Why Don't More Households File for Bankruptcy?

Michelle J. White
University of Michigan

A much higher fraction of U.S. households would benefit financially from bankruptcy than actually file. While the current bankruptcy filing rate is about 1% of households each year, I calculate that at least 15% of households would benefit financially from filing and the actual figure would be several times higher if most households plan in advance for the possibility of filing. Two explanations are explored for why more households don't file for bankruptcy. The first is a model of the interaction between creditors' remedies against debtors who default and the debtors' right to file for bankruptcy. The model implies that some debtors default but do not file for bankruptcy, even though they would benefit financially from doing so, because creditors do not always attempt to collect. The other explanation involves the option value of bankruptcy. Many debtors who would not benefit from filing immediately gain from having the option to file in the future. I calculate the value of the option for typical households and show that it can be very valuable, particularly for households that have high variance of the return to net wealth and households that live in states with high bankruptcy exemption levels.

1. Introduction

Personal bankruptcy law in the United States is extremely favorable to individual debtors. Debtors who file for bankruptcy under Chapter 7 of the U.S. Bankruptcy Code are not required to use any of their future income to repay their debts, regardless of how high their incomes are. They are also not required to use any of their assets to repay debt, as long as the value of their assets is below an exemption level set by their state of residence. Since some states have high exemption levels and most debtors have few assets, debtors who file for bankruptcy can often obtain a discharge from their debts without giving up any

I am very grateful to Frank Buckley, Aaron Edlin, Roger Gordon, Jeff Mackie-Mason, Motty Perry, Eric Posner, Matthew Shapiro, Martha Starr-McCluer, Alan Schwartz, and Steve Zeldes for comments on earlier drafts and to Wendy Petropolous and Yinfang Lin for excellent research assistance. I also benefited from comments made by participants at a number of seminars and conference presentations. Research support was provided by the NSF Law and Social Sciences and Economics programs under grant numbers SBR-9319960 and SBR-9617712.

© 1998 Oxford University Press

of their assets or their future income. In addition, debtors face little or no loss of access to credit following bankruptcy, although they probably pay higher interest rates. Over the last decade, the number of individuals and married couples filing for bankruptcy has increased rapidly, from approximately 300,000 in 1985 to 900,000 in 1995 and over 1.1 million in 1996.[1]

But despite the rapid growth in the number of personal bankruptcy filings, many more households could benefit financially from filing than the number that actually file. Using data from the 1992 *Survey of Consumer Finance* (SCF), I calculate that at least 15% of U.S. households would benefit financially by filing for personal bankruptcy, and this figure would be far higher if most households acted strategically to increase their financial benefit from bankruptcy. In comparison, only 0.66% of U.S. households actually filed for bankruptcy per year over the decade from 1985 to 1994 and around 1.1% of households filed in 1996. Thus the bankruptcy filing rate could double or triple without exhausting the pool of households that would benefit financially from filing. Since approximately 12% of commercial bank assets in the United States is composed of consumer installment loans (*Federal Reserve Bulletin*, vol. 81, Nov. 1995, Table 1.26), a sudden increase in the proportion of households filing for bankruptcy could destabilize the consumer credit system and force the Federal Reserve system to intervene to rescue insolvent commercial banks, with the resulting increase in interest rates possibly causing a recession.

Why don't more of the households that would benefit from filing for bankruptcy actually file? Understanding the phenomenon of the "missing" bankruptcy filings is the goal of this article. Two explanations are explored here. The first involves the interaction of creditors' remedies against debtors who default and the debtors' right to file for bankruptcy. In the model, there are two types of debtors who default, and creditors cannot distinguish between them. If creditors take legal action against debtors who default, one type always repays while the other type always files for bankruptcy. I show that in equilibrium, there are always some debtors who default and would benefit financially from bankruptcy, but do not file because creditors do not take legal action against them. These debtors get the benefit of default without bearing the cost of a bankruptcy filing. Using the results of the model, I calculate that the number of bankruptcy filings would double if all debtors in this situation actually filed for bankruptcy. The second explanation for why the bankruptcy filing rate is so low involves the option value of bankruptcy. Many debtors who would not benefit financially from bankruptcy if they had to file immediately nonetheless benefit from having the option to file for bankruptcy in the future, because the option guarantees that their wealth will not fall below a minimum level. I calculate the value of the option for typical households in each decile of the wealth distribution and show that it is very valuable for some groups of households.

1. These are nonbusiness bankruptcy filings. The data are from the Administrative Office of the U.S. Courts.

The article is arranged as follows. Section 2 discusses legal and institutional aspects of both personal bankruptcy and creditors' legal remedies against debtors. In Section 3, I calculate the proportion of households that would benefit financially by filing for bankruptcy. Section 4 presents the model of the interaction between creditors' remedies and the debtors' right to file for bankruptcy. Section 5 calculates the option value of bankruptcy for typical households at different wealth levels. Section 6 is the conclusion.[2]

2. Institutional Background: Bankruptcy and Wage Garnishment

2.1 Personal Bankruptcy Under Chapters 7 and 13

Debtors who file for bankruptcy under the U.S. Bankruptcy Code have the right to choose between filing under Chapter 7 or Chapter 13.

2.1.1 Chapter 7. Under Chapter 7, debtors must turn over to the Bankruptcy Court all of their assets above a fixed exemption level, in return for which many types of unsecured debt are discharged. Although bankruptcy is a matter of federal law and the rules are uniform across the United States, individual states are allowed to adopt their own bankruptcy exemptions. Most states have separate exemptions for equity in the debtor's principle residence (the "homestead" exemption), equity in motor vehicles, personal property, the cash value of life insurance and IRA/Keogh accounts, and a "wildcard" exemption that can be used for any type of property. Most states allow married couples who file for bankruptcy to double certain exemptions, and 16 states allow debtors to choose between the state's exemption and a separate federal exemption. Table 1 shows Chapter 7 exemptions for all states and the District of Columbia, plus the federal exemption, as of 1992.[3] Exemptions—particularly the homestead exemption—vary widely across states. Seven states have unlimited homestead

2. There has been relatively little research by economists on personal financial distress and bankruptcy. Rea (1984) and Dye (1986) analyze economic incentives under the U.S. Bankruptcy Code of 1978 and consider the insurance aspect of personal bankruptcy. White (1987), Domowitz and Eovaldi (1993), Buckley and Brinig (1998), and Fay, Hurst, and White (1998) analyze personal bankruptcy filing rates empirically. Gropp, Scholz, and White (1997) show that the demand for credit is higher and the supply of credit is lower in states with high personal bankruptcy exemptions. In the legal and sociological literatures, Shuchman (1985) and Sullivan, Warren, and Westbrook (1989) discuss the characteristics of samples of debtors that filed for bankruptcy and Earl (1966), Jacob (1969), and Caplovitz (1974) discuss the characteristics of samples of debtors that experienced financial distress. Buckley (1994) discusses explanations for the prodebtor tilt of U.S. bankruptcy policy. White (1991) discusses economic versus sociological views of why debtors file for bankruptcy.

3. In addition to the exemptions in Table 1, most states exempt clothing, furniture, and household goods. Many details are omitted from Table 1 but are used in the calculations in Section 3 below. For example, exemptions in some states vary depending on whether debtors are working, whether they are elderly, whether they have children, or whether they rent or own. Occasionally debtors who take one exemption cannot take the full value of other exemptions. California has two exemption systems, of which only the most favorable (system II) is listed here (Elias, Renauer, and Leonard, 1993).

Table 1. Bankruptcy and Wage Garnishment Exemptions, 1992

State	Homestead	Personal Property	Retirement Accounts	Motor Vehicle	Wildcard	Wages	Federal Exemption Allowed?
AK	$54,000	0	Unlimited	$3000*	0	$17,500	No
AL	$5000*	$3000*	0	0	0	75%	No
AR	Unlimited	$500	$20,000*	$1200*	0	$1300	Yes
AZ	$100,000	$150*	Unlimited	$1500*	0	75%	No
CA	$7500	0	Unlimited	$1200	$400	75%	No
CO	$30,000*	0	Unlimited	$1000*	0	75%	No
CT	0	0	0	$1500*	0	75%	Yes
DC	0	0	0	$500*	0	75%	Yes
DL	0	0	0	0	$500*	85%	No
FL	Unlimited	$1000*	Unlimited	0	0	100%	No
GA	$5000*	0	Unlimited	$1000*	$400*	75%	No
HI	$20,000*	0	Unlimited	$1000*	0	80–100%	Yes
IA	Unlimited	$100*	Unlimited	$5000*	0	75%	No
ID	$50,000*	0	Unlimited	$1500*	0	75%	No
IL	$7500*	$2000*	Unlimited	$1200*	0	85%	No
IN	$7500*	$100*	Unlimited	0	$4000*	75%	No
KS	Unlimited	0	Unlimited	$20,000*	0	75%	No
KY	$5000*	0	Unlimited	$2500*	$1000*	75%	No
LA	$15,000	0	Unlimited	Unlimited	0	75%	No
MA	$100,000	$925*	Unlimited	$750*	0	$6500	Yes
MD	0	0	0	0	$5500*	75%	No
ME	$7500*	$4500*	Unlimited	$1200*	$400*	75%	No
MI	$3500*	0	Unlimited	$1000*	0	75%	Yes
MN	Unlimited	0	$90,000*	$3000*	0	75%	Yes
MO	$8000	0	0	$500*	$1250*	90%	No
MS	$75,000*	$10,000*	Unlimited	0	0	75%	No
MT	$40,000*	0	Unlimited	$1200	0	75%	No
NB	$10,000*	0	Unlimited	0	$2500*	85%	No
NC	$10,000*	$3500*	0	$1500*	0	75%	No
ND	$80,000*	$5000*	Unlimited	$1200*	0	75%	No
NH	$30,000*	0	0	$1000*	0	75%	No

Continued

exemptions, but 20 other states have homestead exemptions of $7500 or less for individual debtors.[4]

4. State exemptions actually apply regardless of whether debtors have filed for bankruptcy or not. Thus, by themselves, state exemptions do not provide an incentive for debtors to file for bankruptcy, except in a few states where the federal bankruptcy exemption is more generous than the state's exemption and the state permits debtors in bankruptcy to use the federal exemption. However, for most debtors, the set of benefits that debtors gain in bankruptcy—which includes discharge of debt, prohibition of wage garnishment, termination of all debt collection efforts by creditors, and the state or Federal property exemption—is much more valuable than the nonbankruptcy right by itself to use the state's property exemption. But because all aspects of the bankruptcy package other than the state exemptions are uniform across states, the incentive to file for bankruptcy is stronger for debtors who live in states that have more generous exemptions. See Jackson (1986:ch. 11) for a discussion.

Table 1. *Continued*

NJ	0	$1000*	Unlimited	0	0	90%	Yes
NM	$20,000*	0	Unlimited	$4000*	$500*	75%	Yes
NV	$95,000	$4500*	$100,000	$1500*	0	75%	No
NY	$10,000*	$2500*	Unlimited	$2400*	0	90%	No
OH	$5000*	$400*	Unlimited	$1000*	$400*	75%	No
OK	Unlimited	0	Unlimited	$3000*	0	75%	No
OR	$15,000	$7500*	Unlimited	$1200	0	75%	No
PA	0	0	Unlimited	0	$300*	100%	Yes
RI	0	0	Unlimited	0	0	$50	Yes
SC	$5000*	$1000*	Unlimited	$1200*	0	75%	Yes
SD	$30,000*	$4000	0	0	0	60 days	No
TN	$5000	$4000*	Unlimited	0	0	75%	No
TX	Unlimited	$30,000*	Unlimited	0	0	100%	Yes
UT	$8000	0	Unlimited	$1500*	0	75%	No
VA	$5000*	0	Unlimited	$2000	0	75%	No
VT	$30,000*	$700*	$10,000*	$2500*	$7400*	75%	Yes
WA	$30,000*	$100*	Unlimited	$2500*	0	75%	Yes
WI	$40,000	$1000*	Unlimited	$1200*	0	75%	Yes
WV	$7500*	0	Unlimited	$1200*	$400	80%	No
WY	$10,000*	0	Unlimited	$2000*	0	75%	No
Federal	$7500*	$3750*	Unlimited	$1200*	$400*		

*Indicates that the exemption is doubled for married couples who file for bankruptcy.

**Dollar figures indicate that 100% of the specified amount is exempt. 60 days indicates that wages for 60 days are 100% exempt. Wages in excess of the specified amount or the specified number of days are subject to the 75% or 30 times the Federal minimum wage per week (whichever is higher) exemption.

If the value of the debtors' assets exceeds the relevant exemption, the excess assets must be turned over to the bankruptcy trustee. The trustee sells the assets and uses the proceeds to pay creditors on a pro rata basis. Because Chapter 7 is so favorable to debtors, the average repayment rate to creditors in Chapter 7 bankruptcy is only about 1% (White, 1987; Sullivan et al., 1989:ch. 12).

Several factors reduce the attractiveness of filing for bankruptcy under Chapter 7. First, debtors who file for bankruptcy must pay bankruptcy court filing fees, which are about $150, and most debtors seek legal advice before filing for bankruptcy at an additional cost of at least $200.[5] Thus filing for bankruptcy is unattractive for those whose debts are small. Second, debts which are collateralized—primarily mortgages, home equity loans, and automobile loans—can only be discharged in bankruptcy if debtors give up the collateral. However, filing for bankruptcy delays secured creditors from foreclosing and, in addition, nonmortgage lenders can be forced in bankruptcy to reduce the amount of the loan to the market value of the collateral. Third,

5. Recent advertisements by bankruptcy lawyers in the Chicago subway specify legal costs of $200 if a lawyer fills out the paperwork and advises clients how to represent themselves in bankruptcy. Topolnicki and Macdonald (1993) discuss an interview with a bankruptcy lawyer who advertises a "bankruptcy express" service for $350. These figures clearly represent minimum legal costs; average legal costs are presumably higher. Note that debtors can petition the bankruptcy court to waive the filing fee if they are unable to pay it.

some types of debt—student loans, tax obligations, child support payments, and debts incurred by fraud are examples—cannot be discharged in Chapter 7 bankruptcy. Finally, debtors who file for bankruptcy under Chapter 7 may not file again under Chapter 7 for 6 years, although they may file under Chapter 13.

2.1.2 Chapter 13. Now consider Chapter 13, which is intended for debtors who earn regular incomes. Under it debtors do not give up any assets when they file for bankruptcy, but they must propose a plan to repay a portion of their debts from future income, usually over 3 to 5 years. The plan goes into effect as long as the bankruptcy judge accepts it, that is, creditors do not have the right to disapprove the plan. Because debtors have the right to choose between Chapters 7 and 13, they have an incentive to choose Chapter 7 whenever their assets are less than the exemption, since doing so allows them to completely avoid the obligation to repay. Even when households have assets above the exemption level, the fact that they have the right to choose between Chapters 7 and 13 limits the amount they are willing to repay from future income. For example, a household with debts of $50,000 and nonexempt assets worth $10,000 would have to repay $10,000 if it filed under Chapter 7, so the household would be willing to repay no more than the equivalent of $10,000 from future income if it filed under Chapter 13. Congress has attempted to make Chapter 13 more attractive to debtors by allowing some types of debts—including some student loans and debts incurred by fraud—to be discharged in Chapter 13, but not Chapter 7, and by allowing unlimited repeat filings under Chapter 13.[6]

This discussion suggests that debtors whose assets are below the exemption level will either file under Chapter 7 or propose token repayment plans under Chapter 13; while debtors whose assets are above the exemption level will file under Chapter 13 but will propose to repay no more than the value of their nonexempt assets. As a result of the close relationship between the two procedures, in what follows I ignore the distinction between them.

Finally, it should be noted that it is not in the creditors' interest for debtors to file for bankruptcy. Bankruptcy is a collective procedure which provides for equal pro rata repayment of all debts (Jackson, 1986). Assuming that multiple creditors have claims against a particular debtor, it is in the individual creditors'

6. In 1984, Congress enacted a provision (11 U.S.C. §707(b)) which allows the Bankruptcy Court or the U.S. Trustee to dismiss Chapter 7 filings if they would result in "substantial abuse" of the procedure. This provision has sometimes been interpreted to mean that debtors who have high incomes cannot file under Chapter 7. However, the provision explicitly denies creditors the right to initiate motions to dismiss bankruptcy filings based on substantial abuse, which means that the bankruptcy trustee who administers Chapter 7 cases must identify these cases. Wells, Kurtz, and Calhoun (1991) surveyed bankruptcy courts and found that few of them had programs in place to screen Chapter 7 filings for substantial abuse. In addition, court decisions since 1984 have taken the position that Chapter 7 petitions cannot be dismissed based solely on the debtors' ability to repay, that is, other factors such as criminal activity or use of Chapter 7 to avoid provisions of a divorce agreement must also be present. Thus, in practice, the provision has not limited the debtors' right to file under Chapter 7 even if they have high income levels. See Gross (1986) and Buckley and Brinig (1998) for discussions of the legislative history of §707(b). More than 70% of personal bankruptcy filings are under Chapter 7 (*Statistical Abstract of the U.S. 1994*, Table 850).

interest to race against each other to be first to initiate debt collection procedures, because the earliest creditors to collect will receive more than they would if the debtor filed for bankruptcy, while later creditors will receive less. Even if only one creditor has claims against the debtor, debtors are obliged to use both their income and their assets to repay debt outside of bankruptcy, while in bankruptcy debtors are only obliged to use nonexempt assets to repay debt.

2.1.3 The Costs of Bankruptcy. In addition to paying the out-of-pocket costs of lawyers' fees and bankruptcy court filing fees, debtors who file for bankruptcy must bear the cost of the bankruptcy stigma, guilt at having failed to meet their moral obligation to repay their debts, and the cost of reduced access to credit after the bankruptcy filing. There is impressionistic evidence that these costs have been declining, although probably at different rates in different localities and for different types of debtors. Two recent surveys by VISA U.S.A. (1997a, b) of debtors who filed for bankruptcy provide some impressionistic evidence. One survey asked debtors how they learned about bankruptcy. It found that 45% learned about it from friends and family—a much higher figure than in earlier surveys. The fact that people are willing to talk freely about bankruptcy suggests that the level of social disapproval of bankruptcy is low. An additional 19% of debtors learned about bankruptcy from advertisements, presumably by lawyers. Widespread advertising of bankruptcy by lawyers presumably bolsters its social acceptability and therefore tends to reduce the stigma. While most respondents claimed that the decision to file for bankruptcy was difficult, they also expressed a strong sense that filing for bankruptcy significantly improved their lives and that they felt healthier and happier since their filings. Thus while debtors may feel bad about failing to repay their debts, the responses suggest that these costs are often outweighed by the gains from filing. In the same survey, two-thirds of respondents said that they found the actual process of filing for bankruptcy to be easy. Thus debtors who have been through the bankruptcy process are likely to speak favorably about their experience when they discuss bankruptcy with family and friends, which further reduces the bankruptcy stigma. Another recent survey (Staten, 1993) suggests that debtors who file for bankruptcy are able to obtain postbankruptcy credit: three-quarters of debtors had at least one credit card within a year after their bankruptcy filings.[7]

2.2 Creditors' Legal Remedies Against Debtors Who Default

When debtors default on a noncollateralized debt, creditors have various strategies for collecting.[8] The first method is for creditors repeatedly to send letters

7. Debtors often retain a credit card through the bankruptcy process, either by paying off the balance before filing or by reaffirming the debt. In addition, the recent fall in interest rates on credit card loans has caused many lenders to begin targeting the high-risk market, since interest rates are higher in that market. See Saul Hansell, "A Surge in Second-Chance Finance," *New York Times*, March 17, 1996, p. 3-1, and Ausubel (1991).

8. When debtors default on a collateralized debt, creditors can reclaim the collateral. However, if the creditor sells the collateral for less than the amount of the debt, then the remainder is an uncollateralized debt and the discussion here applies. For a general discussion of debt collection procedures from the creditor's viewpoint, see Lawrence (1992).

to and telephone debtors, reminding them of the overdue debt. These contacts may be supplemented by visits to debtors' homes or workplaces by creditors' representatives. Creditors can also hire debt collection services that specialize in taking these actions. Debt contracts invariably give creditors the right to penalize debtors for late payment by adding late charges and interest to the debt, plus the creditor's cost of debt collection. The next step is for creditors to sue the debtor. Debtors often fail to appear in court in response to creditors' lawsuits, in which case the creditor obtains a default judgment.[9]

Having obtained a judgment against the debtor, creditors can use the legal process of garnishment to obtain repayment. Creditors may garnish debtors' property or their wages or both. For example, if the debtor has a bank account, the creditor can obtain a court order directing the bank to pay the funds in the account to the creditor, up to the amount owed. If the debtor owns a house or automobile, the creditor can obtain a court order directing the sheriff to seize the house or automobile and sell it at auction. However, it is most common for creditors to pursue garnishment of debtors' wages.[10] This involves obtaining a court order which directs the debtor's employer to pay part of the debtor's wages directly to the creditor. Each state has a wage garnishment exemption, but the Federal Consumer Credit Protection Act requires that the exemption cover at least 75% of wages or 30 times the federal minimum wage per week, whichever is higher. The column labeled "wages" in Table 1 gives wage garnishment exemptions by state. Three states—Florida, Pennsylvania, and Texas—prohibit wage garnishment entirely.

Survey evidence suggests that wage garnishment is creditors' most highly valued legal remedy (Peterson and Falls, 1981) and also that creditors commonly, but not always, pursue wage garnishment when default occurs (Jacob, 1969). Nonetheless, garnishment of wages is a risky strategy for creditors. It only succeeds if the debtor is working and the creditor can locate the debtor's employer. The amount that can be garnished from each paycheck is usually small and employers sometimes fire workers in order to avoid the trouble of complying with the court order.[11] Also, debtors whose wages are garnished have an incentive to file for bankruptcy since bankruptcy terminates wage garnishment. One study (Earl, 1966:148) reported that only 30% of all attempts by creditors to garnish wages actually succeed in collecting anything.

9. Debtors have little incentive to appear in court because they have no legal defense. See Caplovitz (1974).

10. Garnishment of property by creditors is rare because debtors are unlikely to have substantial assets that creditors can locate. If debtors have bank accounts, then they have an incentive to hide them. If a debtor owns a house, there is likely to be a mortgage and other liens on it, such as for unpaid taxes or prior judgments. If the creditor forces a sale, then the mortgage holder will be paid first and then the debtor is entitled to keep an amount up to the state's homestead exemption. Little is likely to be left over to repay other creditors. The same considerations apply to automobiles owned by debtors.

11. The Consumer Credit Protection Act, 15 U.S.C. §1674(a), prevents employers from firing workers because of a single instance of wage garnishment, but does not protect workers when multiple instances of wage garnishment occur.

3. What Proportion of Households Would Benefit from Bankruptcy?

In this section I calculate the proportion of U.S. households that would benefit financially from filing for bankruptcy under Chapter 7. I use the 1992 *Survey of Consumer Finances* (SCF), which contains detailed information on asset and debt holdings for approximately 3900 households.[12] Households are assumed to benefit financially from filing for bankruptcy if doing so increases their net worth, where net worth equals the total value of assets minus debt. Filing for bankruptcy reduces the household's debt because some debt is discharged, but also reduces the value of household's assets if any of their assets are nonexempt. The household's net worth increases as a result of filing for bankruptcy if the reduction in debt exceeds the value of nonexempt assets.[13]

As an example, suppose a household in the SCF sample lives in Pennsylvania. I calculate whether the household would benefit from filing for bankruptcy, given its asset and debt holdings and the Pennsylvania exemption. Since Pennsylvania allows married couples to double certain exemptions, I adjust these exemptions depending on whether the particular household is a married couple. Also Pennsylvania allows households to use the federal bankruptcy exemption, so I repeat the calculations using the federal exemption. The household is assumed to benefit financially from bankruptcy if its net worth increases as a result of filing, using either exemption. I repeat this procedure for each household living in Pennsylvania and then calculate the percent of Pennsylvania households that would benefit financially from filing for bankruptcy. This procedure is repeated for residents of other states.

The results of these calculations are shown in Table 2 for the 11 states having the largest sample sizes within the SCF and for the United States as a whole. Column 1 shows that the percent of households in each state that would benefit from filing for bankruptcy ranges from 9% in Illinois, Missouri, and New York to 29% in Texas, with an overall figure for the United States of 15%. The high figure for Texas is not surprising given its generous bankruptcy exemption.[14]

These calculations assume that households who file for bankruptcy do not engage in any strategic behavior. However, debtors often get advice from lawyers and others before filing and in the process they may learn strategies to increase their financial benefit from bankruptcy. Since the homestead exemption is the largest bankruptcy exemption in most states, many debtors have home equity less than the homestead exemption. If so, they can increase their benefit from

12. These calculations were run at the Federal Reserve Board, which allowed me to use data on households' state of residence. I am grateful to Martha Starr-McCluer and Arthur Kennickell for allowing me to run these calculations. See Kennickell and Starr-McCluer (1994) for general discussion of the SCF.

13. These calculations ignore the fact that if households did not file for bankruptcy, creditors might harass them or garnish their wages (which would increase the gain from bankruptcy), but they could use the state exemption to protect part of their home equity if creditors foreclosed on their homes (which would reduce the gain from bankruptcy). Since the SCF is a representative sample of households, few would be affected by these considerations. The calculations also ignore the costs of bankruptcy.

14. See White (1998) for a discussion of the distribution of dollar benefits of filing for bankruptcy.

Table 2. Percent of Households That Would Benefit Financially From Filing for Bankruptcy

	(1) Base Case (%)	(2) Strategy I (%)	(3) Strategy II (%)	(4) Strategy III (%)
California	16.4	17.6	21.6	20.3
Florida	16.4	22.9	34.0	23.9
Georgia	11.9	11.9	12.8	15.7
Illinois	9.4	9.6	11.0	12.5
Michigan	18.0	18.0	21.0	22.4
Missouri	9.0	9.0	14.0	15.9
New York	9.4	9.8	13.8	14.2
N. Carolina	15.9	15.9	16.1	19.8
Ohio	11.4	11.5	12.3	15.0
Pennsylvania	16.4	16.2	17.6	17.6
Texas	29.2	36.5	53.9	35.9
U.S.	15.4	17.5	22.6	20.2

bankruptcy by selling some or all of their nonexempt property and using the proceeds to reduce the mortgages on their principle residences.[15] This strategy is referred to as strategy I. Column 2 gives the percent of households that would benefit financially from filing for bankruptcy, assuming that they follow strategy I if they would benefit from doing so. The largest increases occur in states that have unlimited homestead exemptions. In Texas, the percent of households that benefit from filing for bankruptcy rises from 29% to 36% when households follow strategy I and, in Florida, the increase is from 16% to 23%. For the United States overall, the increase is from 15% to 17%.

Some debtors would still have nonexempt property and home equity less than the homestead exemption in their states even if they paid off their mortgages completely. These debtors could benefit even more from bankruptcy if they sold their principle residences and bought more valuable principle residences in the same state or if they made improvements to their principle residences before filing for bankruptcy.[16] Column 3 of Table 2 gives the percent of households that would benefit from filing for bankruptcy after following this procedure—referred to as strategy II. Fifty-four percent of households in Texas and 34% of households in Florida would benefit from bankruptcy after following strategy II. The figure for the United States overall is 23%.

A different type of strategy involves debtors borrowing more before filing for bankruptcy and using the proceeds to purchase services or exempt assets (such

15. Nonexempt property includes personal property in excess of the personal property exemption and equity in real estate other than debtors' principle residences. The SCF gives values for all financial accounts and gives the value of nonfinancial assets such as jewelry, antiques, and collections. Because of illiquidity, debtors are not assumed to sell two other categories of assets: businesses that they own in full or in part and loans owed to them by others.

16. See Resnick (1980) for a discussion of cases in which debtors did this and the enhanced properties were found to be exempt when the debtors filed for bankruptcy.

as clothing) or to reduce debt that is nondischargeable in bankruptcy. When they file for bankruptcy, the new debt will be discharged along with older, unsecured debt. The SCF gives data on households' unused lines of credit, broken down by whether the credit would be secured or unsecured. Strategy III involves debtors borrowing the maximum amount on all their unsecured lines of credit before filing for bankruptcy, but not obtaining new lines of credit and not following strategies I or II. Column 4 of Table 2 gives the results. The largest increases occur in Florida, where the percent of households that benefit from filing for bankruptcy rises from 16% in the base case to 24%, and in Texas, where the increase is from 29% to 36%. For the United States overall, the increase is from 15% to 20%.

These calculations suggest that a minimum of 15% of U.S. households would benefit financially from filing for bankruptcy and that a much higher proportion would benefit if households routinely behaved strategically in making their bankruptcy decisions.[17] A variety of types of debtors fall into this category and presumably a variety of explanations are needed to explain why they do not file for bankruptcy. In the next two sections I explore two different explanations.

4. A Model of Garnishment and Bankruptcy

Suppose there are three types of risk-neutral debtors, denoted A, B, and C. All debtors apply to borrow a fixed amount D for a fixed time period at interest rate r. Creditors, who are also risk neutral, cannot identify debtors' types at the time they make their lending decisions, so that they must either lend to all three types or not lend at all. Creditors are assumed to be willing to lend if they expect to break even on the loans. For simplicity, the discount rate is assumed to be zero.[18]

Debtors of type A are assumed always to repay their loans in full. Debtors of types B and C have in common that they behave strategically in making their decisions to default and to file for bankruptcy. However, type B and C debtors differ in that, at the time of default, type Bs have more debt that is dischargeable in bankruptcy than type Cs. As a result, filing for bankruptcy is financially worthwhile for type Bs, but not for type Cs.[19] Now consider what factors might differentiate type A from type B and C debtors. One possibility

17. The figures for the proportion of households that would benefit from bankruptcy would be about 2 percentage points lower if the costs of filing were taken into account, but would be substantially higher if households followed strategies I–III simultaneously or if they systematically tend to understate the value of their assets when they file for bankruptcy. See White (1998) for a discussion of other bankruptcy strategies.

18. For other asymmetric information models of credit markets, see Stiglitz and Weiss (1981), Bester (1985), and Besanko and Thakor (1987). These models are mainly concerned with explaining credit rationing by lenders and do not explore default or bankruptcy in detail.

19. Another possibility is that type B debtors consulted attorneys for financial advice, while type C debtors consulted credit counseling services. Or type B debtors may feel that they were treated unfairly by creditors, while type C debtors do not. Survey research suggests that debtors who consult with lawyers and/or who feel that they were unfairly treated by creditors are more likely to file for bankruptcy (Jacob, 1969:59–61).

is that type A debtors feel that bankruptcy carries a stigma, while type B and C debtors do not. Another possibility is that some debtors expect to repay their debts and do not behave strategically, but default if they experience some misfortune (such as job loss or illness) that reduces their ability to repay. In this case debtors who experience misfortunes shift from type A to type B or C when the misfortune occurs.[20] The probabilities that debtors are types A, B, and C are assumed to be a, b, and c, respectively, where $a + b + c = 1$.

Figure 1 illustrates the model. The terms in parentheses show the payoffs to creditors and the relevant type of debtor, respectively. At the top, all three types apply to borrow and creditors choose whether to lend without knowing the debtors' types. If creditors do not lend, then the game ends with creditors receiving a payoff of zero and debtors receiving $-L$, which represents their loss when they are unable to borrow. Assuming that creditors lend, then when the loan comes due, debtors must decide whether to default or not. Type A debtors always repay, so that creditors' net payoff is $-D + D(1+r) = rD$ and type A debtors' net payoff is $-rD$. I assume that $-rD > -L$, so that type A debtors benefit from borrowing even though they repay in full. Type B debtors always default, since they do not view bankruptcy as carrying a stigma and they benefit financially from filing. Type C debtors may either default or repay in full. The probability that they default is denoted δ.

Garnishment of the debtors' wages or assets is assumed to be the creditors' best remedy when default occurs. (See the discussion in Section 2.) Creditors must decide whether to initiate garnishment without knowing whether individual debtors who default are type B or C. The probability that creditors initiate garnishment following default is denoted γ. If creditors do not initiate garnishment, then their payoff is $-D$ and the debtors' payoff is D, regardless of whether debtors are type B or C. If creditors initiate garnishment, then their legal costs are denoted K_g. Debtors of type B respond to garnishment by filing for bankruptcy. The expected amount that creditors collect from type B debtors' wages or assets before the bankruptcy filing terminates garnishment is denoted W. The creditors' payoff from initiating garnishment when debtors turn out to be type B is therefore $-D + W - K_g$. The type B debtors' payoff in this situation is $D - W - C_b$, where C_b is the debtors' out-of-pocket cost of filing for bankruptcy. In contrast, debtors of type C do not find it worthwhile to file for bankruptcy and they therefore repay their debt in full when creditors initiate garnishment. They must also pay a penalty of amount P. The creditors' payoff from initiating garnishment when debtors turn out to be type C is therefore $rD + P - K_g$. The type C debtors' payoff is $-rD - P - C_g$, where C_g is their legal cost of terminating garnishment.

Consider the type B debtors' default decision. Since type B debtors always default, it must be the case that their payoff when they default always exceeds the payoff they would receive if they repaid their debt in full, even assuming that creditors always initiate garnishment following default. This requires that $D - W - C_b > -rD$ or $(1+r)D > W + C_b$.

20. Sullivan et al. (1989) argue for this view of bankruptcy.

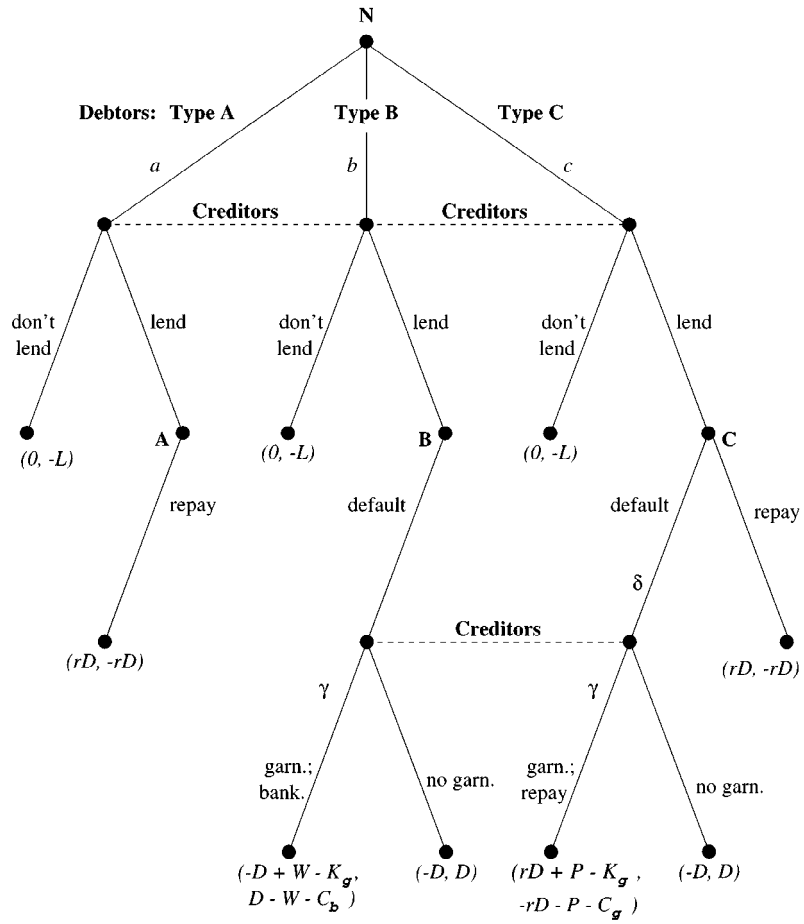

Figure 1. A model of garnishment and bankruptcy.

Now consider the type C debtors' default decision. Debtors of type C gamble when they default, since their payoff if creditors do not pursue garnishment following default exceeds their payoff when they repay, which in turn exceeds their payoff if creditors pursue garnishment following default. Thus $D > -rD > -rD - P - C_g$. Type C debtors choose a pure strategy of default if their expected return when they default, $\gamma(-rD - P - C_g) + (1-\gamma)D$, exceeds their return when they repay, $-rD$, or $\gamma(-rD - P - C_g) + (1-\gamma)D > -rD$. Thus $\delta = 1$ when this condition holds, or when $\gamma < \frac{D(1+r)}{D(1+r)+P+C_g}$. Type C debtors choose a pure strategy of repayment ($\delta = 0$) when this inequality is reversed, and they play mixed strategies ($0 < \delta < 1$) when $\gamma = \frac{D(1+r)}{D(1+r)+P+C_g}$.

Now turn to the creditors' decision whether to pursue garnishment following default. The creditors' payoff from pursuing garnishment is $-D + W - K_g$

if debtors turn out to be type B. Suppose $W < K_g$, so that creditors are worse off if they pursue garnishment and debtors turn out to be type B's than if they had done nothing. The creditors' payoff from pursuing garnishment is $rD + P - K_g$ if debtors turn out to be type C. Assuming that $rD + P - K_g > -D$, then pursuing garnishment is a gamble for creditors. This is because the payoff from garnishment is higher than the payoff from doing nothing if debtors turn out to be type C, but the payoff from garnishment is lower than the payoff from doing nothing if debtors turn out to be type B. Suppose c' denotes the probability that debtors are type C conditional on default occurring (while c is the unconditional probability that debtors are type C). Creditors' expected payoff when they pursue garnishment is $c'(rD + P - K_g) + (1 - c')(-D + W - K_g)$ and their payoff when they do not pursue garnishment is $-D$. They pursue a pure strategy of garnishment following default if $c'(rD + P - K_g) + (1 - c')(-D + W - K_g) > -D$. Thus $\gamma = 1$ if $c' > \frac{K_g - W}{D(1+r)+P-W}$. They pursue a pure strategy of no garnishment following default ($\gamma = 0$) if this inequality is reversed, and they play mixed strategies ($0 < \gamma < 1$) if $c' = \frac{K_g - W}{D(1+r)+P-W}$.

Creditors know that all debtors who default are either type B or type C and they know the unconditional probabilities that debtors are type B or type C (b and c). When a debtor defaults, creditors use Bayes' law to update their beliefs that the debtor is type C. Since c' denotes the probability that a debtor is type C conditional on having defaulted, $c' = \frac{\delta c}{\delta c + b}$.

The information structure of the game is as follows: D, P, W, K_g, C_g, C_b, a, b, c, and lenders' opportunity cost of funds i are exogenously determined and are common knowledge. The strategy choices of creditors and type C debtors (γ and δ) and the conditional probability that debtors who default are type C (c') are endogenously determined. In addition, the condition that lenders must expect to break even in order to be willing to lend determines the interest rate r paid by debtors.

The model has nine possible strategy combinations, corresponding to type C debtors defaulting, repaying in full, or playing mixed strategies, and creditors initiating garnishment, not initiating garnishment, or playing mixed strategies. Figure 2 shows the nine strategy combinations. (Since type A debtors always repay and type B debtors always default, they do not add to the number of strategy combinations.) The top row of Figure 2 consists of strategy combinations in which debtors of type C always repay. Because type B debtors always default, these three strategy combinations would be separating equilibria if they were equilibria. The rest of the strategy combinations in Figure 2 all involve either partial or complete pooling.

Of the nine strategy combinations in Figure 2, possibilities 1 through 6 can be ruled out as equilibria. (See the Appendix.) The three remaining strategy combinations, 7 through 9, are all possible equilibria of the model. All three equilibria are similar in that they all involve debtors of type C defaulting at least some of the time, while creditors do not always initiate garnishment. Because type B debtors always default, this means that all of the possible equilibria of the model involve complete or partial pooling.

		Creditors		
		garnish-ment	mixed	no garnish-ment
Debtors Type C	repay	**1** $\delta = 0$ $\gamma = 1$	**2** $\delta = 0$ $0 < \gamma < 1$	**3** $\delta = 0$ $\gamma = 0$
	mixed	**5** $0 < \delta < 1$ $\gamma = 1$	**9** $0 < \delta < 1$ $0 < \gamma < 1$	**6** $0 < \delta < 1$ $\gamma = 0$
	default	**4** $\delta = 1$ $\gamma = 1$	**8** $\delta = 1$ $0 < \gamma < 1$	**7** $\delta = 1$ $\gamma = 0$

Figure 2. Strategy combinations.

The purpose of the model was to investigate whether, in equilibrium, any debtors who would benefit financially from bankruptcy would default but not file for bankruptcy. Because we assumed that only type B debtors would benefit financially from bankruptcy, any debtor in this situation must be type B. If creditors never pursue garnishment following default (possibility 7), then all of the type B debtors default and none end up filing for bankruptcy. If creditors play mixed and sometimes pursue garnishment (possibilities 8 and 9), then those type B debtors whose wages are garnished following default file for bankruptcy, while those type B debtors whose wages are not garnished avoid bankruptcy. Thus there are always some debtors who default and would benefit financially from filing for bankruptcy, but do not file because creditors do not pursue garnishment against them. The proportion of all debtors who end up in this situation is b in possibility 7 and $b(1 - \gamma)$ in possibilities 8 and 9. These debtors end up even better off financially than they would be if they filed for bankruptcy, because they obtain the benefit of not repaying their debts without bearing the costs of a formal bankruptcy filing.[21]

21. Two extensions of the model are worth noting. First, suppose creditors can identify most or all of the type As at the time they make their lending decisions. In that case the model can be

We can use simulation to investigate both the proportion of households that would benefit financially from bankruptcy but do not file and the type of equilibrium that is likely to prevail given realistic parameter values.[22] To do so, we need to adopt realistic values for D, K_p, P, W, C_g, and i. For the amount owed (D) I use \$1500, which is the average balance on credit card accounts of the top 100 credit card issuers in 1991.[23] For the creditors' cost of initiating garnishment (K_g) I use \$375. This figure equals the credit card issuers' average cost of collection per account in default.[24] The penalty that debtors pay when they default and then repay (P) is assumed to equal \$300. This figure is based on an informal survey of credit card agreements, which usually require that debtors in default pay a collection fee of 20% of the amount owed.[25] The average amount that creditors garnish from debtors' wages before debtors file for bankruptcy (W) is assumed to equal \$125. This figure is based on the assumptions that debtors' wages are \$500 per week (which approximates the average pay of U.S. workers), that debtors are paid weekly (the most common pay period for U.S. workers is weekly), and that creditors garnish 25% of type B debtors' wages for one pay period before debtors file for bankruptcy.[26] Finally, debtors' legal costs when they default and then repay (C_g) are assumed to equal \$200. Little data is available concerning debtors' legal costs. I use \$200 on the assumption that debtors' legal costs when they default and then repay are similar to their legal costs when they file for bankruptcy.[27] For the lenders' opportunity cost of funds (i) I use .05.

---

reinterpreted as a model of the creditors' decision to lend to risky borrowers, that is, types B and C. As the proportion of type A borrowers falls, eventually the only type of equilibrium in which lending occurs is that of possibility 9. Thus the outcome in this case is again that some but not all type B debtors would benefit financially from bankruptcy, but do not file. Second, suppose creditors can distinguish between type B and type C debtors after default occurs, although not before. In this case creditors would always initiate garnishment when type C debtors default and never initiate garnishment when type B debtors default. Type C debtors would respond by never defaulting and type B debtors would default but would never file for bankruptcy. This version of the model is less realistic since garnishment would never be used in equilibrium.

22. Further details concerning the simulation are given in the Appendix.

23. This figure is from the February 1992 *Nilson Report*, quoted in Brito and Hartley (1995).

24. Total costs of collection for bank-issued credit card accounts were \$2.1 billion in 1991 and total outstanding balances in default were \$8.37 billion in 1991. Assuming that accounts in default are of average size (\$1500), then 5.58 million accounts were in default in 1991 and the average cost of collection was therefore \$375 per account. Figures for costs of collection and amount in default are taken from Michael Quint, "Banks Uneasy at Focus on Credit Cards," *New York Times*, November 19, 1991.

25. Twenty percent of the value of an average size account is \$300. Credit card agreements also commonly require that defaulting debtors pay the creditor's costs of collection. This would imply a figure of \$375 based on the information discussed above. I use the lower figure.

26. In actuality, creditors do not attempt to garnish the wages of every debtor who defaults and do not succeed in every garnishment attempt (Jacob, 1969). On the other hand, creditors collect more if debtors are paid biweekly rather than weekly or if debtors delay in filing for bankruptcy following garnishment. I assume that these factors offset each other.

27. See the discussion of the latter in Section 2.

Values must also be selected for the proportions of debtors who are types A, B, and C (a, b, and c). Recent data suggest that the average default rate on credit card loans is .04–.05.[28] In the model, the proportion of households that default is $b+\delta c$. If we assume that $b+\delta c = .04$, then $a+(1-\delta)c = .96$, which implies that $a \leq .96$. I run separate simulations in which $a = .95$ and $a = .90$. These two assumptions represent cases in which the pool of households that considers defaulting is relatively large and relatively small, respectively. For each value of a, I investigate a range of values of the ratio of type B to type C debtors (b/c).

The top panel of Table 3 gives the results when a is assumed to equal .90. For values of b/c greater than 6.7, the equilibrium type is that of strategy combination 7. Because a high proportion of debtors who default are type B, creditors lose money when they initiate garnishment and they therefore choose never to do so. Therefore all type B and type C debtors default, so that the overall default rate is .10. The column of the table labeled "proportion who benefit" gives the proportion of debtors who default but never file for bankruptcy, because creditors never initiate garnishment. Because we assumed that type C debtors would not benefit financially from bankruptcy, all debtors in this category are type B. When the equilibrium type corresponds to strategy combination 7, about 9% of debtors would benefit from bankruptcy but do not file. When $b/c = 6.7$, the equilibrium type corresponds to strategy combination 8. Here, because there are more type Cs in the population of defaulting debtors, the creditors' expected return from pursuing garnishment rises and is just equal to their expected return from not pursuing garnishment. They therefore play mixed strategies. Finally, when $b/c < 6.7$, the equilibrium type corresponds to strategy combination 9. Here creditors still play mixed, but now the probability of garnishment is high enough that debtors of type C are indifferent between defaulting or repaying their debts in full. The most realistic results occur when the equilibrium type corresponds to strategy combination 9 and there are more type C than type B debtors ($b/c \leq 1$). Here creditors use garnishment about three-quarters of the time that debtors default, which is consistent with the evidence cited above that creditors commonly use garnishment. The overall default rate of .04–.06 is also realistic. The proportion of debtors that could benefit financially from bankruptcy but do not file is in the range of .008 to .012, or approximately 1%. Although these figures may seem low, they equal the U.S. bankruptcy filing rates for the years 1995 and 1996. They suggest that the number of households that would benefit financially from bankruptcy but do not file is approximately equal to the current rate at which households file for bankruptcy each year.

28. For credit card loans, Saul Hansell, "A Shaky House of Plastic with No Quick Fix in Sight," *New York Times*, Dec 28, 1995, p. C1, gives a figure of .04, and "Caution Lights Flash for Credit Quality," *Credit Card News*, October 15, 1995, gives a rate of 4.4%. The default figure of $8.37 billion given above, when divided by total bank credit card balances of $167.4 billion in 1991 (data taken from the February 1992 *Nilson Report*), implies a default rate of .05.

Table 3. Simulation Results

Results when $a = .90$

b/c	Type of Equilibrium	δ	γ	r	Proportion Who Benefit	Overall Default Rate
9	7	1	0	.17	.090	.10
7	7	1	0	.17	.087	.10
6.7	8	1	0–.78	.17	.019–.087	.10
5	9	.75	.78	.17	.019	.096
3	9	.45	.78	.15	.017	.086
1	9	.16	.77	.11	.012	.058
0.5	9	.08	.77	.09	.008	.038

Results when $a = .95$

b/c	Type of Equilibrium	δ	γ	r	Proportion Who Benefit	Overall Default Rate
9	7	1	0	.105	.045	.05
7	7	1	0	.105	.044	.05
6.3	8	1	0–.77	.105	.01–.043	.05
5	9	.79	.77	.10	.01	.048
3	9	.48	.77	.10	.009	.043
1	9	.16	.76	.08	.006	.029
0.5	9	.08	.76	.07	.004	.019

Parameter values: $D = \$1500$, $K_g = \$375$, $P = \$300$, $C_g = \$200$, $W = \$125$.

The bottom panel of Table 2 shows the results when $a = .95$. Here the most realistic outcome occurs when the value of b/c is in the range of 3 to 5. In this range the overall default rate is again .04–.05, the equilibrium type again corresponds to strategy combination 9, and creditors again pursue garnishment about three-quarters of the time that debtors default. The proportion of debtors that could benefit financially from bankruptcy but do not file is again about 1%.

Several large U.S. states prohibit wage garnishment entirely, and since garnishment of property by creditors is rare, the garnishment rate in these states must be close to zero. For an equilibrium to occur in which there is little or no garnishment by creditors, the equilibrium must correspond to strategy combinations 7 or 8. The results in Table 3 suggest that when the garnishment rate is close to zero, the proportion of households that would benefit from bankruptcy, but do not file, is much higher than 1%.

To summarize, the model provides a partial explanation for the fact that many more U.S. households would benefit financially from filing for bankruptcy than actually file. In the model, equilibrium requires that there always must be some debtors who default but do not file for bankruptcy, because creditors do not pursue garnishment. These debtors obtain the benefit of not repaying their debts without bearing the costs of a formal bankruptcy filing. The simulation results suggest that about 1% of U.S. households would benefit financially from bankruptcy, but do not file. If all of these households actually filed for bankruptcy, the filing rate would double, at least temporarily, and in states that prohibit garnishment, it could increase by much more.

5. The Value of the Option to File for Bankruptcy

In Section 3, I calculated the proportion of households that would benefit financially from filing for bankruptcy and found that it could be quite high. However, even these calculations underestimate the proportion of households that could benefit financially from bankruptcy, since they consider only the possibility that households file for bankruptcy immediately. Some households that would not benefit from filing for bankruptcy immediately would nonetheless benefit from filing at some point in the future. For these households, the option to file for bankruptcy in the future is valuable. In this section I compute the value of the option to file for bankruptcy for typical households at differing wealth levels.

It is well-known in finance that the positions of stockholders and bondholders in a firm can be expressed in terms of options. Suppose the firm borrows an amount D and promises to repay $D(1+r)$ in 1 year. Shareholders own the firm, but owe $D(1+r)$ to bondholders. They also own a put option on the firm with an exercise price of $D(1+r)$, which means that they have the right to sell the firm to bondholders for a price of $D(1+r)$. Bondholders are owed $D(1+r)$. They have sold a put option on the firm to shareholders with an exercise price of $D(1+r)$ and an expiration date 1 year in the future. If the firm's revenues next year before repaying the debt turn out to be greater than $D(1+r)$, then shareholders will repay the debt and retain ownership of the firm, that is, they will allow the option to expire. If the firm's revenues next year turn out to be less than $D(1+r)$, then shareholders will exercise the option. This means that they sell the firm to the bondholders for $D(1+r)$. But since they owe bondholders $D(1+r)$, the debt is cancelled and ownership of the firm is transferred to bondholders. The put option thus allows shareholders to limit their liability by exercising the option and walking away from the firm when they would otherwise bear the firm's losses. Of course, options are not explicitly traded in this situation. But the value of the shareholders' put option can be determined using the Black–Scholes formula.[29]

A similar interpretation of bankruptcy as an option can be applied to individual debtors. Suppose a household has wealth of W and borrows an amount D on an unsecured basis at interest rate r to be repaid next year. Next year, the household's wealth will be W'. W' is uncertain and the distribution of the return on wealth has a variance of σ^2. Next year the household learns its wealth W' and then decides whether to repay the debt in full or file for bankruptcy. If the household files for bankruptcy, the debt is discharged but the household must pay the costs of filing for bankruptcy, C. Suppose these costs are less than the amount owed, or $C < D(1+r)$. If the household files for bankruptcy, it is allowed to keep either its entire wealth W' or an amount equal to the bankruptcy exemption in the household's state of residence, E, whichever is lower. The household will file for bankruptcy next year if its net wealth after repaying the

29. See Ross et al. (1996:587–597). Note that this interpretation of the firm relies on the assumption that when firms default on debt repayment, ownership of the firm is transferred to bondholders. In actuality, firms that default usually file for bankruptcy and firms in bankruptcy are either liquidated, with the proceeds paid to creditors, or reorganized.

debt, $W' - D(1+r)$, is less than $E - C$ and will remain out of bankruptcy otherwise.

In this situation, debtor households are similar to the shareholders of a firm in that they have the right to file for bankruptcy and this gives them a put option on their next year's wealth. Suppose the exercise price of the option is denoted X. If next year's wealth W' exceeds E, then households exercise the option if $W' - D(1+r) \leq E - C$ and the exercise price is then $X = E - C$. If next year's wealth W' is less than E, then households exercise the option if $W' - D(1+r) < W' - C$. This condition must hold since we assumed that $C < D(1+r)$. The exercise price in this case is $X = W' - C$. Creditors are owed $D(1+r)$. They have sold a put option to borrowers with an exercise price of X. If debtors exercise the option, the debt is cancelled.

The option of filing for bankruptcy in effect provides an insurance policy for debtors which prevents their wealth at the time they file for bankruptcy from falling below the exercise price of the option. But the debtors' situation differs from the shareholders' in an important way. Once shareholders exercise their option and transfer the firm to bondholders, their involvement in the firm ends and they no longer bear the risk of its earnings stream. But, postbankruptcy, debtors still bear the uncertainty of their wealth streams.

Suppose $\Phi(.)$ denotes the value of the cumulative standardized normal distribution, t denotes the time until the debt is due, r is the risk-free rate of interest, and σ^2 is the variance of the return on net wealth. The exercise price of the option is $X = \min[W' - C, E - C]$ and the current value of the household's net wealth is $W - D$. Using the put-call parity relationship and the formula for the value of a call option (Black and Scholes, 1973), the value of the household's option to file for bankruptcy when the debt comes due is

$$(W - D)\Phi(d_1) - Xe^{-rt}\Phi(d_2) - (W - D) + Xe^{-rt} \tag{1}$$

where

$$d_1 = \frac{ln\left(\frac{W-D}{X}\right) + (r + .5\sigma^2)t}{\sqrt{\sigma^2 t}}$$

and

$$d_2 = d_1 - \sqrt{\sigma^2 t}.$$

We wish to calculate the value of Equation (1) for representative households in different regions of the net wealth distribution. To do the calculations I use data from the Panel Study of Income Dynamics (PSID) Wealth Supplements. This dataset provides information concerning the value of various types of assets and liabilities for several thousand households who were asked the same questions in 1984, 1989, and 1994. I drop from the sample households that have no unsecured debt in any of the 3 years. I also drop households whose wealth minus unsecured debt (net wealth) equals zero in 1984 or 1989.[30] For each

30. These households are dropped because rates of return on net wealth are used to calculate the

Table 4. The Value of the Option to File for Bankruptcy Using Median Net Wealth

Decile	(1) Net Wealth	(2) Wealth	(3) σ^2
1	−$1550	$1500	5.2
2	3500	6100	3.4
3	10,300	13,200	3.8
4	20,900	24,000	.81
5	34,400	37,400	.62
6	52,500	55,700	.33
7	77,400	80,600	.24
8	119,300	122,100	.22
9	196,200	200,400	.17
10	425,500	431,700	.24

Decile	(4) Exercise Price $E = \$10{,}000$	(5) Option Value $E = \$10{,}000$	(6) Exercise Price $E = \$65{,}000$	(7) Option Value $E = \$65{,}000$
2	$5750	$4300	$5750	$4300
3	9650	7300	12,850	9700
4	9650	3800	23,650	12,200
5	9650	2400	37,050	16,900
6	9650	640	55,350	18,600
7	9650	130	64,650	14,700
8	9650	37	64,650	8700
9	9650	0	64,650	2600
10	9650	0	64,650	1400

household, the three sets of wealth observations from 1984, 1989, and 1994 are used to calculate the average value of net wealth over the 3 years, the average value of wealth before subtracting unsecured debt (referred to as wealth) over the 3 years, and the 5 year variance of the return to net wealth. Households are ranked in order of average net wealth and I divide the distribution of net wealth into deciles. Table 4, columns 1, 2, and 3, shows the median value of net wealth, the median value of wealth, and the 5 year variance of the return to net wealth for each decile. Although the data used to calculate the variance is for the past, I assume (following common practice) that it will remain the same over the period of the option.

Now consider the exercise price X. If we combine the homestead and other bankruptcy exemptions and rank them across U.S. states, the values at the 25th and 75th percentiles of the distribution are $E = \$10{,}000$ and $65,000, respectively. Suppose the cost of filing for bankruptcy C is assumed to equal $350, which represents a minimum figure for out-of-pocket costs. Suppose

variance and these are undefined when net wealth is zero. There are approximately 3000 households in the dataset after these deletions. All data are in 1992 dollars.

also that the time until the loan is due and the option expires, t, is 5 years and the risk-free interest rate, r, is .05 per year.[31]

Columns 5 and 6 of Table 4 show the exercise price and the value of the option to file for bankruptcy, assuming that $E = \$10{,}000$, for all deciles of the net wealth distribution except the lowest. (The lowest decile is omitted because option values cannot be calculated when net wealth is negative.) The value of the option is \$4300 for households in the second decile. Since this figure is greater than the value of net wealth—\$3500—households in the second decile have an incentive to file for bankruptcy even if their net wealth rises rather than falls over the period of the loan. The value of the option is \$7300 in the third decile, \$3800 in the fourth decile, \$2400 in the fifth decile, and then declines quickly in value until it is zero in the ninth and tenth deciles. Thus the value of the option to file for bankruptcy is fairly high for households that have wealth below the median, but very low for households that have wealth above the median. The value of the option declines as net wealth increases in the upper half of the wealth distribution both because the variance of the return on net wealth generally declines and because the exercise price of the option declines relative to the households' net wealth level. Higher wealth households are less likely to benefit from filing for bankruptcy and therefore the value of the option decreases.

Columns 7 and 8 of Table 4 repeat the calculations assuming that the bankruptcy exemption is \$65,000 rather than \$10,000. Here the value of the option to file for bankruptcy rises sharply as wealth increases, from \$4300 in the second decile to \$9700 in the third decile, \$12,200 in the fourth decile, \$16,900 in the fifth decile, and \$18,600 in the sixth decile. The value of the option rises in this range because the exercise price is rising due to the high exemption level. In the seventh decile and above, the exercise price is constant and the variance of the return to net wealth declines. Both of these factors cause the value of the option to decline. These calculations show that the option to file for bankruptcy is very high for households in the middle of the wealth distribution if they live in high exemption states.

Because the distribution of the variance of the return to net wealth is extremely skewed, even within particular deciles of the net wealth distribution, I redo the calculations using the average—rather than the median—values of all the variables for each decile. Households whose return to net wealth has high variance presumably include those whose earners are self-employed and those whose earners have a high proportion of their wealth invested in human capital. The results are reported in Table 5. The main difference between the two

31. The option value calculations assume that households can only file for bankruptcy at the end of the 5 year period. Since in fact households can file for bankruptcy at any time (unless they have filed under Chapter 7 within the past 6 years), the value of the option in general is understated. See Geske and Johnson (1984) for a discussion of the difference in value between European versus American put options and simulation results. The value of the option is also understated because households can increase its value by engaging in the types of strategic behavior discussed in Section 3, which in effect increase the bankruptcy exemption and therefore the exercise price.

Table 5. The Value of the Option to File for Bankruptcy Using Average Net Wealth

Decile	(1) Net Wealth	(2) Wealth	(3) σ^2
1	−$5600	$3300	96,400
2	3500	6800	11,600
3	10,400	14,200	2000
4	21,200	24,700	140
5	34,700	38,400	221
6	52,600	56,800	75
7	77,700	81,300	20
8	119,500	123,700	58
9	197,200	201,800	41,500
10	652,900	665,600	830

Decile	(4) Exercise Price $E = \$10{,}000$	(5) Option Value $E = \$10{,}000$	(6) Exercise Price $E = \$65{,}000$	(7) Option Value $E = \$65{,}000$
2	$6450	$5000	$6450	$5000
3	9650	7500	13,850	10,800
4	9650	7500	24,350	19,000
5	9650	7500	38,050	29,600
6	9650	7500	55,450	44,000
7	9650	7500	64,650	50,300
8	9650	7500	64,650	50,300
9	9650	7500	64,650	50,300
10	9650	7500	64,650	50,300

sets of calculations is that the average variance of the return to net wealth is far greater than the median variance. A property of put options is that as the variance increases, the value of the option rises to a maximum which equals the present value of the exercise price, or Xe^{-rt}. When the average rather than the median variance of the return to net wealth is used, the value of the option to file for bankruptcy is always at its maximum. The reason for the high value of the option is that when the variance of the return to net wealth is high, the probability that households' net wealth will fall below the exercise price is very high and households are therefore very likely to exercise their option to file for bankruptcy.

In column 5 of Table 5, where the bankruptcy exemption is assumed to equal $10,000, the value of the option to file for bankruptcy becomes $5000 in the second decile and $7500 in the third through tenth deciles. In column 6, where the bankruptcy exemption is $65,000, the value of the option to file for bankruptcy is still $5000 in the second decile, but rises as X increases to $10,800 in the third decile, $29,600 in the fifth decile, and $50,300 in the seventh decile. It remains constant at $50,300 in the eighth through tenth deciles.

The results of these calculations suggest that the value of the option to file for bankruptcy varies widely across households. For households that have low

variance of the return to net wealth, the value of the option is relatively low unless they are in the middle deciles of the wealth distribution. For households that have high variance of the return to net wealth, the value of the option can be extremely high at all deciles of the net wealth distribution, particularly when the bankruptcy exemption is high.

The National Bankruptcy Review Commission (1997) recently proposed a substantial increase in bankruptcy exemptions relative to current levels. Under the proposal, the exemption for renters would be $35,000 for single filers and $70,000 for married filers and the nonhomestead exemption for homeowners would be $20,000 for single filers and $40,000 for married filers. In addition, states would be allowed to adopt homestead exemptions ranging from a minimum of $20,000 to a maximum of $100,000. Suppose these recommendations were adopted and all states adopted homestead exemptions of $60,000—the midpoint of the allowed range. Using aggregate figures for the proportion of married versus single households and of renters versus owners, the proposal would result in an average bankruptcy exemption level of $78,700. This would be an extremely large increase compared to the median exemption level as of 1992, which was approximately $25,000. Suppose we compute the value of the option to file for bankruptcy under the proposal using the average values of the variance of the return to net wealth. The results are the same as in column 7 of Table 5 for deciles 2 through 6. But for deciles 7 through 10, the effect of adopting the commission's proposal would be to raise the value of the option from $50,300 to $61,300. Thus, under the proposal, the value of the option to file for bankruptcy would rise substantially for households that have high variance and for households who live in states that currently have exemption levels below $78,700. The result of adopting the change would probably be a large increase in the number of bankruptcy filings.[32]

In this section I have shown that bankruptcy can be interpreted as a put option. The value of the option to file for bankruptcy can be extremely valuable for debtor households, particularly those who have high variance of the return to net wealth and those who live in states with high bankruptcy exemptions.

6. Conclusion

Although U.S. bankruptcy filing rates are at an all-time high, I argue in this article that many more households would benefit financially from filing for bankruptcy than actually file. While the current bankruptcy filing rate is slightly more than 1% of households each year, I calculate that at least 15% of households would benefit financially from filing, and the actual figure could be several times higher if households tended to behave strategically in planning for bankruptcy.

This article explores two explanations of why more households don't file for bankruptcy. The first involves an asymmetric information model of the

32. Fay et al. (1998) estimate that an additional 100,000 bankruptcy filings per year would occur if these proposals were adopted.

interaction between creditors' remedies against debtors who default—mainly garnishment of debtors' wages—and the debtors' right to file for bankruptcy. The model suggests that some debtors default but do not file for bankruptcy, even though they would benefit financially from doing so. This is because they obtain the benefits of bankruptcy without bearing the costs of filing, since creditors do not attempt to collect. I calculate that if all households in this situation actually filed for bankruptcy, the filing rate would double, at least temporarily. The other explanation involves the option value of bankruptcy. The option to file for bankruptcy in effect provides debtors with a guarantee that their wealth on the date when the loan comes due will not be below an exercise price equal to the minimum of the bankruptcy exemption level or their gross wealth, minus the out-of-pocket costs of filing. The value of the option to file for bankruptcy is highest for those debtor households that have high variance of the return to net wealth and for those who live in states with high bankruptcy exemptions.

The rapid rise in the U.S. bankruptcy filing rate that has occurred over the past several years suggests that an increasing proportion of households who would benefit financially from bankruptcy are actually choosing to file. To some extent this is probably due to the doubling of the Federal bankruptcy exemption that occurred in 1994, which increased the benefit from filing for households in the 16 states which allow use of the Federal exemption. Understanding the reasons behind the rise in the popularity of bankruptcy and designing appropriate reforms to limit ways in which strategically minded debtors can manipulate the bankruptcy system are important topics for future research.

Appendix: Discussion of the Model in Section 4

A.1 Strategy Combinations 1 Through 6

In strategy combination 1, debtors of type C always repay and debtors of type B always default. Creditors therefore learn when they use garnishment that all debtors who default are type B. Since creditors lose money when they pursue garnishment against type B debtors, their best strategy is never to pursue garnishment. As a result, γ must equal 0 rather than 1. The same argument rules out strategy combination 2 as an equilibrium.

In strategy combination 3, debtors of type C always repay and creditors never use garnishment. But if creditors never use garnishment, then debtors of type C always prefer to default rather than to repay and δ therefore cannot equal zero. The same argument rules out strategy combination 6 as an equilibrium.

In strategy combination 4, creditors always pursue garnishment and debtors of type C always default. But if creditors always pursue garnishment, then debtors of type C always prefer to repay, since their payoff if they repay exceeds their payoff if they default. Therefore δ cannot be greater than 0. The same argument rules out strategy combination 5 as an equilibrium.

A.2 Equilibrium Possibilities 7 through 9

The conditions for equilibrium possibility 7, as discussed in the text are $c' = c/(c+b) < (K_g - W)/(D(1+r) + P - W)$, $\delta = 1$, and $\gamma = 0$. In addition,

creditors must expect ex ante to break even on loans. Suppose the lenders' opportunity cost of funds is denoted i. Since only debtors of type A repay their loans, the lenders' break-even condition is $(1+i)D = a(1+r)D$. These conditions are used in the simulation.

For equilibrium possibility 8, the conditions discussed in the text are $c' = (K_g - W)/(D(1+r) + P - W)$, $0 < \gamma < D(1+r)/(D(1+r) + P + C_g)$, $\delta = 1$, and $c' = c/(c+b)$. Here the break-even condition is again $(1+i)D = a(1+r)D$. All debtors of type B and C default and creditors are indifferent between pursuing versus not pursuing garnishment. Therefore the creditors' expected return from pursuing garnishment following default must be the same as their expected return from not pursuing garnishment following default, which is zero.

For equilibrium possibility 9, the conditions discussed in the text are $c' = (K_g - W)/(D(1+r) + P - W)$, $\gamma = D(1+r)/(D(1+r) + P + C_g)$, and $c' = \delta c/(\delta c + b)$. Because a fraction $(1-\delta)$ of type C now do not default, the creditors' break-even condition becomes $(1+i)D = a(1+r)D + c(1-\delta)(1+r)D$.

References

Ausubel, L.M. 1991. "The Failure of Competition in the Credit Card Market," 81 *American Economic Review* 50–81.

Besanko, D., and A. Thakor. 1987. "Collateral and Rationing: Sorting Equilibria in Monopolistic and Competitive Credit Markets," 28 *International Economic Review* 617–89.

Bester, H. 1985. "Screening vs. Rationing in Credit Markets with Imperfect Information," 75 *American Economic Review* 850–55.

Black, F., and M. Scholes. 1973. "The Pricing of Options and Corporate Liabilities," 81 *Journal of Political Economy* 637–54.

Brito, D.L., and P.R. Hartley. 1995. "Consumer Rationality and Credit Cards," 103 *Journal of Political Economy* 400–33.

Buckley, F.H. 1994. "The American Fresh Start," 4 *Southern California Interdisciplinary Law Journal* 67–97.

———, and M.F. Brinig. 1998. "The Bankruptcy Puzzle," *Journal of Legal Studies* 187–208.

Caplovitz, D. 1974. *Consumers in Trouble: A Study of Debtors in Default*. New York: Free Press.

Domowitz, I., and T. Eovaldi. 1993. "The Impact of the Bankruptcy Reform Act of 1978 on Consumer Bankruptcy," 36 *Journal of Law & Economics* 803–35.

Dye, R. 1986. "An Economic Analysis of Bankruptcy Statutes," 24 *Economic Inquiry* 417–28.

Earl, D.R. 1966. *The Bankruptians*. New York, NY: Exposition Press.

Elias, S., A. Renauer, and R. Leonard. 1993. *How to Declare Personal Bankruptcy*, 4th ed. Berkeley, Calif.: Nolo Press.

Fay, S., E. Hurst, and M.J. White. 1998. "The Bankruptcy Decision: Does Stigma Matter?," working paper, University of Michigan.

Geske, R., and H.E. Johnson. 1984. "The American Put Option Valued Analytically," 39 *Journal of Finance* 1511–24.

Gropp, R., J.K. Scholz, and M.J. White. 1997. "Personal Bankruptcy and Credit Supply and Demand," 112 *Quarterly Journal of Economics* 217–52.

Gross, K. 1986. "Preserving a Fresh Start for the Individual Debtor: The Case for Narrow Construction of the Consumer Credit Amendments," 135 *University of Pennsylvania Law Review* 59.

Jackson, T. 1986. *The Logic and Limits of Bankruptcy Law*. Cambridge, Mass.: Harvard University Press.

Jacob, H. 1969. *Debtors in Court: The Consumption of Government Services.* Chicago: Rand McNally & Co.

Kennickell, A.B., and M. Starr-McCluer. 1994. "Changes in Family Finances from 1989 to 1992: Evidence from the Survey of Consumer Finances," 80 *Federal Reserve Bulletin* 861–82.

Lawrence, D.B. 1992. *Handbook of Consumer Lending.* Englewood Cliffs, N.J.: Prentice-Hall.

National Bankruptcy Review Commission. 1997. *Final Report: Bankruptcy: The Next Twenty Years.* October 20. National Bankruptcy Review Commission.

Peterson, R.L., and G.D. Falls. 1981. "Costs and Benefits of Restrictions on Creditors' Remedies." Working paper 41, Credit Research Center, Krannert Graduate School of Management, Purdue University.

Rea, S. 1984. "Arm-breaking, Consumer Credit and Personal Bankruptcy," 22 *Economic Inquiry* 188–208.

Resnick, A. 1980. "Prudent Planning or Fraudulent Transfer? The Use of Nonexempt Assets to Purchase or Improve Exempt Property on the Eve of Bankruptcy," 85 *Commercial Law Journal* 238.

Ross, S.A., R.W. Westerfield, and J. Jaffe. 1996. *Corporate Finance*, 4th ed. Chicago: Irwin.

Shuchman, P. 1985. "New Jersey Debtors 1982-1983," 15 *Seton Hall Law Review* 541–92.

Staten, M. 1993. "The Impact of Post-Bankruptcy Credit on the Number of Personal Bankruptcies." Working paper 58, Credit Research Center, Krannert Graduate School of Management, Purdue University.

Stiglitz, J., and A. Weiss. 1981. "Credit Rationing in Markets with Imperfect Information," 71 *American Economic Review* 393–410.

Sullivan, T., E. Warren, and J. Westbrook. 1989. *As We Forgive Our Debtors*. New York: Oxford University Press.

Topolnicki, D.M., and E.M. Macdonald. 1993. "The Bankruptcy Bonanza," *Money* 82–94.

VISA U.S.A., Inc. 1997a. "Consumer Bankruptcy: Annual Bankruptcy Debtor Survey," in *Visa Consumer Bankruptcy Reports*. VISA U.S.A.

VISA U.S.A., Inc. 1997b. "Qualitative Research: Bankruptcy Process," in *Visa Consumer Bankruptcy Reports*. VISA U.S.A.

Wells, W., J. Kurtz, and R. Calhoun. 1991. "The Implementation of Bankruptcy Code Section 707(b): The Law and the Reality," 39 *Cleveland State Law Review* 15–48.

White, M.J. 1987. "Personal Bankruptcy Under the 1978 Bankruptcy Code: An Economic Analysis," 63 *Indiana Law Journal* 1–53.

_____. 1991. "Economic Versus Sociological Approaches to Legal Research: The Case of Bankruptcy," 25 *Law and Society Review* 685–709.

_____. 1998. "What's Wrong with U.S. Bankruptcy Law?" 65 *University of Chicago Law Review* 685–732.