

Bankruptcy and Consumer Behavior: Theory and Evidence from the U.S.¹

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Introduction. This paper surveys theoretical research on personal bankruptcy, presents a model of optimal bankruptcy policy, discusses U.S. bankruptcy law, and surveys empirical evidence from the U.S. concerning how bankruptcy affects credit markets and other consumer behaviors. Bankruptcy law is an important factor affecting consumer credit markets, because whether consumers repay their loans or default depends on whether the legal system punishes defaulters and, if so, how severely. Bankruptcy law also affects other aspects of consumer behavior, including the decision to file for bankruptcy, the decision to become an entrepreneur, the number of hours worked, and how consumers allocate their portfolios.

Unlike most of the European countries, the U.S. has separate bankruptcy laws for consumer debtors versus for corporations. The U.S. bankruptcy system is also unusual in how favorably its personal bankruptcy law treats debtors and how frequently consumers default and file for bankruptcy. U.S. consumers held about \$1,720 billion in unsecured debt in 2002, or about \$16,000 per household. The annual loss rate to creditors is about 7%, suggesting that losses on unsecured debt are about \$120 billion per year or \$1,100 per household per year.² The number of personal bankruptcy filings per year in the U.S. increased five-fold between 1980 and 2003, from 300,000 filings to more than 1,500,000 (see table 1). This means that nearly one and a half percent of U.S. households currently files for bankruptcy each year. Despite the increase in filing rates and the high rate of default on consumer loans, the proportion of U.S. households that would benefit financially from filing for bankruptcy is even higher than the proportion of households that currently files. Between 15% and 33% of households would benefit financially from filing for bankruptcy, depending on whether households take advantage of strategies that increase their financial benefit from filing, such as converting assets from non-exempt to exempt categories or moving to high exemption states.³

The paper is arranged as follows. Section I discusses the economic objectives of bankruptcy law generally and examines how the objectives of corporate and personal bankruptcy differ. Section II discusses U.S. personal bankruptcy law. Section III presents a model of optimal personal bankruptcy policy. Section IV discusses other theoretical issues related to personal bankruptcy. Sections V-X survey empirical research on the effects of personal bankruptcy law on credit

² See table 1 for the source of data on number of bankruptcy filings. Data on consumer debt are taken from *Economic Report of the President*, 2003, and “Effect of U.S. Economy on Credit Card Loss Rates,” *S&P Business Wire*, Dec. 18, 2002.

³ White (1998a).

markets, the decision to file for bankruptcy, and other aspects of consumer behavior. Section XI concludes.

I. Objectives of Bankruptcy Law.

Bankruptcy law applies to corporations, unincorporated businesses, and consumers. Economists have discussed five separate objectives of bankruptcy: (1) encouraging efficient investment decisions before and after bankruptcy, (2) encouraging efficient effort-level decisions before and after bankruptcy, (3) avoiding a race by creditors to be first that could cause businesses to shut down prematurely, (4) making an efficient choice between liquidation and reorganization once debtors are in bankruptcy, and (5) providing debtors with insurance against the consequences of adverse shocks to consumption, such as those caused by illness, job loss, or failure of the debtor's business.

Consider which of these objectives apply to personal bankruptcy. Note that personal bankruptcy law covers both consumer and small business bankruptcy, since most small businesses are unincorporated and therefore business debts are legal obligations of the business owner.

Objective (1) does not apply to consumer debtors, because consumers generally borrow to finance consumption rather than investment. But it does apply to small business. Objective (2) applies mainly to consumer debtors. Outside of bankruptcy, consumer debtors are obliged to use part of both their earnings and their wealth to repay debt and, if they default, creditors can collect by garnishing wages and/or claiming debtors' assets. After filing for bankruptcy, debtors may also be obliged to use their earnings and wealth to repay pre-bankruptcy debt. In both situations, the obligation to repay can discourage debtors from working hard. But under U.S. law, filing for bankruptcy ends debtors' obligation to use any of their earnings to repay debt. The Supreme Court has justified this policy—called the “fresh start”—on the grounds that it encourages debtors to work hard after bankruptcy (“from the viewpoint of the wage earner, there is little difference between not earning at all and earning wholly for a creditor”).⁴ A similar justification for the fresh start also applies to owners of small businesses, since their incentive to start new businesses and their ability to borrow after bankruptcy are higher if they are not required to use future profits to repay pre-

⁴ Local Loan Co. v. Hunt, 202 U.S. 234 (1934).

bankruptcy business debts.⁵ However the fresh start also encourages opportunism, since it gives debtors incentives to borrow more and work less before bankruptcy, and to file for bankruptcy even when they are not in financial distress.

In contrast, objectives (3) and (4) are mainly relevant in the corporate bankruptcy context. These objectives arise because failing firms may either liquidate or continue to operate (reorganize) in bankruptcy and inefficiencies occur when firms take the wrong path. A cost of creditors' racing to be first to collect is that it may cause corporations to liquidate when it would be more economically efficient for them to reorganize.⁶ But in personal bankruptcy, true liquidation no longer occurs. This is because, while individual debtors' most valuable asset is generally their human capital, human capital can only be liquidated by selling debtors into slavery--as the Roman did--or confining them in debtors' prisons until someone else pays their debts--as the British did in Charles Dickens' time. Since slavery and debtors' prisons are no longer used, all personal bankruptcies are reorganizations. Bankrupt debtors retain ownership of their human capital and the right to continue using it, but some of their financial wealth/non-human capital may be liquidated and they may face a tax on the post-bankruptcy return to their human capital. (Nonetheless, one of the two U.S. personal bankruptcy procedures is called liquidation.)

Finally, objective (5) applies mainly in personal bankruptcy. This is the objective of insuring debtors against the consequences of adverse shocks to consumption, such as those caused by illness, job loss, or failure of the debtor's business. When earnings or wealth turns out to be low, the obligation to repay debt makes a bad situation worse for debtors and may cause their consumption to fall to very low levels. But very low consumption levels can be costly even if they are temporary, because debtors may lose their homes, develop permanent health problems because they cannot afford medical care to treat their illnesses, their children may drop out of school and not go back, etc. Sharp reductions in consumption by a large number of households may also cause or contribute to an economy-wide recession. Individual debtors can partially insure themselves against adverse consumption shocks by limiting their borrowing and diversifying their financial wealth. But they remain vulnerable since they cannot diversify their human capital, which for most

⁵ Other countries do not generally apply the fresh start in bankruptcy and they treat debtors much more harshly. For example, in Germany, individual debtors are not allowed to file for bankruptcy voluntarily and their debts are not discharged in bankruptcy, although creditors' efforts to collect are stayed. Debtors are required to repay from future earnings. See White (1996) and Alexopoulos and Domowitz (1998) for discussion. Note that in the U.S., not all debt is discharged in bankruptcy, so that in practice debtors receive only a partial fresh start.

⁶ See White (1994) for a model of objectives (3) and (4).

debtors constitutes most of their wealth. Personal bankruptcy provides partial consumption insurance to debtors by discharging some debts when adverse shocks occur, thereby freeing funds for consumption that would otherwise be used for debt repayment.⁷

Exemptions in personal bankruptcy are closely related to the insurance objective. When individual debtors file for bankruptcy, they are allowed to retain ownership of all their financial wealth up to the exemption level, plus their human capital. Higher wealth exemptions increase the level of insurance, because when the wealth exemption is higher, debtors file for bankruptcy and obtain debt relief in response to smaller adverse shocks to income or wealth. The 100% exemption for future wages—the “fresh start”—also provides insurance since debtors keep all of their post-bankruptcy wages in situations where adverse shocks cause them to file for bankruptcy.

Exemptions also provide insurance to owners of non-corporate small businesses, since owners of failed firms can file for bankruptcy and obtain discharge of both the firm’s debts and their own personal debts. In bankruptcy they must use all of their non-exempt wealth to pay the firm’s debts, but they keep their exempt wealth plus all of their post-bankruptcy earnings. Note that bankruptcy law provides owners of non-corporate firms with far less protection than that provided to corporate shareholders through the corporate form and limited liability, since corporate shareholders’ liability for the corporation’s losses is limited to loss of the value of their shares. In addition, corporate shareholders can further insure themselves by diversifying their shareholdings.

II. U.S. Personal Bankruptcy Law

In the U.S., the Constitution reserves for the Federal government the power to make laws concerning bankruptcy. This means that—with one important exception—personal bankruptcy law is uniform across the U.S. When a debtor files for bankruptcy, creditors must cease their collection efforts and cease garnishing the debtor’s wages.⁸

There are two different personal bankruptcy procedures and debtors are allowed to choose between them. The first procedure is called Chapter 7 and, under it, all unsecured debts are discharged. Unsecured debts are those for which the creditor does not have a claim on any

⁷ Rea (1984) and Jackson (1986) were the first to discuss the insurance aspect of personal bankruptcy. See Olson (1999) and Athreya (2002) for discussion in the macroeconomic context.

⁸ To garnish wages, creditors must obtain a court order allowing them to collect a portion of the debtor’s wages from the debtor’s employer. Federal law allows creditors to garnish up to 25% of debtors’ wages, but some states restrict garnishment further and a few prohibit it completely.

particular asset owned by the debtor; they include credit card debt, installment debt, medical bills, and tort judgments. (Secured debts—such as mortgage and car loans—are not discharged in bankruptcy unless the debtor gives up the asset that secures the debt.) Debtors must give up all of their non-exempt assets for repayment to creditors, but—under the “fresh start”—all of their future earnings are exempt from the obligation to repay. In 1978, the U.S. Congress adopted a uniform set of bankruptcy exemptions, but gave the states the right to opt out and adopt their own exemptions. About two-thirds of the states opted out by requiring that their residents use the state’s exemptions in bankruptcy. The remaining one-third adopted their own exemptions, but allowed residents to choose between the states’ exemptions and the Federal exemption. As a result, exemption levels are the only feature of bankruptcy law that varies across the states.⁹

Table 1 gives information on bankruptcy exemptions by U.S. state as of 2001. The top panel gives exemptions for home equity (“homestead” exemptions), which vary widely. Texas, Florida, and five other states have unlimited exemptions for wealth in the form of home equity, which means that wealthy debtors in these states can file for bankruptcy and keep millions of dollars in wealth as long as it is invested in their homes. In contrast, Delaware and Maryland have no exemption at all for home equity. Some states allow married couples who file for bankruptcy to double the homestead exemption and a few allow the elderly to take larger exemptions. The middle panel of table 1 gives exemptions for personal property. Exemptions for personal property may be specified either as maximum dollar values or as blanket exemptions for particular types of property. Most states have separate exemptions for clothing, equity in cars, furniture, jewelry, tools of the trade, and burial plots. Some states also have “wildcard” exemptions that apply to any type of property. The personal property exemptions listed in table 1 are the sum of non-housing exemptions for which states specify a maximum dollar value. In addition to these exemptions, some states have exemptions for retirement accounts and life insurance policies. The bottom panel of table 1 lists states that allow their debtors to choose between the state’s exemptions and the Federal exemption. Compared to most state exemptions, the Federal exemptions favor renters relative to homeowners, since the Federal personal property exemptions are relatively high and renters can apply part of the Federal homestead exemption to personal property.

⁹ See Hynes, Malani, and Posner (2003) for discussion of the political economy of exemption laws. All of the states opted out between 1978 and 1982 and, since then, relatively few changes in exemption levels have occurred.

The second personal bankruptcy procedure, called Chapter 13, is intended for wage earners. Under it, debtors in bankruptcy keep all of their assets in bankruptcy, but they must propose a multi-year plan to repay part of their unsecured debt from future earnings. If they fulfill the repayment plan, then the unpaid portion of the debt is discharged. Creditors are entitled to receive the same amount in Chapter 13 as they would receive if the debtor had filed under Chapter 7, but no more. This means that if all of a debtor's assets would be exempt under Chapter 7, the debtor can file under Chapter 13 and propose to repay only a token amount. Another reason why debtors sometimes file under Chapter 13 is that they are behind on their mortgage or car payments and filing under Chapter 13 delays the foreclosure process. In Chapter 13, car lenders can be forced to reduce the principle value of the loan to the car's current market value and mortgage lenders sometimes voluntarily agree to easier repayment terms.

Because debtors have the right to choose between Chapters 7 and 13, filing for bankruptcy is very favorable for them. Debtors can choose between using part of their future earnings but none of their wealth to repay debt under Chapter 13 or using part of their wealth but none of their future earnings to repay debt under Chapter 7. This means that although both wealth and future earnings are part of debtors' ability to repay, debtors are only obliged to use one or the other to repay in bankruptcy. Because most debtors have no non-exempt wealth, they usually prefer to file under Chapter 7. In addition, debtors who have wealth that is non-exempt can often transfer it from non-exempt to exempt categories before filing for bankruptcy (such as by converting cash into home equity if their home equity is less than the homestead exemption). This allows them to file under Chapter 7 and avoid using either their future earnings or their wealth to repay their debt. About 70% of all bankruptcy filings occur under Chapter 7.¹⁰

III. Theory

In this section I examine a model of optimal personal bankruptcy policy that emphasizes objectives (1), (2) and (5) above.¹¹ I assume that individual debtors have no non-bankruptcy sources of consumption insurance, such as unemployment compensation or welfare. I also assume that there is only a single personal bankruptcy procedure, but the procedure incorporates variable

¹⁰ For a more detailed discussion of the differences between Chapters 7 and 13 and special circumstances that might lead debtors to file under Chapter 13, see White (1998a).

¹¹ This section draws on Bebchuk and White (2004) and Fan and White (2003). For other models of bankruptcy that emphasize its macroeconomic effects, see Domowitz and Alexopoulos (1998) and Athreya (2002).

exemptions for both financial wealth and future wages. (In contrast, current U.S. personal bankruptcy law either exempts all future wages under Chapter 7 or exempts all financial wealth under Chapter 13.)

The model has two periods. In period 1, a representative consumer borrows an amount B at interest rate r , to be repaid in period 2. The loan can be used either for consumption or investment—including an investment in an unincorporated business. Assume that the debt is unsecured and that it is the consumer’s only loan.¹² The consumer also chooses her work hours in period 1, denoted N_1 . Work hours are assumed to represent the consumer’s effort level and/or investment in human capital. The wage rate per unit of time is assumed to be one. The consumer’s wealth in period 1, W_1 , is known with certainty.

At the beginning of period 2, the consumer chooses her period 2 labor supply, N_2 . The wage rate per unit of time remains one. After making this choice, the consumer’s period 2 wealth is determined by a draw from the wealth distribution, $f(W_2)$, where W_2 can take any real value. Finally the consumer decides whether to file for bankruptcy.

The rules of bankruptcy are as follows. There is a fixed dollar cost of filing, denoted F , that includes lawyers’ fees and court filing fees. In bankruptcy, the debt $B(1+r)$ is discharged. There are two exemptions in bankruptcy, one for wealth and one for period 2 earnings. The wealth exemption X is assumed to be a fixed dollar amount that combines states’ exemptions for homesteads and personal property. It can take any positive or negative value. The earnings exemption could either be a fraction of period 2 wages (a “bankruptcy tax”) or a fixed dollar amount. But if the exemption were a fixed dollar amount, then consumers would either be subject to no bankruptcy tax at all—if their earnings were below the exemption, or would be subject to a 100% marginal bankruptcy tax on all of their earnings above the exemption. The latter situation would be extremely inefficient and would lead consumers who file for bankruptcy to reduce their earnings to the exemption level, which might involve quitting their jobs.¹³ For this reason, I assume that the earnings exemption takes the form of a fixed fraction of period 2 earnings, x , where

¹² Because the consumer has only a single loan, the model does not consider priority rules in bankruptcy. See below for discussion of secured versus unsecured loans in the personal bankruptcy context.

¹³ Another reason for assuming a fractional wage exemption is that wage garnishment exemptions take this form (normally 75% of wages are exempt from garnishment). Nonetheless, the proposed bankruptcy reform currently pending in the U.S. Congress imposes a fixed dollar wage exemption on certain types of debtors.

$0 \leq x \leq 1$. Consumers who file for bankruptcy must therefore repay $W_2 - X$ from their period 2 wealth plus $(1 - x)N_2$ from their period 2 earnings.

Consider the relationship between discharge of debt in bankruptcy and the two exemptions. Given the absence of non-financial penalties for bankruptcy, such as slavery or imprisonment, the two exemption levels and the filing cost F determine the price of discharge. If $X = \infty$ and $x = 1$ (the maximum values for both), then the price of discharge is F . Conversely if X is large and negative and $x = 0$ (the minimum values for both), then there is no discharge of debt, i.e., the price of discharge is complete impoverishment. The “fresh start” is represented by $x = 1$. The harshest exemption policy currently allowed in the U.S. is represented by $X = 0$ and $x = 1$, where the price of discharge is $F + W_2 - X$. This is an intermediate level, since debtors must repay use all of their wealth but none of their future earnings to repay their debt. In the model, we examine how the efficiency of personal bankruptcy is affected by varying the policy parameters X and x .

Now consider the bankruptcy decision in period 2. If the consumer repays in full, period 2 consumption is $W_2 - B(1 + r) + N_2$; while if she files for bankruptcy, period 2 consumption is $X + xN_2$ (assuming that she pays the bankruptcy filing cost beforehand).¹⁴ She is assumed to make the bankruptcy decision so as to maximize her period 2 consumption. This means that the condition for bankruptcy is:

$$B(1 + r) \geq (W_2 - X) + (1 - x)N_2. \quad (1)$$

Exp. (1) says that the amount of debt discharged in bankruptcy must exceed the value of non-exempt wealth and earnings that the debtor must use to repay. (1) implies that there is a threshold value of period 2 wealth, denoted \hat{W}_2 , at which consumers are indifferent between filing or not filing, or $\hat{W}_2 = B(1 + r) + X - (1 - x)N_2$. Consumers file for bankruptcy if $W_2 \leq \hat{W}_2$ and do not file otherwise. Holding period 2 earnings constant, this expression implies that consumers’ probability of filing for bankruptcy rises when either of the two exemptions increase.

The solid line in figure 1 graphs period 2 consumption, shown as the solid line, as a function of period 2 wealth W_2 . Period 2 earnings, N_2 , are assumed to be constant. Consumption has three

¹⁴ This assumes that the consumer pays the cost of filing F beforehand, so that the cost is passed on to creditors. Also the model assumes that creditors never garnish debtors’ wages, since debtors always file for bankruptcy if they default. See below for discussion of wage garnishment and the possibility that debtors might default but not file for bankruptcy.

regions: the right-most where $W_2 > \hat{W}_2$ and the debtor repays in full; the middle region where the debtor files for bankruptcy, period 2 wealth is $X \leq W_2 \leq \hat{W}_2$, and period 2 consumption is $X + xN_2$; and the left-most where the debtor files for bankruptcy, $W_2 < X$, and period 2 consumption is $W_2 + xN_2$.¹⁵ The dashed line in figure 1 shows how the bankruptcy decision changes when period 2 labor supply increases.

Bankruptcy provides consumption insurance by shifting resources from higher to lower wealth states. Allowing consumers to file for bankruptcy and obtain debt discharge causes interest rates to rise and lowers consumption in the non-bankruptcy region, but increases consumption in bankruptcy. Higher levels of either exemption increase the amount of insurance by shifting the bankruptcy threshold \hat{W}_2 to the right, so that consumers file for bankruptcy at higher wealth levels. However while both exemptions provide consumption insurance, the insurance that each provides is slightly different. Raising the wealth exemption X transfers additional resources from good to medium draws of the wealth distribution, i.e., from the right hand to the middle region of figure 1. In contrast, raising the earnings exemption x transfers additional resources from good to both medium and bad draws of the distribution, i.e., from the right hand region to the middle and left hand regions of figure 1. This difference between the two exemptions suggests a new justification for the “fresh start”—that a higher earnings exemption provides more valuable consumption insurance than a higher wealth exemption, because the former transfers consumption to the region where it is lowest.

Now turn to lenders. Assume that there are many consumers who apply to borrow and all are identical as of period 1. Lenders are willing to lend as long as there exists an interest rate at which expected repayment covers the opportunity cost of funds, denoted \mathbf{r} . The condition under which lenders expect to make zero profits is:

$$B(1 + \mathbf{r}) = \int_{-\infty}^X [(1 - x)N_2 - F]f(W_2)dW_2 + \int_X^{\hat{W}_2} [W_2 - X + (1 - x)N_2 - F]f(W_2)dW_2$$

¹⁵ If consumers' wages are subject to garnishment in period 1 (because they have defaulted on an earlier debt), then \hat{W}_2 shifts to the left since an additional benefit of filing for bankruptcy is that garnishment ends. See below for further discussion of the relationship between default and bankruptcy.

$$+ \int_{\hat{W}_2}^{\infty} B(1+r)f(W_2)dW_2 \quad (2)$$

The three terms on the right hand side represented expected repayment in each of the three regions of figure 1. Eq. (2) determines the market-clearing interest rate, r , as a function of the two exemption levels.

To determine how the interest rate varies with the exemption levels, differentiate (2) with respect to x and X . (We assume that B is fixed and that N_1 is independent of the two exemption levels.) The results are:

$$\frac{dr}{dx} = \left(\frac{N_2}{B}\right) \frac{\left[\int_{\hat{W}_2}^{\hat{W}_2} f(W_2)dW_2 + Ff(\hat{W}_2)\right]\left[1 - \frac{(1-x)}{x}e_x\right]}{\int_{\hat{W}_2}^{\infty} f(W_2)dW_2 - Ff(\hat{W}_2)} \quad (3)$$

and

$$\frac{dr}{dX} = \left(\frac{1}{B}\right) \frac{\left[\int_{\hat{W}_2}^{\hat{W}_2} f(W_2)dW_2 + Ff(\hat{W}_2)\right] - \left[\int_{\hat{W}_2}^{\hat{W}_2} f(W_2)dW_2 + Ff(\hat{W}_2)\right]\left[\frac{N_2(1-x)}{X}e_x\right]}{\int_{\hat{W}_2}^{\infty} f(W_2)dW_2 - Ff(\hat{W}_2)} \quad (4)$$

where e_x and e_X denote the elasticities of N_2 with respect to x and X , respectively.

If $e_x = 0$ ($e_X = 0$), then dr/dx (dr/dX) must be positive as long as the cost of filing for bankruptcy F is not too high. Now consider the possibility that e_x is non-zero, so that period 2 effort depends on the fraction of post-bankruptcy earnings that workers keep. Note that the expression $[1 - ((1-x)/x)e_x]$ must be positive for any reasonable values of e_x .¹⁶ Therefore if e_x shifts from zero to positive, dr/dx becomes smaller in size but remains positive. This is because the increase in the wage exemption causes consumers to work more in period 2 since the return to work effort is higher. As a result, they earn more and repay more, so that lenders raise the interest rate by less in response to the same increase in x . If e_x shifts from zero to negative, then dr/dx

¹⁶ For example, if $x = .5$, then e_x must be less than 1.

becomes more positive since consumers work less and repay less when the exemption level rises. Finally, suppose e_x is non-zero. Regardless of sign, it is likely to be small, since labor supply is not very responsive to changes in wealth.¹⁷ dr/dX must be positive as long as both e_x and F are small.

Eqs. (3) and (4) are not always satisfied, so that lending markets sometimes break down. When X increases, borrowers are more likely to file for bankruptcy. Lenders respond by raising the interest rate, but this only increases the amount that debtors repay if they do not file for bankruptcy. As a result, raising the interest rate becomes less and less effective as X rises. (While borrowers may also partially repay their debt in bankruptcy, the amount they repay is unaffected by the interest rate.) At very high levels of X , the probability of debtors repaying in full is so low that no interest rate clears the market and creditors cease lending. A similar argument applies to increases in x , since when x rises, debtors are more likely to file for bankruptcy and repay less when they do so. Because all potential borrowers are identical as of period 1, lenders either lend to all or stop lending completely.¹⁸

To illustrate, suppose $f(W_2)$ is distributed normally with a mean of 2 and standard deviation of .25 and suppose $x = 1, B = 1, F = 0, r = 0.1$, and $e_x = 0$. Then loan markets operate as long as X is less than .9 (90% of the loan amount), but they fail if X exceeds .9. However if future wages are not entirely exempt, then loan markets can operate at even higher levels of X . Suppose $X = .95$ and $N_2 = 1 - .1x$, so that $e_x = -.1x/(1 - .1x)$. Then loan markets operate as long as $x \leq .4$, but fail if $x > .4$.

Now turn to consumers. Their utility in each period is assumed to depend positively on consumption and negatively on work hours and they are assumed to be risk averse. For simplicity, the discount rate is assumed to be zero. The representative consumer's expected utility function is therefore:

¹⁷ While the stereotype is that wealthy people work less, empirical evidence suggests that the probability of owning a business increases with wealth. See Holtz-Eakin et al (1994) and Fan and White (2003).

¹⁸ If borrowers varied along some credit-relevant dimension that lenders could observe in period 1, then lenders would gradually cease lending to more credit-worthy borrowers as the bankruptcy exemption level increased.

$$\begin{aligned}
& U(W_1 + N_1 + B, N_1) + \int_{-\infty}^X U(W_2 + xN_2, N_2) f(W_2) dW_2 \\
& + \int_X^{\hat{W}_2} U(X + xN_2, N_2) f(W_2) dW_2 + \int_{\hat{W}_2}^{\infty} U(W_2 - B(1+r) + N_2, N_2) f(W_2) dW_2 \quad (5)
\end{aligned}$$

Because all consumers are identical as of period 1, the social welfare function (SWF) is the same as the representative consumer's expected utility function.¹⁹

Individual consumers determine their period 1 and period 2 labor supply, N_1 and N_2 , so as to maximize expected utility, treating the interest rate and the exemption levels as fixed. They increase N_1 until minus the ratio of the marginal disutility of effort to the marginal utility of consumption in period 1 equals unity. This means that N_1 is unaffected by the exemption variables as long as additional effort does not increase debtors' obligation to repay in bankruptcy. (This holds, for example, if consumers use all their additional wages for consumption.) Consumers increase N_2 until minus the ratio of the expected marginal disutility of effort to the expected marginal utility of consumption in period 2 equals the expected value of working an additional hour, or $(1-p(1-x))$, where p denotes the probability of bankruptcy.

Now consider the determination of the optimal bankruptcy policy, denoted by X^* and x^* . For marginal changes in the two exemption variables, the conditions for an optimal bankruptcy policy are determined by differentiating (5) with respect to x and X .²⁰ The resulting first order conditions are:

$$\frac{dSWF}{dX} = U_1(X + xN_2, N_2) \int_X^{\hat{W}_2} f(W_2) dW_2 - [B \frac{dr}{dX}] \int_{\hat{W}_2}^{\infty} U_1(W_2 - B(1+r) + N_2, N_2) f(W_2) dW_2 \quad (6)$$

and

$$\begin{aligned}
\frac{dSWF}{dx} &= (N_2) \int_{-\infty}^{\hat{W}_2} U_1(\max[W_2, X] + xN_2, N_2) f(W_2) dW_2 \\
&- [B \frac{dr}{dx}] \int_{\hat{W}_2}^{\infty} U_1(W_2 - B(1+r) + N_2, N_2) f(W_2) dW_2 \quad (7)
\end{aligned}$$

¹⁹ The model assumes that wages are not subject to garnishment in period 1. It could be modified to consider this possibility.

²⁰ The envelope theorem ensures that consumers make optimal choices of period 1 and period 2 labor supply as long as changes in the exemption variables are small.

where U_1 denotes the marginal utility of consumption. The optimal exemption levels are determined by substituting (3) and (4) into (6) and (7), respectively, setting the resulting expressions equal to zero and solving.

It is easiest to interpret special cases of (6) and (7). Suppose filing costs F are zero and $e_x = 0$. Then (6) becomes:

$$\frac{dSWF}{dX} = \int_X^{\hat{W}_2} f(W_2) dW_2 \left[U_1(X + xN_2, N_2) - \frac{\int_{\hat{W}_2}^{\infty} U_1(W_2 - B(1+r) + N_2, N_2) f(W_2) dW_2}{\int_{\hat{W}_2}^{\infty} f(W_2) dW_2} \right] \quad (8)$$

The term in square brackets is the marginal utility of consumption when consumers file for bankruptcy but use part of their wealth to repay (the middle region of figure 1), minus the average marginal utility of consumption when consumers avoid bankruptcy (the right hand region of figure 1). At low levels of X , the marginal utility of consumption must be higher in bankruptcy than outside of bankruptcy, so the expression must be positive. As X rises, the average marginal utility of consumption in bankruptcy falls (because wealth is higher since more wealth is exempt), while the average marginal utility of consumption outside of bankruptcy rises (because interest rates rise). So the difference between the two terms gets smaller.

Nonetheless expression (8) must remain positive, so that the optimal wealth exemption level X^* is the highest level at which lenders are willing to lend. The intuition is that risk averse consumers always want to purchase additional insurance as long as it is sold at a fair price. A higher wealth exemption provides additional consumption insurance and lenders “sell” the insurance at a fair price because of the zero profit constraint. As a result, borrowers wish to buy as much insurance as possible and the optimal wealth exemption X^* is the highest possible level.

Now suppose F is positive rather than zero. In this case, a third term whose sign is negative is added to expression (8). The additional term may either cause the optimal exemption level to fall or to remain unchanged. With $F > 0$, consumption insurance now costs consumers more than the fair price, since they pay both the fair price plus an additional cost when they file for bankruptcy. As a result, demand for consumption insurance falls and even risk averse consumers may not wish

to purchase the maximum amount. The optimal exemption level falls by more as F rises and as consumers become less risk averse.

Now consider the case when $e_x \neq 0$ but $F = 0$. Then the following third term is added to the expression in square brackets in (8):

$$+ \frac{\int_{\hat{W}_2}^{\infty} U_1(W_2 - B(1+r) + N_2, N_2) f(W_2) dW_2}{\int_{\hat{W}_2}^{\infty} f(W_2) dW_2} \left(\frac{N_2(1-x)}{X} \right) e_x \quad (8')$$

This term has the same sign as the sign of e_x . Therefore if e_x shifts from 0 to negative, then $dSWF/dX$ becomes negative at the old value of X^* . As a result, the optimal exemption level X^* becomes smaller. This is because an increase in X now causes work effort to fall, so that borrowers repay less and lenders raise interest rates by more than they did when work effort was fixed. As a result, consumption insurance is more expensive and the efficient amount of insurance falls. The opposite reasoning holds if e_x shifts from zero to positive.

Now turn to the earnings exemption. Suppose again that $F = 0$ and $e_x = 0$. Then substituting eq. (4) into eq. (7), the resulting expression is:

$$(N_2 \int_{-\infty}^{\hat{W}_2} f(W_2) dW_2) \left[\frac{\int_{-\infty}^{\hat{W}_2} U_1(\max[W_2, X] + xN_2, N_2) f(W_2) dW_2}{\int_{-\infty}^{\hat{W}_2} f(W_2) dW_2} - \frac{\int_{\hat{W}_2}^{\infty} U_1(W_2 - B(1+r) + N_2, N_2) f(W_2) dW_2}{\int_{\hat{W}_2}^{\infty} f(W_2) dW_2} \right] \quad (9)$$

The interpretation of expression (9) is similar to that of expression (8). The terms in square brackets in (9) are the average marginal utility of consumption in bankruptcy minus the average marginal utility of consumption outside of bankruptcy. For a given level of X , a higher earnings exemption provides consumers with additional consumption insurance. Because lenders “sell” the insurance at a fair price, risk averse consumers wish to buy as much as possible and the optimal exemption level x^* is the maximum level at which lenders are willing to lend. Additional insurance in the form of a higher earnings exemption is particularly valuable, since debtors must use part of

their period 2 earnings to repay their debt even when their wealth falls in the lowest region in figure 1. Raising x therefore raises consumption where it is the most valuable.

When F is positive rather than zero, an additional term with a negative size is added to exp (9) and the optimal earnings exemption is therefore lower. The intuition is the same as that given for the optimal wealth exemption. When e_x is non-zero and $F = 0$, an additional term is added to expression (9) that has the same sign as the sign of e_x . If e_x is negative (positive), the optimal x^* falls (rises) relative to the optimal level when $e_x = 0$. The reasoning is the same as above.

Wang and White (2000) simulated a parameterized version of this model. They assumed that the cost of filing for bankruptcy F was positive and that e_x and e_w were both negative. They found that the optimal earnings exemption level x^* was always one—a result that supports the U.S. “fresh start” policy. But in an extension of their model, Wang and White introduced an additional margin for moral hazard—consumers were allowed to choose whether to hide part of their non-exempt wealth when they filed for bankruptcy (in addition to choosing their effort level). Hiding a portion of wealth makes filing for bankruptcy more attractive, but drives up interest rates. In this situation, Wang and White found that the optimal wage exemption was sometimes less than 100%. A lower wage exemption improved efficiency by discouraging consumers from hiding wealth, since hiding wealth made them more likely to file for bankruptcy and therefore they paid the bankruptcy “tax” on earnings more often than consumers who did not hide wealth. (In contrast a lower wealth exemption encouraged consumers to hide wealth.) In Wang and White’s model, the two exemptions were substitutes, since when the optimal wage exemption level was less than 100%, the optimal wealth exemption level increased.

What does the model imply in terms of testable hypotheses? First, it suggests that in jurisdictions with higher bankruptcy exemptions, consumption is more highly insured and therefore is more certain/less variable. Second, higher wealth exemptions reduce the supply of credit, so that interest rates are predicted to be higher and credit rationing is predicted to be stronger in jurisdictions with higher exemptions. Third, if consumers tend to be risk averse, then jurisdictions with higher exemption levels will have higher demand for credit, since consumers demand more credit when they have more consumption insurance. But if debtors are risk neutral or not very risk

averse, then higher exemption levels may reduce demand for credit, because the cost of the additional wealth insurance is more than debtors are willing to pay. Fourth, if potential entrepreneurs are risk averse, then jurisdictions that have higher bankruptcy exemptions will tend to have higher entrepreneurship rates. This is because potential entrepreneurs are more willing to take the risk of going into business if a generous bankruptcy exemption reduces the downside risk of business failure. Finally, the model suggests that the predicted change in work effort following bankruptcy is ambiguous, since the income and substitution effects pull in opposite directions.

Not all of these predictions have been tested, but in section IV I survey the empirical literature on personal bankruptcy in the U.S. The next section of the paper discusses other theoretical issues in personal bankruptcy.

IV. Additional Theoretical Considerations

Bankruptcy and incentives for strategic behavior

A problem with U.S. personal bankruptcy procedures is that they encourage debtors to engage in strategic behavior in order to increase their financial gain from filing. Using the same notation as above, consumers' financial benefit from filing for bankruptcy under Chapter 7 can be expressed as:

$$\text{Financial benefit} = \max[B(1+r) - \max[W_2 - X, 0], 0] - F \quad (10)$$

Here the fresh start policy is assumed to be in effect, so that future earnings are exempt from the obligation to repay. Consumers' financial benefit from filing for bankruptcy is the amount of debt discharged, $B(1+r)$, minus the value of non-exempt assets that they must give up in bankruptcy, which is the $\max[W_2 - X, 0]$. (Bankruptcy costs are ignored.) Although this expression gives the financial benefit from filing under Chapter 7, it also approximates the financial benefit from filing under Chapter 13, since debtors' obligations to repay under the two Chapters are closely related.

White (1998a and 1998b) calculated the proportion of U.S. households that would benefit from filing for bankruptcy, using data from the *Survey of Consumer Finances*, which includes detailed information on households' wealth. For each household in the SCF, she calculated the financial

benefit of filing for bankruptcy on the survey date. The results were that approximately one-sixth of U.S. households had positive financial benefit and would therefore benefit from filing.

White also examined how the results would change if consumers pursued various strategies to increase their financial gain from bankruptcy, including (a) debtors converting assets from non-exempt to exempt by using them to repay part or all of their mortgages (assuming that additional home equity would be exempt in bankruptcy), (b) debtors moving to a more valuable house, if doing so would allow them to shelter additional wealth in bankruptcy, and (c) debtors charging all of their credit cards to the limit (but not obtaining new credit cards). These strategies together increased the proportion of households that benefited from bankruptcy from one-six to one-third. A final strategy involved debtors moving to Texas before filing for bankruptcy, since Texas has the most favorable exemptions. Combining all of these strategies, 61% of all U.S. households could benefit from filing for bankruptcy. These results suggest that, even with the high bankruptcy filing rate in the U.S., many more households could benefit from filing for bankruptcy than actually choose to file. Thus the bankruptcy filing rate is likely to continue to increase in the future.

Default without bankruptcy.

The model discussed above did not consider the possibility that consumer might default on their debt but not file for bankruptcy. White (1998b) investigated an asymmetric information game in which the decision to default is separate from the decision to file for bankruptcy. Debtors first decide whether to default and, following default, creditors decide whether to attempt to collect by obtaining a court order to garnish the debtor's wages. If creditors attempt to collect, then debtors choose whether to file for bankruptcy. There are two types of debtors. Type 1's are assumed to have low wealth and they always default. If creditors attempt to collect, then type 1 debtors always file for bankruptcy and creditors receive nothing. Type 2 debtors have higher wealth and they may or may not default. If creditors attempt to collect following default, type 2 debtors always repay in full. Creditors are assumed unable to identify individual debtors' types at the time of default. Attempting to collect is assumed to be costly for creditors, while filing for bankruptcy imposes a cost on debtors.

White shows that in equilibrium, type 1 debtors always default, but type 2 debtors and creditors both play mixed strategies. This means that some debtors of both types obtain the benefit of debt discharge without bearing the costs of filing for bankruptcy, because they default and creditors

never attempt to collect. The model therefore suggests that, even though U.S. bankruptcy filing rates are high, additional households would benefit from filing for bankruptcy but do not actually file because they default and creditors never attempt to collect.

The option value of bankruptcy. Consumer's right to file for bankruptcy can be expressed as a put option with an exercise price equal to the exemption level. Debtors' future wealth is uncertain. If it turns out to exceed the wealth exemption plus the amount owed, then they pay off the debt in full. But if debtors' wealth turns out to be less than this amount, then they exercise their option to "sell" the debt to creditors for a price equal to $\min[X, W_2]$, i.e., they file for bankruptcy.

White (1998) calculated the value of debtors' option to file for bankruptcy. She used household-level data from the PSID, which asks respondents questions concerning their wealth every five years. The calculations were done separately for households at various points in the wealth distribution. The results showed that the value of the option to file for bankruptcy is high for some households in all portions of the wealth distribution. The high value of the bankruptcy option suggests that many households who would not benefit from filing for bankruptcy immediately nonetheless have a positive option value and may find it worthwhile to file for bankruptcy in the future.

The crisis model of bankruptcy. The economic view of bankruptcy and credit markets is controversial and many sociologists and law academics reject it completely. Their view of bankruptcy, as discussed in Sullivan et al (1989) and (2000), is that consumers file for bankruptcy only when unanticipated adverse events such as illness, divorce, or job loss occur that make it impossible for them to repay. In this model, debtors do not plan in advance for the possibility of bankruptcy, but file only when adverse events leave them with no choice.

The crisis model leads to several testable hypotheses. One is that credit availability and interest rates are predicted to be unrelated to bankruptcy exemption levels, because debtors do not take into account the possibility of filing for bankruptcy when deciding whether and how much to borrow. Another testable implication is that whether consumers file for bankruptcy will depend on whether adverse events have occurred and on income, since income affects ability to repay. But bankruptcy decisions will not depend on the financial benefit from filing for bankruptcy. In theory these

differing predictions should allow the economic model of bankruptcy and the crisis model of bankruptcy to be tested against each other empirically.

Overlending. Policymakers in the U.S. often argue that creditors rather than debtors are responsible for high bankruptcy filing rates, because creditors lend too much and debtors therefore find it difficult to repay.²¹ One important issue is that U.S. bankruptcy rules make it difficult for lenders to predict whether potential borrowers will repay, since debtors are obliged to use both earnings and wealth to repay outside of bankruptcy, but are only obliged to use their non-exempt wealth to repay in bankruptcy. As a result, lenders must predict both debtors' ability to repay and their probability of filing for bankruptcy. And if debtors decide to behave opportunistically, then they have an incentive to borrow as much as possible before filing.

Another factor is that competition among lenders may create a prisoner's dilemma situation. Suppose there are two credit card lenders, A and B, and each must decide whether to offer credit cards to the other's customers. Suppose S_a equals one if A solicits B's customers and equals zero otherwise and S_b equals one if B solicits A's customers and equals zero otherwise. A's profits are $P_a(S_a, S_b)Q_a(S_a) - C(Q_a(S_a))$ and B's profits are $P_b(S_b, S_a)Q_b(S_b) - C(Q_b(S_b))$. Here $P_a(S_a, S_b)$ and $P_b(S_b, S_a)$ are A's and B's average revenue per cardholder, respectively. Suppose that before any solicitation occurs, A and B have the same average revenue per cardholders, or $P_a(0,0) = P_b(0,0)$. Soliciting by either lender is assumed to lower both lenders' average revenue, so that $P_a(1,0) < P_a(0,0)$, $P_a(1,1) < P_a(0,1)$, $P_b(1,1) < P_b(0,0)$, and $P_b(1,1) < P_b(0,1)$. One explanation for the decline in average revenue is that adverse selection occurs in the response to solicitations (Ausubel, 1999). Thus when A solicits B's customers, those who respond are of lower quality than the average among B's customers, and vice versa. Another explanation is that soliciting increases the total credit available to borrowers who accept the new card and additional credit increases the probability of default (Domowitz and Sartain, 1999). Either explanation implies that soliciting by either lender lowers average revenue for both lenders. $Q_a(S_a)$ and $Q_b(S_b)$ are the total number of cards that A and B issue, which is assumed to depend only on own

²¹ Sullivan, Warren and Westbrook (1989) also make this argument.

soliciting. Thus $Q_a(1) > Q_a(0)$ and $Q_b(1) > Q_b(0)$. Finally, $C(Q_a(S_a))$ and $C(Q_b(S_b))$ are A's and B's total cost functions, where average costs are assumed to fall with number of cards issued.

The payoffs of the game are:

		B	
		Solicit	No
A	Solicit	$P_a(1,1)Q_a(1) - C(Q_a(1))$, $P_b(1,1)Q_b(1) - C(Q_b(1))$.	$P_a(1,0)Q_a(1) - C(Q_a(1))$, $P_b(0,1)Q_b(0) - C(Q_b(0))$.
	No	$P_a(0,1)Q_a(0) - C(Q_a(0))$, $P_b(1,0)Q_b(1) - C(Q_b(1))$.	$P_a(0,0)Q_a(S_a) - C(Q_a(0))$, $P_b(0,0)Q_b(0) - C(Q_b(0))$.

Consider whether A and B choose to solicit or not. The dominant strategy equilibrium is for both to solicit if the following two conditions hold for A and analogous conditions hold for B:

$$P_a(1,1)Q_a(1) - P_s(0,1)Q_a(0) > C(Q_a(1)) - C(Q_a(0)) \quad (11)$$

$$P_a(1,0)Q_a(1) - P_s(0,0)Q_a(0) > C(Q_a(1)) - C(Q_a(0)) . \quad (12)$$

The right side of both conditions is the change in total costs that occurs as a result of A soliciting. The left hand side of (12) gives the increase in A's total revenues from soliciting, assuming that B does not solicit; while the left hand side of (11) gives the increase in A's total revenues from soliciting, assuming that B also solicits. Both lenders are more likely to solicit each others' customers if there are substantial economies of scale in soliciting, if the number of customers that respond to a solicitation increases, and/or if adverse selection is not too severe (i.e., new customers are not much lower in quality than old customers).

Is the mutual soliciting equilibrium inefficient compared the alternative of no soliciting, i.e., does "overlending" occur? Competition among lenders gives consumers an opportunity to borrow more, but opportunistic behavior raises interest rates and makes those who repay worse off. Competition among lenders also may increase or decrease lenders' profits. Whether the "overlending" equilibrium is more or less efficient compared to the no soliciting equilibrium depends on all of these factors.

Bankruptcy as protection for government s.

Finally, another function of the bankruptcy system is to protect the government from the obligation to use the social safety net to bail out consumers who borrow too much and/or turn out to have low wealth in period 2. In the absence of bankruptcy, these debtors would be obliged to repay their debts and, as a result, their consumption might fall so low that they qualify for government assistance. Posner (1995) has argued that bankruptcy benefits the government by transferring some of these costs from the public sector to private lenders.

V. Empirical Research on Bankruptcy and Credit Markets

The Effect of Bankruptcy on Supply and Demand for Credit. In the theoretical section, I argued that bankruptcy exemptions both reduce the supply of credit and increase the demand for credit, although the increase in demand may be reversed at high exemption levels.

The first paper to test these predictions was Gropp, Scholz and White (1997). They used data from the 1983 Survey of Consumer Finance (SCF) to examine how bankruptcy exemptions affect supply and demand for consumer credit. The SCF gives detailed information on debts and assets for a representative sample of U.S. households and it also indicates whether households have been turned down for credit and what interest rates they pay. The GSW study did not distinguish between different types of debt or different types of exemptions, so that their debt variable included both secured and unsecured debt and their bankruptcy exemption variable was the sum of homestead and personal property exemptions. The authors found that borrowers are more likely to be turned down for credit and paid higher interest rates in states with higher bankruptcy exemptions—evidence of a reduction in the supply of credit in high-exemption states. In particular, borrowers were 5.5 percentage points more likely to be turned down for credit if they lived in a state in the highest quartile of the exemption distribution, rather than in a state in the lowest quartile of the exemption distribution. In addition, borrowers in the second quartile of the wealth distribution paid an interest rate that was 2.3 percentage points higher if they lived in a state with combined bankruptcy exemptions of \$50,000 rather than \$5,000. But borrowers in the third and fourth quartile of the wealth distribution paid interest rates that were not significantly different in high versus low exemption states.

The authors also examined how the amount of debt held by households varied between high versus low exemption states. Although supply and demand for credit cannot be separately

identified, a finding that households hold more debt in high exemption than low exemption states suggests that the increase in demand for credit more than offsets the reduction in the supply of credit, and conversely. The authors found that high-asset households held more debt in high exemption states, while low-asset households held less. Thus when high-asset households increased their credit demand in response to higher exemption levels, lenders accommodated them by lending more. But when low-asset households' increased their credit demand, lenders responded with tighter credit rationing. GSW calculated that, holding everything else constant, a household whose assets placed it in the highest quartile of the asset distribution would hold \$36,000 more debt if it resided in a state with combined bankruptcy exemptions of \$50,000 rather than \$6,000; while a household whose assets placed it in the second to lowest quartile of the asset distribution would hold \$18,000 less debt. Thus higher exemption levels were associated with a large redistribution of credit from low-asset to high-asset households.

The results of the study suggest that, while policy-makers often think that high bankruptcy exemptions help the poor, in fact they cause lenders to redistribute credit from low-asset to high-asset borrowers and raise the interest rates they charge low-asset borrowers.

The Effect of Bankruptcy on Secured versus Unsecured Credit. More recent papers on bankruptcy and credit markets distinguished between secured versus unsecured loans and between homestead and personal property exemptions. Berkowitz and Hynes (1999) and Lin and White (2001) both used the Home Mortgage Disclosure Act (HMDA) data to investigate the effect of bankruptcy exemptions on mortgage credit. The HMDA data give information on whether applicants for mortgages and home improvement loans were turned down, as well as the location and some characteristics of the potential borrower. While mortgage loans are always secured, home improvement loans may either be unsecured or take the form of second mortgages. This means that they represent a mixture of secured and unsecured loans.

Berkowitz and Hynes (1999) argued that higher homestead exemptions reduce rather than increase default and therefore lead to an increase in the supply of mortgage credit. Their argument is that, if debtors have defaulted on their mortgages and are in danger of losing their homes, they can file for bankruptcy, obtain discharge of their non-mortgage debts, and use funds that would otherwise go to non-mortgage creditors to pay the mortgage. The higher the exemption levels, the more of debtors' wealth is protected in bankruptcy and therefore the lower the probability that they

will default on their mortgages. Berkowitz and Hynes found support for their hypothesis that higher bankruptcy exemptions lead to an increase in mortgage availability.

Lin and White (2001) extended the bankruptcy decision model discussed above to include two separate decisions by debtors: whether to default on an unsecured loan and whether to default on a mortgage.²² If debtors default on an unsecured loan, then they are assumed to file for bankruptcy. If debtors default on a mortgage, lenders have the right to foreclose on the house and sell it, regardless of whether the debtor has filed for bankruptcy. The proceeds of selling the house net of transactions costs are used, first, to repay the mortgage, second to repay the second mortgage (if any), and, third, to give the debtor the homestead exemption. Any remaining funds are used to repay unsecured creditors. In the extended model, debtors face uncertainty concerning both their period 2 wealth and their period 2 housing value.

There are several distinct cases, corresponding to different levels of period 2 housing value. In one case, the value of the house is so low that housing equity is more negative than the cost of moving, so that debtors prefer to default on their mortgages regardless of the value of their period 2 wealth, W_2 . Debtors also default on their unsecured debt and file for bankruptcy if W_2 turns out to be low, i.e., the bankruptcy decision is the same as in the model just discussed. In other cases, housing value is higher and so debtors would prefer to repay their mortgages and keep their houses. But whether they can do so depends on their realizations of period 2 wealth, W_2 . This is the case emphasized by Berkowitz and Hynes, where debtors' ability to repay their mortgages may be enhanced by filing for bankruptcy and obtaining discharge of their unsecured debt. Finally, housing value may be so high that debtors never default on their mortgages and never file for bankruptcy. If W_2 turns out to be too low to repay the unsecured debts, then debtors sell their houses and use the proceeds to repay both loans.

Lin and White show, first, that if the transactions cost of foreclosure is fixed, then neither the homestead nor the personal property exemption level affects the supply of mortgage loans. This is because, when debtors default on their mortgages, lenders foreclose on the house and are repaid before the debtor receives the homestead exemption. So mortgage repayment is independent of

²² See Brueckner (2000) for a model of mortgage default which is similar to the model discussed above of the bankruptcy decision.

both exemption levels.²³ However a more realistic assumption is that the transactions cost of foreclosure is higher when the debtor files for bankruptcy, because filing for bankruptcy delays the foreclosure process.²⁴ Then a rise in either exemption reduces the supply of mortgage credit, because debtors' probability of filing for bankruptcy rises and mortgage lenders' return falls when debtors file for bankruptcy. These predictions hold even if borrowers are assumed to file for bankruptcy as a means of increasing their ability to repay their mortgages, as discussed above. Finally, increases in either the homestead or the personal property exemption are predicted to reduce the supply of unsecured credit.

Since the HMDA data cover a series of years in the 1990's, Lin and White tested their model both with and without state fixed effects. The results without state fixed effects rely on cross-state variation in exemption levels. They show that applicants for both mortgage and home improvement loans were significantly more likely to be turned down in states with higher homestead exemptions. When applicants live in states with homestead exemptions that are unlimited rather than in the lowest quartile of the distribution, their probability of being turned down for mortgage loans rises by 2 percentage points and their probability of being turned down for home improvement loans rises by 5 percentage points. When applicants live in states with personal property exemptions of \$10,000 rather than \$1,000, their probability of being turned down for mortgage loans rises by 1 percentage point and their probability of being turned down for home improvement loans rises by 0.4 percentage points. All of these results are statistically significant. Because the availability of mortgage loans is influenced by exemption levels, the results suggest that the costs of foreclosure are higher when borrowers file for bankruptcy.

When state fixed effects are introduced, the exemption variables capture only the effects of changes in exemption levels that occur during the period covered by the data. In this specification, Lin and White again found that applicants are more likely to be turned down for mortgage and home improvement loans, although the mortgage loan coefficient is only significant at the 10% level. But the relationships between the personal property exemption and the probability of applicants being turned down for either type of loan were insignificant. Because few changes in exemption levels occurred in the years covered by the HMDA data, more years of data will be

²³ This result assumes that mortgage lenders have no claim on other assets of the debtor, even if the proceeds of selling the house are less than the amount of the mortgage.

²⁴ Borrowers who are behind on their mortgage payments and expect lenders to foreclose often file for bankruptcy under Chapter 13. Doing so allows them to delay the foreclosure proceeding, although they must eventually repay their mortgage arrears in order to avoid foreclosure.

needed to definitely answer the question of whether there is a relationship between credit availability and bankruptcy exemptions.

The Effect of Bankruptcy on Small Business Credit. In the U.S., personal bankruptcy law is the bankruptcy procedure applicable to small businesses as well as to consumers. Owners of unincorporated businesses are legally liable for their businesses' debts. This means that, if the business fails, owners have an incentive to file for personal bankruptcy because both their business and personal debts will be discharged. In contrast, owners of corporations are not legally liable for their corporations' debts, so that personal bankruptcy law in theory is irrelevant to small corporations. But in practice, lenders to small corporations often require the corporation's owner to personally guarantee the loan and/or to give the lender a second mortgage on the owner's house. This muddies the corporate/non-corporate distinction and makes personal bankruptcy law applicable to small corporations as well. About one in five personal bankruptcy filings in the U.S. list some business debt, suggesting the importance of bankruptcy law to small business owners (see Sullivan et al, 1989).

Berkowitz and White (2003) used the National Survey of Small Business Finance to examine how bankruptcy exemptions affect small business credit. They found that if small businesses are located in states with high rather than low homestead exemptions, they are more likely to be turned down for credit and, if they receive loans, interest rates are higher and loan sizes are smaller. For non-corporate firms, the probability of being credit rationed rises by 32% if firms are located in states with unlimited rather than low homestead exemptions; while for corporate firms, the increase is 30%. Both relationships are statistically significant. Conditional on receiving a loan, non-corporate firms paid 2 percentage points more in interest and corporate firms paid 0.83 percentage points more if they were located in states with homestead exemptions at the 75th versus the 25th percentiles of the distribution. Both types of firms receive about \$70,000 less credit if they are located in states with homestead exemptions at the 75th rather than the 25th percentiles of the distribution. Thus higher bankruptcy exemptions also reduce the supply of credit to small businesses, both non-corporate and corporate.

VI. The Bankruptcy Filing Decision and Bankruptcy Stigma

Now turn to the empirical studies of the consumer bankruptcy decision. Among the important issues are whether consumers' bankruptcy decisions follow the economic versus the sociological model and whether bankruptcy stigma is an important factor in explaining the decision to file. As discussed above, the economic model of bankruptcy predicts that consumers plan in advance for the possibility of bankruptcy and their probability of filing depends on the financial benefit from doing so. This model implies that the important factors affecting the bankruptcy decision are consumers' assets and debts and the bankruptcy exemption in their state, since these factors combine to determine the financial benefit from filing. The sociological model of bankruptcy assumes that consumers do not plan in advance for bankruptcy and they file only when adverse events reduce their ability to repay. This model implies that the important determinants of the bankruptcy decision are measures of households' ability to repay, including income and whether adverse events such as illness, job loss, or divorce have recently occurred. An important additional issue is the role of social disapproval, or stigma, in the bankruptcy filing decision. Although the bankruptcy procedure in the U.S. is very favorable to individual debtors, they may hesitate to file if social disapproval is strong.²⁵

Several papers used aggregate bankruptcy filing data to test the relationship between bankruptcy exemption levels and consumers' probability of filing for bankruptcy. White (1987) used county-level aggregate data from the early 1980's to test this relationship and found a positive and significant relationship between exemption levels and county-level bankruptcy filing rates. Buckley and Brinig (1998) did the same type of study using aggregate data by state during the 1980's, but did not find a significant relationship between filing rate and exemption levels. The Buckley-Brinig results for exemption levels are not surprising, since they included state dummy variables in their analysis. In this specification, the state dummy variables capture the effect of states' initial exemption levels, while the exemption variables themselves capture the effect of changes in exemption levels. Because few states changed their exemption levels during the period, Buckley and Brinig found no relationship between exemption levels and the probability of filing.

²⁵ Another reason why consumers might avoid filing for bankruptcy is that they may not be able to obtain credit after filing. However a survey by Staten (1993) finds that three-quarters of debtors are able to obtain new credit within a year after filing for bankruptcy, although they tend to pay high interest rates. Some lenders feel that debtors are better credit risks after filing for bankruptcy, since they cannot file again under Chapter 7 for six years.

Efforts to estimate models of the bankruptcy filing decision using household-level data were initially hampered by the lack of survey data on whether individual households have filed for bankruptcy. In an innovative study, Domowitz and Sartain (1997) got around this limitation by combining two data sources: a sample of households that filed for bankruptcy under Chapter 7 in the early 1980's and a representative sample of U.S. households--the 1983 Survey of Consumer Finances (SCF)—that included information on households' income and wealth. They found that households were more likely to file for bankruptcy if they had greater medical and credit card debt and less likely to file if they owned a home. Domowitz and Sartain did not examine the effect of financial benefit or exemptions on the bankruptcy filing decision.

Fay, Hurst and White (2002) were the first to use micro-data to estimate a model of the bankruptcy filing decision--they used panel data from the Panel Study of Income Dynamics (PSID). In 1996, the PSID asked respondents whether they filed for bankruptcy during the period 1984-95 and, if so, in which year. Using the results of the survey and other data collected each year by the PSID, FHW calculated households' financial benefit from filing for bankruptcy each year. For each year they also had information concerning households' income, homeowner status, demographic characteristics, and whether particular adverse events had occurred during the previous year. FHW found that consumers are significantly more likely to file for bankruptcy as their financial benefit from filing increases: if financial benefit increased by \$1,000 for all households, then the results imply that the national bankruptcy filing rate will increase by 7 percent each year. Thus the evidence supports the hypothesis that consumers treat filing for bankruptcy as an economic decision. FHW also found that ability to pay affects the bankruptcy decision, since households with higher income were found to be significantly less likely to file. However FHW were not able to cleanly test the economic versus the sociological models of bankruptcy against each other. This is because financial benefit is measured with error, since the PSID does not collect data on wealth every year and, as a result, measured financial benefit is correlated with income. This means that FHW's finding that income is significantly related to the probability of filing for bankruptcy could support either the sociological model (because income itself affects the bankruptcy decision) or the economic model (because financial benefit affects the bankruptcy decision and income is correlated with measured financial benefit). Finally, FHW also examined whether recent adverse events affected the bankruptcy decision by including measures of whether the household head or spouse experienced job loss or a serious illness during the previous year or

whether divorce occurred during the previous year. They found that all three variables were positively related to the probability of filing for bankruptcy, but the job loss and illness variables were insignificant and the divorce variable was only marginally significant. Thus the results provide little support for the sociological model of bankruptcy.

Now turn to the role of bankruptcy stigma in the decision to file for bankruptcy. Gross and Souleles (2002) used a dataset of credit card accounts from 1995 to 1997 to model the decision to default on credit card loans and to file for bankruptcy. They controlled for variables such as the cardholder's riskiness and the length of time since the account was opened. They treat the residual of their model as a measure of the effect of bankruptcy stigma. Gross and Souleles found that, over the two year period of their data, the probability of filing for bankruptcy rose by 1 percentage point and the probability of default rose by 3 percentage points, holding everything else constant. The authors interpret their results as evidence that bankruptcy stigma fell during their time period.

Fay, Hurst and White (2002) used a more direct approach to measuring bankruptcy stigma—they used the aggregate bankruptcy filing rate in the local region during the previous year as an inverse proxy for the level of bankruptcy stigma. Surveys of bankruptcy filers show that they usually learn about bankruptcy from friends and relatives. Filers learn that the bankruptcy process is quick and easy, which reduces their fear of filing. They also learn that friends and relatives view bankruptcy in a favorable rather than a judgmental light, i.e., the level of bankruptcy stigma is lower than they thought. FHW hypothesized that in a region with more bankruptcy filings, people are more likely to learn first-hand about bankruptcy, which reduces their perception of the level of bankruptcy stigma and makes them more likely to file. They tested this by including in their bankruptcy filing model the aggregate bankruptcy filing rate in the household's bankruptcy court district during the previous year. They found that in districts with higher aggregate filing rates (lower bankruptcy stigma), the probability of filing for bankruptcy was significantly higher.

VII. Bankruptcy and The Decision to Become an Entrepreneur

Fan and White (2003) examined whether debtors who live in states with higher bankruptcy exemptions are more likely to own businesses, using panel data from the Survey of Income and Program Participation. They focused on the effect of the homestead exemption, since it is the largest and most variable of the bankruptcy exemptions, and they distinguished between the effects

of the homestead exemption on the behavior of homeowners versus renters, since only the former can take the homestead exemption. Fan and White found that homeowners are 35% more likely to own businesses if they live in states with high or unlimited rather than low homestead exemptions; while the difference for renters was 29%. Both differences are statistically significant. (The fact that exemptions have a large effect on renters' probability of owning businesses may be due to the fact that most renters expect to become homeowners by the time they face the prospect of bankruptcy.) Fan and White also examined the effect of bankruptcy exemptions on decisions to start and end businesses, where starting a business is measured by not owning a business in one year and owning one in the next, while ending a business is the opposite. They found that homeowners are 28% more likely to start businesses if they live in states with unlimited rather than low homestead exemptions, although the relationship is only marginally significant. But they did not find a significant relationship ending a business and the exemption level.

VIII. Bankruptcy and Work Effort

As discussed above, policymakers justify the "fresh start" in bankruptcy (the 100% exemption for post-bankruptcy earnings) on the grounds that debtors work harder after bankruptcy if they are not required to use part of their earnings to repay old debt. But the model discussed above implies that the fresh start in fact has an ambiguous effect on post-bankruptcy labor supply. Outside of bankruptcy, creditors may garnish part of debtors' wages if debtors default. Then if debtors file for bankruptcy, garnishment ends and debtors keep all of their post-bankruptcy earnings. The substitution effect of keeping all their earnings implies that debtors will work more after bankruptcy. But discharge of debt in bankruptcy also increases debtors' wealth and the income effect implies that they will work less after bankruptcy. Overall, bankruptcy could therefore be associated with either an increase or a decrease in work effort.

Han and Li (2004) used the PSID's special bankruptcy survey to test whether consumers work more or less after bankruptcy. They found that filing for bankruptcy is associated with a large--17%--reduction in the number of hours worked by the household head, but the relationship was not statistically significant. Their results suggest that the income effect of debt discharge in bankruptcy is quantitatively more important than the substitution effect of ending debtor's obligation to repay. These results, although tentative, suggest support for reforms that would reduce the exemption for

post-bankruptcy earnings to less than 100%, since these reforms are more likely to be economically efficient if labor supply falls when debtors file for bankruptcy.

IX. Bankruptcy and Consumption Insurance

The model discussed above emphasized the insurance role of bankruptcy and the fact that higher exemption levels are associated with additional insurance. Grant (2003) tested this hypothesis, using data from the U.S. Consumer Expenditure Survey. This dataset gives micro-level information for a rotating panel of households, each of which is interviewed quarterly over a one-year period. To measure the insurance effect of bankruptcy, Grant computed the average variance of household consumption for each state-year covered by the dataset. Then he regressed the change in the variance of consumption from one year to the next on the bankruptcy exemption level, control variables, and state fixed effects. The data have the advantage of covering a 20-year period, so that the number of changes in bankruptcy exemption levels is maximized. In this formulation, the hypothesis is that the coefficient of the exemption variable will have a negative sign, which implies that higher exemptions are associated with lower consumption variance/higher consumption insurance. Grant found that both the exemption variable and a dummy variable for states with unlimited homestead exemptions have the predicted negative signs and the results were statistically significant. Thus the empirical results provide support at a macro level for the hypothesis that higher bankruptcy exemptions are associated with an increase in the level of consumers' certainty concerning their future consumption.²⁶

X. Bankruptcy and Portfolio Reallocation

Because unsecured debts are discharged in Chapter 7 bankruptcy but some assets are exempt, debtors who contemplate filing for bankruptcy have an incentive to borrow—even at high interest rates—in order to acquire liquid assets. This is because the liquid assets will be exempt in bankruptcy, while the debts will be discharged. This behavior is referred to as “borrowing to save.” The higher the bankruptcy exemption level in the debtor's state, the stronger is debtors' incentive to

²⁶ Grant (2003) and Lehnert and Maki (2002) have also examined the relationship between bankruptcy and consumption smoothing.

borrow to save. (Similar types of behavior were discussed in section IV above in connection with the proportion of households that would benefit from filing for bankruptcy.)

Lehnert and Maki (2002) examined whether households are more likely to borrow to save if they live in states with higher bankruptcy exemptions. Their definition of borrowing to save is that a household simultaneously holds unsecured debt and liquid assets above a threshold level and also holds liquid assets greater than 3% of gross income. The threshold value was \$2000 for renters and \$5000 for homeowners. Lehnert and Maki tested their model using household-level panel data from the Consumer Expenditure Survey. The results were that homeowners were 1 to 4 percent more likely to borrow to save if they lived in states with bankruptcy exemptions that were above the lowest quartile of the exemption distribution. Renters were less likely to borrow to save and the relationship was less likely to be statistically significant.

XI. Conclusion

The results of the studies surveyed in this paper suggest that bankruptcy has important and wide-ranging effects on both credit markets and on other aspects of consumer behavior. On the credit market side, generous bankruptcy exemptions increase consumers' demand for credit by providing partial consumption insurance, but cause lenders to reduce the supply of credit by increasing the probability of default. In states with higher bankruptcy exemptions, consumers are turned down for credit more often and pay higher interest rates. If they have high assets, they hold more credit in high-exemption states; while if they have low assets, they hold less credit in high-exemption states. Small businesses are also more likely to be turned down for credit, pay higher interest rates, and hold less credit if they are located in high exemption states. These results apply to both non-corporate or corporate small businesses. Overall, the bankruptcy system causes credit to be redistributed from high exemption to low exemption states and from low asset to high asset borrowers. High bankruptcy exemptions also have other effects on consumer behavior—they cause debtors to behave more opportunistically, reallocate their portfolios toward more unsecured debt and more liquid assets, file for bankruptcy more often, work fewer hours after filing for bankruptcy, and become self-employed more often. But higher bankruptcy exemptions benefit consumers by reducing the variance of consumption, i.e., they provide partial consumption insurance.

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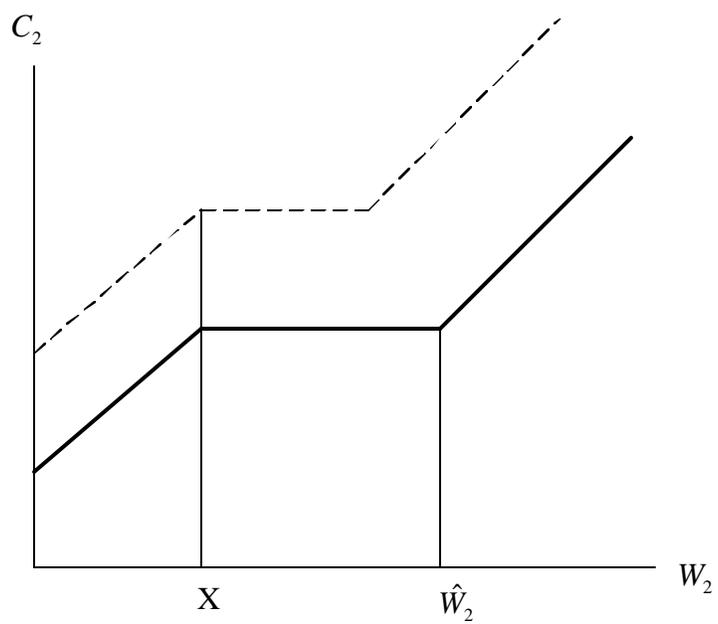
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Figure 1: The Insurance Effect of Bankruptcy



**Table 1:
Non-business and Business Bankruptcies
1980-present**

Year	Number of non-business bankruptcy filings	Number of business bankruptcy filings
1980	241,431	36,449
1985	297,885	66,651
1990	660,796	64,688
1995	806,816	51,878
2000	1,240,012	35,472
2002	1,539,111	38,540
2003	1,625,208	35,037

Source: *Statistical Abstract of the United States*, 2002, table 724, and 1988, table 837, and data from Administrative Office of the U.S. Courts.

**Table 2:
Personal Bankruptcy Exemptions in the U.S., 2001**

Homestead Exemptions	State
0 – \$7,500	Alabama, Delaware, District of Columbia, Georgia, Kentucky, Illinois, Indiana, Maine, Maryland, Michigan, New Jersey, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia
\$8,000 – \$30,000	Colorado, Hawaii, Louisiana, Missouri, Nebraska, New Hampshire, New Mexico, New York, Nebraska, North Carolina, Oregon, Utah, West Virginia, Wyoming, Federal exemption
\$40,000 – \$100,000	Arizona, California, Connecticut, Idaho, Massachusetts, Mississippi, Montana, North Dakota, Rhode Island, Vermont, Washington, Wisconsin
>\$100,000 - \$250,000	Alaska, Minnesota, Nevada
Unlimited	Arkansas, Florida, Iowa, Kansas, Oklahoma, South Dakota, Texas
Personal Property Exemptions	State
\$2,000 – \$4,500	Alabama, Florida, Indiana
\$5,000 – \$8,700	Delaware, Illinois, Louisiana, Maryland, Massachusetts, Missouri, Nebraska, North Carolina, North Dakota, Ohio, South Dakota, Tennessee, Utah, Wyoming
>=\$10,000	Alaska, Arizona, Arkansas, California, Colorado, Connecticut, District of Columbia, Georgia, Hawaii, Idaho, Iowa, Kansas, Kentucky, Maine, Michigan, Minnesota, Mississippi, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Texas, Vermont, Virginia, Washington, West Virginia, Wisconsin, Federal exemption

States that allow bankrupts to use either the state or the Federal exemptions

State

Arkansas, Connecticut, District of Columbia, Hawaii, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New Mexico,

Pennsylvania, Rhode Island, Texas, Vermont, Washington,
Wisconsin

Notes: The exemptions given are for single filers. Some states allow married couples to double the homestead exemption and some the elderly or disabled to take higher exemptions. States usually have a number of different personal property exemptions for items such as clothing, equity in cars, furniture, jewelry, tools of the trade, burial plots, or damage awards. These may be specified either as maximum dollar values or as blanket exemptions for the particular type of property. Some states also have a dollar-denominated “wildcard” exemption that applies to any type of property. The personal property exemptions listed in table 1 are the sum of all personal property exemptions for which a maximum dollar value is given. In addition to these exemptions, some states have exemptions for retirement accounts and life insurance policies. Source: Author’s calculations from data in Elias et al (2001).