. In addition, 11 U.S.C. sec. 1322(c)(1) allows debtors to cure defaults on their mortgages in Chapter 13, as long as the residence has not been sold in foreclosure. For discussion, see Bourguignon (2007) and Levitin and Goodman (2008).

save their homes. Car loans are treated the same way in Chapter 13, so debtors can also use Chapter 13 to save their cars.[9] Second, the bankruptcy trustee may help debtors challenge excessive fees and penalties imposed by lenders.[10] Third, the credit card subsidy increases Chapter 13 filers' ability to repay their mortgages and/or car loans by discharging some or all of their unsecured debt. For each additional dollar that debtors owe on their mortgages and car loans, an additional dollar of unsecured debt is discharged in Chapter 13.

In contrast, financially distressed debtors who file for bankruptcy under Chapter 7 receive little help in saving their homes because filing under Chapter 7 does not prevent mortgage lenders from foreclosing or allow debtors to spread out repayment of arrears. However, Chapter 7 helps homeowners who do not wish to save their homes because their unsecured debt is discharged and they are not required to repay anything from their future incomes.[11]

These rules imply that distressed homeowners who wish to save their homes are likely to file for bankruptcy under Chapter 13, whereas debtors who do not own homes are likely to file under Chapter 7. Previous evidence is consistent with this prediction. Eraslan, Li, and Sarte (2007) found that over 80 percent of a sample of Chapter 13 filers in 2001–2 were homeowners, and Zhu (forthcoming) found that 86 percent of a sample of Chapter 13 filers in 2003 were homeowners. In contrast, homeowning is much less important among Chapter 7 bankruptcy filers; Zhu (forthcoming) found that only 47 percent of his sample of Chapter 7 bankruptcy filers in 2003 were homeowners.

Prior to the 2005 bankruptcy reform, all debtors had the right to choose between Chapters 7 and 13, but the 2005 bankruptcy reform changed this by requiring some higher income debtors to file under Chapter 13 and to repay part of their unsecured debt from future income if they file for bankruptcy. This change implies that, in theory, post-2005 Chapter 13 filers will consist of a mixture of financially distressed homeowners who file to save their homes and higher income debtors who file

9. Debtors must repay the car loans in full during their repayment plans (Whitford 2007).

10. Porter (2008) found that mortgage lenders add questionable or excessive fees in half of all foreclosures.

11. Some homeowners use Chapter 7 to negotiate with mortgage lenders, but they must repay arrears more quickly than in Chapter 13 in order to prevent foreclosure. Some states also have programs to prevent foreclosure outside of bankruptcy by allowing debtors a certain period of time to repay arrears (Jacoby 2008).

because Chapter 13 is the only bankruptcy procedure open to them. We examine this issue in Section 4.

We also investigate the effects of introducing mortgage cram down in Chapter 13. The legal theory of cram down is that underwater mortgages can be divided into two parts: a secured part equal to the current market value of the house and an unsecured part equal to the mortgage principal minus current market value. Under cram down, the unsecured part of the mortgage would be treated like any other unsecured loan and would be partly or fully discharged in Chapter 13. Adopting cram down would equalize the treatment in bankruptcy of mortgages on debtors' principal residences and other secured debts because bankruptcy law already allows for cram down of mortgages on rental properties and vacation homes.[12]

2. MODEL

In this section, we model debtors' decisions to file for bankruptcy and to default on their mortgages under current bankruptcy law. Suppose in period 0 debtors borrow an amount P in the form of unsecured debt (such as credit card or medical debt), an amount M in the form of a mortgage, and an amount A in the form of an automobile loan. In period 1, debtors owe P', M', and A' on the three loans, respectively. The terms P', M', and A' include the discounted present value of principal and interest payments, plus arrears, late fees, and penalties. In addition, M' and A' include interest on the arrears, and M' may include additional interest owed because the mortgage had a low initial teaser rate but a higher rate thereafter. To keep the theory simple, we assume that debtors always repay their car loans in full. In Section 4, however, we take account of the fact that debtors may give up their cars rather than repay their car loans in bankruptcy.

Both housing value and debtors' incomes in period 1 are assumed to be uncertain. At the beginning of period 1, the value of the house is drawn from a distribution and income is drawn from an independent distribution. The realized value of the house is denoted V, and realized income per year is denoted Y. To keep the model simple, housing value

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12. However, cram down of car loans was restricted under the 2005 bankruptcy reform (Whitford 2007 and Levitin and Goodman (2008).

and income are assumed to remain constant thereafter.[13] Automobile value, in contrast, is known with certainty and is assumed to remain constant over time.

After learning V and Y, debtors decide whether to default on their mortgages and whether to file for bankruptcy. Although most debtors are already behind on their mortgage payments at the time they file for bankruptcy, we use the term "default" to refer to debtors' decisions to abandon their homes and move to rental housing. If debtors default but do not file for bankruptcy, then mortgage lenders are assumed to foreclose on the house. If debtors default and file for bankruptcy under Chapter 13, mortgage lenders cannot foreclose during the bankruptcy procedure, and debtors are allowed to remain in their homes while they repay mortgage arrears as part of their repayment plans.

If foreclosure occurs, the mortgage lender sells the house. The proceeds are first used to pay the cost of foreclosure, denoted C_f; second, the mortgage (first mortgage, then second mortgage) is paid; third, an amount up to the state's homestead exemption, denoted X_h, goes to the homeowner; and fourth, unsecured debt is paid.[14] All claims are paid in full until the proceeds of sale are exhausted. If anything remains after unsecured debt is repaid in full, it goes to the homeowner.

Debtors who file for bankruptcy must also pay bankruptcy costs of C_b, where C_b includes lawyers' fees, filing fees, trustees' fees, and the cost of taking required credit counseling and debt management courses. We assume that debtors pay C_b in full at the time of filing.[15] The term C_b is assumed to be less than P', because otherwise debtors would never file for bankruptcy.

Now consider how debtors' obligation to repay in Chapter 13 is determined. Consider the mortgage first and suppose the payments are divided into two parts. The first part consists of arrears and interest on arrears, plus normal interest and principal payments owed during the 5-year repayment period. The discounted present value of these payments is denoted M_1'. The second part consists of normal interest and

13. The model here is intentionally simplified because of the nature of the data on Chapter 13 bankruptcy filings. For dynamic models of bankruptcy, see Livshits, MacGee, and Tertilt (2007) and Eraslan, Li, and Sarte (2007).

14. If the house sells for less than the amount owed, then the mortgage lender may have an unsecured recourse claim for the remainder. See Pence (2006) for discussion of which states prohibit recourse claims.

15. Some bankruptcy costs are paid over the course of the repayment plan rather than at the time of filing. We take account of this in Section 4.

principal payments due from year 6 until the end of the mortgage con-
tract. Assume that the mortgage contract has N years remaining. The
discounted present value of debtors' future mortgage payments from
year 6 until year N is denoted M'_2. The present value of mortgage pay-
ments during and after the repayment plan sum to the present value of
debtors' total mortgage payments, or $M'_1 + M'_2 = M'$.

As an example, suppose the debtor has a 30-year mortgage with
normal mortgage payments of $750 per month, or $9,000 per year. As
of the beginning of year 2, the debtor owes arrears equal to 4 months
of payments, or $3,000, plus late fees, penalties, and interest on these
payments that total $1,000. She files for bankruptcy under Chapter 13.
During the 5-year repayment period, she owes a total (undiscounted) of
$(5 \times \$9,000) + \$4,000 = \$49,000$. The discounted present value of these
payments is M'_1, or approximately $45,000 at a discount rate of 3 per-
cent. From year 6 to year 28 (when the mortgage ends), the debtor owes
$9,000 per year. The discounted present value of these payments is
M'_2, or approximately $139,000 at the same interest rate. Therefore, M'
equals $184,000.

The discounted present value of debtors' car payments during the
repayment plan is A'. We assume that debtors repay their car loans in
full during the plan.

Now turn to debtors' obligation to repay unsecured debt in bank-
ruptcy, which is the most complicated issue. Since the bankruptcy reform
of 2005, debtors in bankruptcy have been subject to a means test that
determines both whether they are allowed to file under Chapter 7 and,
if not, their obligation to repay unsecured debt if they file for bankruptcy
under Chapter 13. Under the means test, debtors first compute their
yearly income, which equals their average monthly income during the
6 months prior to filing multiplied by 12. Then they determine their
yearly income exemption, denoted X_y, which is the amount of income
they are allowed to keep for their living expenses each year while they
are in Chapter 13. Finally, they compute their disposable income, which
equals income minus the income exemption. If debtors' disposable in-
come is less than $1,200 per year, they are allowed to file under Chapter
7, and if they choose to file under Chapter 13, they are not required to
repay any of their unsecured debt. If their disposable income is greater
than $2,000 per year, they must file under Chapter 13 if they file for

bankruptcy, and they must use all of their disposable income for 5 years to repay debt.[16]

Now consider how the income exemption X_y is calculated. The minimum value of the income exemption equals the median family income level in the debtor's state of residence, adjusted for family size. This means that debtors whose income is below the state median income level plus \$1,200 are allowed to file for bankruptcy under Chapter 7. However, debtors whose income is above the state median level must calculate their income exemption by adding up various allowances for living expenses. There are formula-based allowances for rent, transportation, and personal expenditures.[17] There are also additional allowances for some or all of debtors' actual expenditures on taxes, mandatory payroll contributions, insurance, telecommunications costs, child care, child support, children's educational expenses, care of elderly or disabled relatives, and home security costs. Finally, debtors add their secured debt payments during the plan to the income exemption.

In our notation, a particular debtor's disposable income during the 5-year Chapter 13 repayment period equals $5(Y - X_y)$ if she has no secured debt and $5(Y - X_y) - A' - M'_1$ if she has a mortgage, a car loan, or both.[18] Thus, when debtors have mortgages or car loans, their obligation to repay unsecured debt decreases. For each additional dollar of secured debt payment, a dollar of additional unsecured debt payment is discharged, until debtors' obligation to repay unsecured debt declines to zero. This procedure of increasing the income exemption by the amount of secured debt payments increases debtors' ability to repay their mortgages, thus making it easier for them save their homes. It also increases debtors' ability to save their cars. We refer to the reduction in debtors' obligation to repay unsecured debt when their secured debt payments are higher as the credit card subsidy.[19] The subsidy equals $\max\{\min[5(Y - X_y), P'], 0\} - \max\{\min[5(Y - X_y) - M'_1 - A', P'], 0\}$. It

16. If debtors' disposable income is between \$1,200 and \$2,000 per year, they are allowed to file under Chapter 7 if their unsecured debt is more than four times their disposable income per year.

17. The procedure for determining the income exemption is based on Internal Revenue Service procedures for collecting from delinquent taxpayers but is more generous to debtors. See White (2007a) for discussion of the means test. Entrepreneurs are not subject to the means test and may file under Chapter 7 regardless of their incomes.

18. For simplicity, we do not discount Y or X_y. This is equivalent to assuming that Y and X_y increase each year at a rate equal to the discount rate.

19. Prior to 2005, there was no credit card subsidy because there was no means test to determine how much debtors were obliged to repay in Chapter 13.

is more valuable when debtors have more unsecured debt and larger mortgages or car loans.[20]

Some Chapter 13 filers are obliged to use their home equity to repay debt, in addition to using their disposable incomes. Suppose a debtor has income below the state's median level, so all of her future income is exempt. Suppose, however, that the value of her house V exceeds $M' + X_h + C_f$, which means that selling the house would generate enough money to repay at least some of her unsecured debt. The "best interest of creditors" test requires that unsecured creditors receive at least as much in Chapter 13 as they would in Chapter 7 (11 U.S.C. sec. 1307 [2000]). Therefore, because unsecured creditors would receive $V - M' - X_h - C_f$ if the debtor filed under Chapter 7, she must repay at least this amount in Chapter 13. The best-interest-of-creditors test means that even low-income debtors will avoid filing under Chapter 13 if the value of their homes is sufficiently high that they would have to repay all of their unsecured debt in bankruptcy, or if $V - M' - X_h - C_f + C_b \geq P'$.

Debtors' alternate housing cost is denoted R'. It equals the present value of the cost of moving to rental housing in period 1 and paying rent for the next N years.

2.1. Default and Bankruptcy Decisions under Current Law

Now consider debtors' bankruptcy and default decisions in period 1. Debtors are assumed to make these decisions so as to maximize the discounted present value of their wealth defined over the next N years—that is, until the end of the mortgage contract. However, debtors are assumed to have no financial wealth other than their home equity, and as a result, they may be subject to liquidity constraints that prevent them from making wealth-maximizing choices.[21] Debtors choose among four alternatives: default on the mortgage and file for bankruptcy (D/B), default but do not file for bankruptcy (D/NB), do not default but file for bankruptcy (ND/B), and do not default or file for bankruptcy (ND/NB). We first consider debtors' decisions under current law. Then we modify

20. Berkowitz and Hynes (1999) first suggested that filing for bankruptcy increases debtors' ability to repay their mortgages by reducing their unsecured debt obligations.

21. The assumption that debtors maximize their wealth in making their default and bankruptcy decisions is referred to as the "ruthless" decision model. There is empirical evidence supporting ruthless decision models of both default and bankruptcy, although these models also suggest that many debtors do not behave ruthlessly. For empirical studies of the bankruptcy and mortgage default decisions, see Fay, Hurst, and White (2002), Quigley and Van Order (1995), and Foote, Gerardi, and Willen (2008).
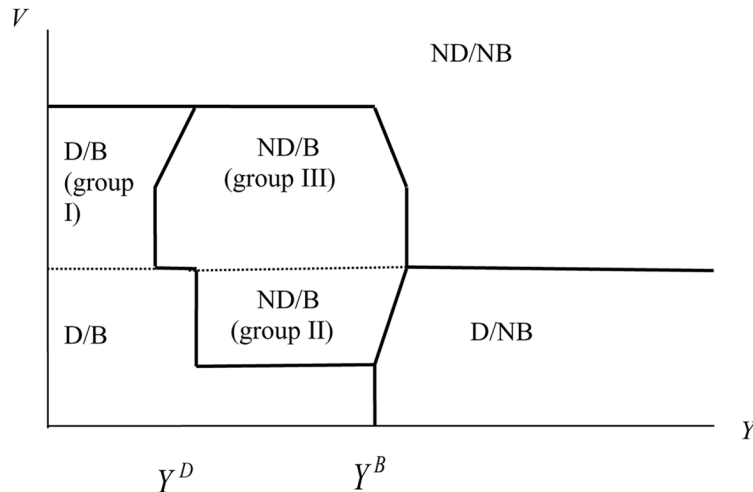
Figure 1. Homeowners' predicted bankruptcy and default decisions

the model to consider how their decisions would change if mortgage cram down were introduced in Chapter 13.

Figure 1 shows debtors' decisions. Income Y is shown on the horizontal axis, and housing value V is shown on the vertical axis. The figure is divided into four regions that correspond to the four choices. Here we describe each of the four regions intuitively; details are given in White and Zhu (2008).

Consider the default decision first. The basic condition for debtors to default is that the present value of the cost of owning, $M' - V$, exceeds the present value of the cost of renting, R', or $V < M' - R'$.[22] However, if debtors receive the credit card subsidy, then their cost of owning decreases from $M' - V$, and as a result, they may keep their homes even when V is less than $M' - R'$. On the other hand, debtors who are liquidity constrained may default when V exceeds $M' - R'$. We assume that debtors are willing to devote up to half of their incomes to pay the cost of

22. Note that this default condition is quite different from the usual assumption that debtors default when their mortgages are under water, which means that $V < M$. In addition to V and M, the default decision also depends on interest and discount rates, which are incorporated in M', and on the present value of the cost of rental housing. If future housing values and/or rental costs are uncertain, there is also an option value to delaying the default and bankruptcy decisions.

their Chapter 13 repayment plans, which, during the first year, is $C_b + (M'_1 + A')/5$. Debtors are assumed to be liquidity constrained and forced to default if their incomes are below this amount. The income level at which debtors are indifferent between defaulting and not defaulting is denoted Y^D. Figure 1 shows that Y^D varies depending on the value of debtors' homes and their incomes.

Now turn to debtors' decisions to file for bankruptcy. Debtors prefer to file for bankruptcy if their gain from filing exceeds bankruptcy costs C_b. For debtors who default on their homes and whose incomes are below the state's median level, the gain from filing is the value of unsecured debt P', since all of it is discharged in bankruptcy. However, debtors' gain from filing is higher if they receive the credit card subsidy and lower if the best-interest-of-creditors test forces them to repay more of their unsecured debt. The income level at which debtors are indifferent between filing and not filing for bankruptcy is denoted Y^B. Figure 1 shows that Y^B also varies depending on the value of debtors' homes and their incomes.

In Figure 1, region D/B is outlined in heavy black lines and is divided by a dashed line. Below the dashed line, housing value and income are both low. Debtors default because the cost of owning exceeds the cost of renting (so $V < M' - R'$), and they file for bankruptcy because the gain from having their unsecured debt discharged exceeds bankruptcy costs ($P' > C_b$). Above the dashed line, debtors are liquidity constrained. They still gain from filing for bankruptcy because their incomes are low, but they wish to save their homes because their housing value exceeds $M' - R$. They default on their mortgages because they cannot afford their repayment plans during the first year, even if they spend half of their incomes on housing, so $.5Y < C_b + (M'_1 + A')/5$. Because liquidity constraints are important to our analysis, the upper portion of the D/B region is labeled "group I."

In region D/NB, housing values are less than $M' - R'$, so debtors prefer to default rather than save their homes. However, they do not file for bankruptcy because their incomes are above Y^B.

In region ND/NB, both housing value and income are high. Debtors prefer to save their homes because the cost of renting exceeds the cost of owning ($V > M' - R'$), and they prefer to avoid bankruptcy because their incomes are sufficiently high that the gain from filing is less than the cost.[23]

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23. The ND/NB region is assumed to include the area where V exceeds $M' + X_h +$

Finally, in region ND/B, housing value and income both have intermediate values. All debtors in this region file for bankruptcy and keep their homes, so they receive the credit card subsidy. The ND/B region is also divided by a dashed line. Below the dashed line, debtors would default because housing value is less than $M' - R'$, but the credit card subsidy causes them to save their homes. If we view the credit card subsidy as a policy to encourage debtors to save their homes, then the lower part of the ND/B region is the area where the policy succeeds; it is labeled "group II." In the upper part of the ND/B region, debtors would save their homes even without the subsidy because V exceeds $M' - R'$, but they receive the subsidy anyway. This area, labeled "group III," is where the subsidy does not change debtors' behavior.[24]

Overall, the credit card subsidy reduces default but at the cost of encouraging more debtors to file for bankruptcy and subsidizing some debtors who would have saved their homes anyway. In Section 4, we estimate the size of groups I, II, and III.

2.2. Default and Bankruptcy Decisions under Cram Down

Now consider how changing bankruptcy law to allow cram down of mortgages in Chapter 13 would affect debtors' default and bankruptcy decisions. In particular, suppose bankruptcy judges reduce debtors' mortgage payments by multiplying payments by V/M whenever the mortgages are under water—that is, when $V/M < 1$. The reduction is assumed to apply to mortgage payments both during and after the Chapter 13 repayment plan, so M'_1 is replaced by $(V/M)M'_1$ and M'_2 is replaced by $(V/M)M'_2$.[25] All other aspects of bankruptcy law are assumed to remain the same, and debtors are assumed to make their default and bankruptcy decisions in the same way. Note that although the cost of the credit card subsidy is borne by unsecured lenders, the cost of cram down is borne by mortgage lenders.

The main changes caused by cram down are as follows. First, fewer debtors are liquidity constrained because Chapter 13 repayment plans

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$C_f + P' - C_b$ but Y is low. In this area, debtors are liquidity constrained and unable to pay their mortgages, but the value of their homes is so high that they would not gain from filing under Chapter 13. We assume that they sell their homes outside of bankruptcy.

24. Not all debtors have an ND/B region. If the credit card subsidy is small because debtors have little unsecured debt or small mortgages, then Y^D may exceed Y^B.

25. To discourage debtors from presenting biased assessments of the decline in home value, the reduction in the mortgage principal could be based on an objective measure, such as the decline in the S&P/Case-Schiller housing value index for the relevant metropolitan area over the period since the mortgage was issued.

become less costly. In Figure 1, this means that the right-hand boundary of the group I region shifts to the left. Second, debtors' gain from filing for bankruptcy increases because cram down reduces their mortgage payments. As a result, Y^B increases, more debtors file for bankruptcy, and the right-hand boundaries of the group II and group III regions shift to the right. This increases the number of debtors in groups II and III. Third, the lower boundary of group II region shifts downward. This is because cram down reduces the cost of owning while leaving the cost of renting unaffected. As a result, debtors who own low-value houses are less likely to default. The overall effect of these changes is that fewer debtors default.

Now consider how the introduction of cram down affects the size of groups I, II, and III. Group I—composed of debtors who default because they are liquidity constrained—becomes smaller. Group II—composed of debtors who save their homes under cram down but would otherwise have defaulted—now includes two sets of debtors: those in the lower part of the ND/B region and those who previously were liquidity constrained but now save their homes because of cram down. Group III—composed of debtors who receive one or both of the subsidies but would have saved their homes anyway—becomes larger because cram down makes filing for bankruptcy more attractive.

3. CHARACTERISTICS OF CHAPTER 13 BANKRUPTCY FILERS

We collected a new data set of all Chapter 13 bankruptcy filings in Delaware in 2006; there were 586 filings in total. The data are taken both from the forms that debtors submit at the time of filing and from their repayment plans, which are filed later. We used filings in Delaware because the Delaware bankruptcy court has been a leader in making bankruptcy filings publicly available and because Delaware filers are fairly representative of bankruptcy filers nationally.[26]

26. Debtors' filing forms and repayment plans are available through the Bankruptcy Courts' online PACER system (http://pacer.psc.uscourts.gov). See Administrative Office of the U.S. Courts, Statement of Current Monthly Income and Calculation of Commitment Period and Disposable Income (http://www.uscourts.gov/rules/Revised_Rules_and_Forms/ BK_Form_B22C_101105.pdf). Zhu (forthcoming) presents evidence that Delaware filers are representative of bankruptcy filers nationally. See also Lawless (2008) and Eggum, Porter and Twomey (2008) for discussion of two national samples of Chapter 13 filers in which debtor characteristics such as income are similar. For example, Lawless et al. (2008) found that the median income of Chapter 13 filers in their 2007 sample was $35,600,

Table 1. Summary Statistics for All Chapter 13 Filers and for Repayment Plans

	Mean	SD
Homeowner	.96	.20
Debtor passes the means test	.77	.42
Income ($)	39,900	23,400
House value ($)	197,000	122,000
Positive home equity	.71	.46
Home equity (all homeowners) ($)	39,800	70,000
Mortgage listed at filing	.83	.38
Mortgage principal ($)	154,000	109,000
Auto loan listed at filing	.57	.50
Auto loan ($)	18,400	17,300
Priority debt listed at filing	.52	.50
Priority debt ($)	8,500	18,600
Unsecured debt listed at filing	.89	.32
Unsecured debt ($)	29,800	37,500
Student loans listed at filing	.16	.37
Student loans ($)	15,000	23,800
Lawyers' fee ($)	2,800	940
Repayment plan	.90	.30
For plan filers:		
Mortgage debt in plan	.79	.41
Auto debt in plan	.45	.50
Priority debt in plan	.09	.29
Unsecured debt in plan	.42	.49
Student loans in plan	.006	.077
Only unsecured debt in plan	.09	.29
Trustee's fee ($)	2,900	2,500

Note. Asset and debt values are for those with positive values only.

The importance of Chapter 13 as a save-your-home bankruptcy procedure is illustrated by the fact that 96 percent of Chapter 13 filers in our sample are homeowners and 77 percent pass the means test, which means that they filed under Chapter 13 voluntarily (see Table 1).[27] The average home value is $197,000 for homeowners, and the average level of mortgage debt for those who list mortgages at filing is $154,000. Average home equity for all homeowners is nearly $40,000, and equity is positive for 71 percent of homeowners. Because average home equity

which is close to the median income figure of $37,200 in our Delaware sample of Chapter 13 filers in 2006.

27. We categorize debtors as homeowners if they give the value of their homes or the amount of the mortgage on their filing forms or, because this data is sometimes missing, if they repay a mortgage in their repayment plans. Because mobile-home loans are listed as mortgages on bankruptcy forms, owners of mobile homes are categorized as homeowners.

is positive, most debtors in the sample have an incentive to save their homes, although liquidity constraints may limit their ability to do so.

With regard to other debts, 57 percent of debtors list car loans at filing, and the average car loan is $18,400; 52 percent list priority debt (taxes owed) at filing, and the average debt level is $8,500; 89 percent list unsecured loans, and the average debt level is $29,800; while 16 percent list student loans, and the average debt level is $15,000.

Now turn to debtors' Chapter 13 repayment plans. We located repayment plans for 90 percent of Chapter 13 filers. Among the remainder, some may have abandoned their efforts to save their homes and shifted their bankruptcy filings to Chapter 7, whereas others may have repaid their mortgage arrears without filing a repayment plan—perhaps after successfully renegotiating their mortgages with lenders. Among plan filers, 79 percent propose to repay mortgages, 45 percent propose to repay car loans, 9 percent propose to repay priority debt, 42 percent propose to repay unsecured loans, and only .6 percent propose to repay student loans.[28]

Around 9 percent of Chapter 13 filers propose to repay only unsecured debt in their repayment plans, and these plans raise the issue of why debtors filed under Chapter 13 in the first place. Nearly two-thirds of debtors in this group passed the means test and could have filed under Chapter 7, so high incomes did not force them to file under Chapter 13, but 82 percent were homeowners, and their average home equity was $56,000. Of these debtors, more than one-third had home equity that exceeded the Delaware homestead exemption of $50,000. Thus, some debtors who repaid only unsecured debt in Chapter 13 probably did so because if they filed under Chapter 7, they would have been obliged to sell their homes in bankruptcy.

The average lawyer's fee in our sample is around $2,800. In addition, debtors must pay a bankruptcy court filing fee of $274, and they must take both credit counseling and debt management courses at a minimum cost of $100. Bankruptcy trustees also impose a fee of 10 percent of the amount paid under the repayment plan; the average trustee's fee in the

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28. Student loans cannot be discharged in Chapter 13 unless the judge decides that repaying them would constitute an "undue hardship" (11 U.S.C. sec. 523 [a][8]). Some filers in our sample presumably obtained hardship discharges. Those who did not probably avoided putting their student loans payments into their repayment plans because they are not required to do so and because paying student loans as part of a plan subjects the payments to the trustee's 10 percent fee. These factors explain why few repayment plans include student loans.

sample—assuming that debtors complete their repayment plans—is $2,900. Our evidence thus suggests that filing under Chapter 13 costs the average debtor over $3,000; costs rise to $6,000 for debtors who complete repayment plans.[29]

Do higher income debtors file under Chapter 13 because the means test prevents them from filing under Chapter 7 rather than because they wish to save their homes? We found little difference in homeowning rates between higher income debtors who failed the means test and were obliged to use Chapter 13 versus lower income debtors who passed the means test and filed under Chapter 13 voluntarily. However, we found that higher income debtors were more likely to repay mortgage debt and less likely to repay only unsecured debt in their plans. These results suggest that higher income debtors, like lower income debtors, file under Chapter 13 in order to save their homes.

4. SIMULATION RESULTS

Now turn to the simulation of the model in Figure 1. We collected or constructed data for the variables Y, X_y, V, M, M', M'_1, M'_2, P', A', and C_b. For the homestead exemption X_h, we use the Delaware value of $50,000. We assume that the cost of foreclosure C_f equals 30 percent of housing value. The number of years in the future that debtors take into account in making their decisions, N, is assumed to be 28—equal to the length of a 30-year mortgage obtained 2 years previously. To construct the present value of future mortgage payments, we assume the mortgage interest rate to be .06 and debtors' discount rate to be .03. To construct the cost of alternate rental housing R', we assume that debtors spend 25 percent of their incomes on rent,[30] and we assume a onetime moving cost, payable immediately, of $2,000. We then convert rent payments into present value assuming that the rate of increase in rent equals the discount rate. In constructing A', we include priority debts and lawyers' fees as well as automobile loans, because these debts are repaid before other unsecured debts, and they therefore increase the

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29. If debtors do not complete their repayment plans, they do not receive a discharge, and creditors may resume their collection efforts.

30. This is the median rent-to-income ratio in Delaware. See U.S. Department of Commerce (2005, table 958).

Table 2. Summary Statistics ($) for Chapter 13 Filers with Repayment Plans

	Mean	SD
Income (Y)	42,600	21,900
Income exemption (X_y)	56,500	17,500
Homestead exemption (X_h)	50,000	0
House value (V)	197,000	119,000
Home equity	45,000	73,300
Bankruptcy cost (C_b)	2,900	800
Mortgage principle (M)	150,000	105,000
Present value of future mortgage payments during and after the repayment plan, including arrears (M')	525,000	132,000
Present value of future unsecured debt payments (P')	26,500	35,000
Present value of future payments on auto loans, including payments on priority debt and student loans (A')	19,700	32,200
Present value of the cost of alternate rental housing, including moving costs (R')	203,000	103,000

Note. See the Appendix for discussion of how the present value of future loan payments other costs is calculated.

credit card subsidy.[31] We exclude observations that have no repayment plan, where the debtor is not a homeowner, or where information about mortgage payments under the plan is missing. With these exclusions, the sample size falls to 436. The Appendix gives details concerning how we constructed the variables, and Table 2 shows summary statistics for debtors who file repayment plans in Chapter 13.

Then, for each debtor, we calculate the boundaries of each of the regions in Figure 1 and determine in which region the debtor is predicted to locate. Column 1 of Table 3 gives the results in the base case: 92 percent of debtors are predicted to file for bankruptcy, which is close to the 100 percent who actually file, and 57 percent of debtors are predicted to default, even though only 15 percent of debtors have underwater mortgages. We attempted to check the accuracy of the model's predictions of default by examining whether, as of the fall of 2008, debtors were still listed in online telephone directories at the same address shown in their bankruptcy filings. Otherwise, we classified them as defaulting.

31. Priority debts are nondischargeable in bankruptcy, and Chapter 13 filers must pay them in full as part of their repayment plans unless debtors' disposable income is exhausted by repaying secured debt (11 U.S.C. sec. 1322[a]). The same treatment applies to lawyers' fees that are not paid in advance.

Table 3. Simulation Results

	Base Case (1)	25% Lower Housing Value	
		No Cram Down (2)	Cram Down (3)
All Chapter 13 filers:			
Bankruptcy predicted	.92	.94	.94
Default predicted	.57	.59	.50
House value is less than mortgage	.15	.56	.56
Group I:			
Proportion of Chapter 13 filers	.32	.18	.14
Income ($)	38,700	37,600	34,500
Unsecured debt ($)	26,600	31,400	32,000
Future mortgage payments ($)	333,000	294,000	270,000
Home equity ($)	54,100	22,800	43,400
Credit card subsidy ($)	2,900	3,000	3,000
Cram-down subsidy ($)	. . .	. . .	2,900
Group II: [a]			
Proportion of Chapter 13 filers	.009	.005	.102
Income ($)	71,400	93,700	65,000
Unsecured debt ($)	93,500	40,300	35,000
Future mortgage payments ($)	732,000	742,000	356,000
Home equity ($)	45,700	−40,000	−74,000
Credit card subsidy ($)	44,900	40,300	10,000
Cram-down subsidy	. . .	. . .	134,000
Group III:			
Proportion of all Chapter 13 filers	.37	.38	.42
Income ($)	48,100	47,600	48,300
Unsecured debt ($)	30,300	30,100	30,200
Future mortgage payments ($)	257,000	250,000	232,000
Home equity ($)	40,000	1,500	−3,400
Credit card subsidy ($)	4,500	4,800	4,500
Cram-down subsidy ($)	. . .	. . .	31,600

Notes. All figures except proportions are average values. Values for subsidies are for those filers who received subsidies. Future mortgage payments are in present-value terms.

[a] Group II includes only debtors in the lower part of the ND/B region if there is no cram down (columns 1 and 2). If cram down is in effect (column 3), group II also includes debtors who were liquidity constrained before cram down but save their homes once cram down is introduced.

This procedure is likely to overestimate default because some debtors have unlisted telephone numbers and others may have sold their homes and moved without defaulting. Of those who are predicted to default, 58 percent actually defaulted, whereas of those who are predicted to save their homes, 46 percent defaulted. The fact that debtors are more likely to default if they are predicted to do so supports the model. However, the fact that many debtors do the opposite of what the model

predicts suggests that debtors do not always act in their own financial interest.[32]

Now consider the results for groups I, II, and III in the base case. About one-third of debtors are in group I—that is, they default because they are liquidity constrained. Compared with all debtors in the sample, they have above-average home equity levels and mortgage payments but below-average incomes. Their credit card subsidies if they saved their homes would be only $2,900, on average, which does not loosen the liquidity constraint enough to change their default decisions. Now turn to group II debtors, who save their homes as a result of the credit card subsidy when they otherwise would have defaulted. Less than 1 percent of debtors are in this group. Their average credit card subsidy in present-value terms is $44,900, or around 7 percent of the present value of future mortgage payments. These debtors are unusual because their unsecured debt and their mortgage payments are both extremely high, which makes their credit card subsidies high. They also have unusually high incomes—$71,400—compared with an average income level in the sample of $42,600. Finally, group III debtors receive the credit card subsidy but would have kept their homes anyway; 37 percent of debtors fall in this group, and their average credit card subsidy is $4,500, or 1.2 percent of the present value of future mortgage payments. These debtors can afford to save their homes because they have above-average incomes and below-average mortgage payments, compared with bankruptcy filers generally.

Thus, even though 96 percent of debtors in Chapter 13 are homeowners, the credit card subsidy causes very few of them to save their homes when they otherwise would have defaulted. Those who do save their homes receive unusually high subsidies. The credit card subsidy also goes to many debtors who would have saved their homes anyway. Because very few debtors change their default decisions, 85 percent of the subsidy dollars go to debtors who would have saved their homes anyway. Overall, the credit card subsidy is not an effective program for reducing foreclosures.[33]

In column 2 of Table 3, we rerun the simulation assuming that all debtors' homes have decreased in value by 25 percent. This represents

32. Carroll and Li (2008) find that, among homeowners who file for bankruptcy, 30–40 percent experience foreclosure. Their study does not distinguish between homeowners according to whether they gain financially from saving their homes versus defaulting.

33. This is consistent with the results of Eggum, Porter and Twomey (2008), who argue that many debtors in Chapter 13 have unaffordable mortgage payments.

the current situation in which housing values have decreased sharply but bankruptcy law remains unchanged.[34] With lower housing values, the percentage of debtors in the sample whose mortgages are under water increases from .15 percent to .56 percent, and average home equity decreases from $45,000 to $-$3,200. However, the proportion of debtors who are predicted to file for bankruptcy increases only slightly, and the proportion who are predicted to default increases only slightly. The fraction of debtors who are liquidity constrained (group I) decreases sharply. This is because, with lower housing values, many debtors who previously defaulted because they were liquidity constrained now default because the cost of owning (which increases when housing values decrease) now exceeds the cost of renting. The fractions of debtors in groups II and III remain about the same. These results suggest that the credit card subsidy is no more effective as a policy for dealing with the mortgage crisis when housing values decrease.

Now turn to the results when we introduce cram down of mortgages in bankruptcy, shown in column 3 of Table 3. Everything else is assumed to remain the same, so debtors may receive the credit card subsidy as well as the cram-down subsidy. As discussed above, cram down reduces debtors' mortgage payments by the ratio of house value (reduced by 25 percent) to the mortgage principal, so M_1' and M_2' are both multiplied by $.75V/M$ if this figure is less than 1. The average value of $.75V/M$ is .89, so cram down reduces debtors' future mortgage payments by 11 percent on average. The introduction of cram down sharply reduces the probability of default, but it has no effect on the probability of bankruptcy.

Now consider how cram down affects the three groups of debtors. Group I decreases because cram down loosens liquidity constraints by reducing debtors' mortgage payments. If those debtors who remain liquidity constrained instead saved their homes, they would receive mortgage subsidies averaging $3,000 and cram-down subsidies averaging $2,900. However, these subsidies are too small to allow them to avoid default.

Group II now includes two separate sets of debtors who would otherwise have defaulted—those in the lower part of the ND/B region and those who previously were in group I but now save their homes as a

34. The 25 percent figure equals the decline in the S&P/Case-Schiller index of home values for 20 U.S. metropolitan areas from July 2006 to November 2008. See Standard & Poor's Financial Services, S&P/Case-Shiller Home Price Indices (http://www.standardandpoors.com/indices/sp-case-shiller-home-price-indices/en/us/?indexId=spusa-cashpidff--p-us----).

result of the cram-down subsidy. A combined total of 10.2 percent of all debtors now are in group II and save their homes as a result of the combined credit card and mortgage subsidies, but the cost of cram down is high. Cram down cuts the mortgage payments of group II debtors by $134,000 in present-value terms, for an average reduction of 27 percent. In addition, these debtors receive credit card subsidies averaging $10,000, for a combined total subsidy of $144,000 in present-value terms. Debtors in group II have above-average incomes—$65,000 compared with an overall average of $42,600. Thus, debtors who save their homes as a result of cram down are well off compared with all debtors in Chapter 13, and they receive very large subsidies. However, only large subsidies would cause them to save their homes because their average home equity is −$74,000.[35]

Finally, the proportion of debtors in group III increases when cram down is introduced. These debtors would have saved their homes anyway, but they receive an average cram-down subsidy of $31,600 and an average credit card subsidy of $4,500. They have above-average incomes and slightly negative home equity of −$3,400.

The simulations suggest several results. First, the credit card subsidy by itself has little effect on whether debtors save their homes: less than 1 percent of Chapter 13 filers save their homes when they would otherwise have defaulted. Second, cram down is much more effective as a save-your-home policy—the proportion of Chapter 13 filers who save their homes instead of defaulting increases from less than 1 percent to more than 10 percent when cram down is introduced. However, cram down is costly to mortgage lenders: on average, each debtor who saves his or her home rather than defaulting receives a transfer of $134,000 in present-value terms, and for each debtor who saves his or her home, 4.1 additional debtors who would have saved their homes anyway receive transfers of $31,600. Thus, the total cost of cram down per home saved is $264,000 in present-value terms.

The final step in the analysis would normally be to project how many additional homes would be saved if cram down were introduced in Chapter 13 and the total cost to both mortgage and unsecured lenders. Our data set is not suitable for projecting the number of additional homes saved, however, because it covers only debtors who filed for bankruptcy

35. Within group II, debtors with higher incomes receive larger subsidies. The average combined cram down plus credit card subsidy is $77,000 for those in the lowest quartile, $117,000 in the two middle quartiles, and $252,000 in the highest quartile. A similar pattern applies to group III debtors.

when cram down was not in effect. If cram down were introduced, the large subsidies are likely to result in many additional bankruptcy filings by debtors whose characteristics may be quite different from those in our sample. However, the Congressional Budget Office (2009) recently estimated that 350,000 additional bankruptcy filings would occur over the next several years if cram down of mortgages in bankruptcy were adopted.[36] We can use this figure to estimate the cost of cram down and the credit card subsidy. Suppose we assume that all of the additional bankruptcy filings would be by debtors in groups II and III, that the relative proportions of group II and group III filers would be the same as in our sample, and that filers in each group would receive the same average subsidies as in our sample. Then the aggregate cost of introducing cram down in present-value terms would be $18 billion to mortgage lenders plus $2 billion to unsecured lenders. In addition, 359,000 Chapter 13 bankruptcy filings occurred in 2008, and these debtors are also eligible to receive the cram-down subsidy. Assume that they have the same likelihood of receiving cram down as debtors in our sample. Then the cost of providing the cram-down subsidy to debtors who would have filed for bankruptcy anyway is an additional $10 billion per year. This suggests that the total cost of introducing cram down over the next several years would be around $28 billion to mortgage lenders plus an additional $2 billion to unsecured lenders.[37]

5. CONCLUSION

The most important finding of this paper is that Chapter 13 functions as a save-your-home bankruptcy procedure, as evidenced by the fact that 96 percent of Chapter 13 filers are homeowners and 77 percent of debtors file under Chapter 13 voluntarily rather than being forced to do so. Although nearly all debtors who file under Chapter 13 do so in order

36. The version of cram down in the proposed legislation is similar to the assumptions in our model. The proposed legislation is *Helping Families Save Their Homes in Bankruptcy Act of 2009* (H.R. 200, 111th Cong., 1st Sess. [2009]). It allows bankruptcy judges to reduce underwater mortgages to the current market value of the house. The bill requires that debtors first attempt to have their mortgages modified through the new nonbankruptcy foreclosure-prevention programs.

37. The figures for the cost of cram down are $350,000\{[(.42/.52) \times \$31,600] + [(.10/.52) \times \$134,000]\}$ for additional filings and $359,000[(.42 \times \$31,600) + (.10 \times \$134,000)]$ for bankruptcy filings that would have occurred anyway. The figure for the cost of providing the credit card subsidy to additional filers is $350,000\{[(.42/.52) \times \$4,500] + [(.10/.52) \times \$10,000]\}$. Debtors who would have filed anyway already receive the credit card subsidy, so there is no additional cost from adopting cram down.

to save their homes, our model suggests that the credit card subsidy causes less than 1 percent of them to save their homes when they would otherwise have defaulted. However, if cram down of mortgages in Chapter 13 were introduced, the proportion of Chapter 13 filers who save their homes rather than default would increase 10-fold. For these debtors, cram down reduces future mortgage payments by an average of $134,000, whereas for debtors who receive the subsidy but who would have saved their homes anyway, cram down reduces future mortgage payments by $31,600 (both figures are in present-value terms). We estimate that the aggregate cost to mortgage and unsecured lenders of introducing cram down would be around $30 billion.

Two caveats should be emphasized. First, although we argue that foreclosures are socially costly and that preventing them is efficient, this does not mean that preventing every foreclosure is economically efficient. Some debtors may have bought homes that they cannot afford or may have experienced permanent income losses that make their current homes unaffordable. These homes would be more highly valued by alternative occupants, and it would be economically efficient to transfer them. The analysis in this paper does not address the normative questions of how many homes should be saved and whether introducing cram down would mainly save homes that should or should not be saved.

A second point is that the cost of cram down and the number of additional bankruptcy filings that would occur if cram down were adopted both depend heavily on the new nonbankruptcy foreclosure-prevention programs that are just starting to operate. The recently announced Home Affordable Modification program to avoid foreclosures requires that mortgage lenders bear the full cost of reducing debtors' mortgage payments to 38 percent of their incomes plus half of the additional cost of reducing debtors' mortgage payments to 31 percent of their incomes. For many debtors, this program is likely to be more attractive than filing under Chapter 13 and receiving the cram-down subsidy. If so, the number of additional bankruptcy filings will be small, but if lenders refuse to modify mortgages outside of bankruptcy—as they have under previous government programs—then the number of additional bankruptcy filings could be much higher.

APPENDIX: EXPLANATION OF VARIABLES USED IN THE SIMULATION

V = house value. This is the debtor's figure for the market value of the house, taken from Schedule A of the bankruptcy filing form "Real Property." When

house value is missing, we assume that it equals the value of assets (from the Summary of Schedules, bottom figure) minus the amount of the debtor's automobile loan (from Schedule D).

Y = debtor's income per year. This income figure is taken from Schedule I, "Current Income of Individual Debtor(s)." If this figure is missing, we use the income figure given on Form B22C, line 15, which is based on debtors' average monthly income during the 6 months prior to filing.

X_y = income exemption per year. This is given on Form B22C, line 16 or line 57, depending on whether debtors have below-median income. For debtors with below-median income, the exemption equals the median income level in Delaware, adjusted for family size. For debtors with above-median income, it equals the sum of the rent, transport, personal care, and other allowances.

M_1' = mortgage and other payments during the repayment plan. We use two sources of data to construct this variable: the debtor's monthly payment under the Chapter 13 plan (from the plan filing) and the debtor's normal monthly mortgage payment (from Schedule J, questions Q1, Q3, and Q13). Payments under the plan include the cost of repaying mortgage arrears and interest on arrears but normally do not include regular mortgage payments. The debtor's normal monthly mortgage payment includes first and second mortgage payments, property taxes, insurance, and maintenance cost. We add the two monthly payments and convert them to present value using a discount rate of 3 percent per year. This gives us a multiplier of 56 that converts monthly payments to present value, assuming a 5-year plan. Since we have data on the length of the repayment plan, we adjust the calculation if the plan is for less than 5 years.

M_2' = normal mortgage payment from the end of the repayment plan to the end of the mortgage. We start with data on the monthly normal mortgage payment (from Schedule J, questions Q1, Q3, and Q13). Because we do not know the remaining term of the mortgage, we assume that it is 28 years from the date of filing. We convert the monthly normal mortgage payment to present value using a 3 percent discount rate. Then we add the payments from years 6 through 28 to get the present value of mortgage payments from the end of the repayment plan through the end of the mortgage. This gives us a multiplier of 165 that converts normal monthly payments to present value, assuming a 5-year plan. If the repayment plan is less than 5 years, we adjust the multiplier.

M' = total mortgage payments during and after the repayment plan. This equals $M_1' + M_2'$.

A' = automobile loans and priority debt. Debt figures are taken from the Summary of Schedules. We add automobile loans and priority debt, since both are paid before unsecured debt and both therefore increase the mortgage subsidy. These debts must be repaid in full during the term of the repayment plan. Debt is converted to present value without discounting, which means that the interest rate is assumed to be the same as the discount rate.

P' = unsecured debt. The principal amount of unsecured debt equals the sum

of credit card debt, bank debt, medical bills, and student loans. Figures are taken from the Summary of Schedules. We assume that whatever unsecured debt is repaid will be paid in full during the repayment plan. Because the debt is unsecured, there is no interest during the plan. Future payments are discounted at the rate of 3 percent, which gives a multiplier of .92 that converts dollars of debt to the present value of future payments.

X_v = homestead exemption, which is $50,000 in Delaware.

C_b = bankruptcy cost. This is the sum of debtors' lawyers' fees paid at the time of filing plus the Chapter 13 filing fee of $274. We take the lawyer's fee from the "Statement of Compensation of Attorney for Debtor" or from the front page of the repayment plan. Where this figure is missing, we substitute the average value. Trustees' fees and lawyers' fees not paid at filing are included in M'_t.

R' = alternate housing cost. We assume that the cost of renting alternate housing equals 25 percent of debtors' income. Rent is assumed to increase at a rate of 2 percent per year and is discounted to present value at a rate of 3 percent per year. The resulting multiplier per dollar of annual rent is 18.9. Renters are also assumed to incur a onetime moving cost in the first year of $2,000. Data on the distribution of rent payments to income in Delaware are taken from U.S. Department of Commerce (2005, table 958).

C_f = cost of foreclosure. On the basis of Pence (2006), we assume that the cost of foreclosure equals 30 percent of house value.

M = original mortgage principal, taken from Schedule D.

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