

Determinants of the Consumer Bankruptcy Decision

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ABSTRACT

Qualitative choice models of consumers' decisions to file for bankruptcy and their choice of bankruptcy chapter are estimated jointly, combining choice-based sampling techniques with a nested estimation procedure. Medical and credit card debt are found to be the strongest contributors to bankruptcy, with homeownership playing an important role with respect to both the decision to declare bankruptcy and the choice of bankruptcy alternative. The potential effects of legal changes relating to property exemptions and dischargeable debt categories are found to encourage debt repayment through Chapter 13.

ALMOST 5.5 MILLION HOUSEHOLDS FILED for bankruptcy protection during the 1980s. The annual number of filings under Chapters 7 and 13 of the U.S. Bankruptcy Code doubled over that decade, compared with an increase of 28 percent in the previous ten years. Net losses to creditors are counted in the tens of billions of dollars, and these losses have grown twice as fast as consumer installment credit since 1980.

Research in the area of consumer bankruptcy is largely based on the analysis of aggregate filing data (a set of references is contained in Domowitz and Eovaldi (1993)). There are few general studies of bankruptcy that use data on individual debtors or households.¹ Given the importance of this area to banking, the credit industry, and public policy, it is surprising that there is no model quantifying the economic and demographic influences guiding the overall bankruptcy choice. An empirical qualitative choice model of the bankruptcy decision is presented here, using household-level data. The model includes both the decision to file for bankruptcy and the choice between available bankruptcy alternatives under the law.

Distinctions between the relative impact of alternative sources of debt, household conditions, asset holdings, and property exemptions are important with respect to debates over extensions of credit and public policy relating to bankruptcy law. The probability of filing for bankruptcy protection is examined in

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¹ Virtually all of these studies focus on bankruptcy before the Bankruptcy Reform Act of 1978, a massive rewriting of bankruptcy statutes, and use narrow databases. An exception is Sullivan, Warren, and Westbrook (1989). A review of studies based on disaggregated data is given in Luckett (1988).

terms of disaggregated categories of secured and nonsecured debt, including credit card debt, personal loans, unsecured bank loans, medical debt, and classifications of secured loans. Household conditions, such as homeownership and marital status, also play a role. The model is further augmented by equity and asset information, disaggregated by asset class. Finally, information on exemption levels, student loans, debt repayment, and attorney representation help to explain chapter choice, given the legal nature of bankruptcy alternatives.

In terms of the decision to declare bankruptcy, health problems leading to substantial medical debt are found to constitute the most important factor in assessing the impact of household conditions. On the other hand, the largest single contribution to bankruptcy at the margin is credit card debt relative to income. An increase in credit card debt from the population average to the level of a typical bankrupt household is predicted to cause a six-fold increase in the conditional probability of filing for protection.

Homeownership discourages bankruptcy by a substantial amount. Increases in secured debt leading to higher bankruptcy probabilities are found to be important only in the presence of mortgage debt, however. Purchases of items such as automobiles on credit apparently require a fixed stock of mortgage debt in order to be substantial contributors to bankruptcy.

Household conditions also have a substantial effect on the choice of bankruptcy chapter. Higher marriage rates, employment rates, and income all encourage the choice of Chapter 13 rehabilitation over Chapter 7 liquidation. Equity levels are clearly factors in the decision. Higher levels of equity relative to debt push debtors into Chapter 13 with a probability double that predicted for households with low equity holdings.

From the perspective of bankruptcy law and policy, the most interesting chapter choice results pertain to property exempt from liquidation or repayment and categories of debt dischargeable only under a single alternative. Incentives that increase the incidence of Chapter 13 relative to Chapter 7 are considered desirable by bankruptcy judges and participants in the credit industry. Exemptions constitute an important choice variable for policymakers in this regard. The estimates presented here suggest that a decrease in exemption levels across all property categories by 50 percent would increase the probability of choosing the Chapter 13 alternative by 18 to 25 percent.

A short overview of bankruptcy alternatives is provided in Section I in order to clarify the chapter choice problem and to aid in data interpretation. Random utility maximization and a combination of specialized choice-based pseudolikelihood functions are used in Section II to produce a statistical model of the bankruptcy and chapter choice decisions. The impact of changes in debt and asset levels on the probability of filing and chapter choice is examined in Section III. Some remarks with respect to the implications of our results for bankruptcy law and policy conclude the paper.

I. The Consumer Bankruptcy Process

In Chapter 7, the debtor surrenders nonexempt property rights and wealth to the court. The household retains property rights classified as exempt

from bankruptcy proceedings. Creditors must cease all collection efforts at this point, but may file a claim with the court. A plan is formulated for the liquidation of assets and the distribution of the proceeds to creditors.

Once the plan is approved by the court, the household is discharged of responsibility for most of the debt not covered by the liquidation. Some debt is not dischargeable, such as recent income taxes, alimony, child support, and government-supported educational loans. Other such categories include debts incurred through fraud, false financial statements, fines, and penalties, as well as tort claims and certain debts incurred within short periods before the bankruptcy filing. Home ownership is not protected, except to the extent offered by homestead exemptions. In particular, arrears with respect to mortgage repayment may force sale of the household domicile. On the other hand, there is no limit on the amount of debt that can be discharged. The household need not be insolvent or unable to pay the bills. The Chapter 7 debtor simply gives up all nonexempt assets in return for being able to keep all future income.

Chapter 13 offers a completely different alternative to the household. Debtors are allowed to retain their existing property. The time for repayment of all or a portion of debt out of future income is extended, usually over a period of three years. In particular, a household can restructure secured loans with lower periodic payments. The only exception is the home mortgage, which cannot be rescheduled. However, the household can pay off mortgage arrears, while maintaining the regular mortgage payments, thus avoiding foreclosure. Court approval of the plan does not require the consent of creditors.

In most cases, Chapter 13 debtors are relieved of the obligation to repay some portion of existing debt. The main restriction on minimum plan payments involves the Chapter 7 alternative and property exemption levels. The household must pay at least as much to creditors in Chapter 13 as they would have received under a Chapter 7 filing. The latter amount depends on exemption levels. A household with a large amount of nonexempt property either loses that property under Chapter 7 or pays the value of the property to creditors in Chapter 13.

Unlike Chapter 7, the Chapter 13 discharge covers nearly all the household's obligations. Only legal costs, alimony, and child support obligations survive. There is some extra protection for the household's home as well. Prior use of Chapter 13 proceedings does not preclude a household from obtaining a discharge in a subsequent Chapter 7 case, but Chapter 7 debtors cannot refile for six years.

II. Estimation of a Bankruptcy Choice Model

Three issues arise in the specification and estimation of a model characterizing the bankruptcy choice. First, the Chapter 7 and Chapter 13 alternatives are not totally independent. Confirmation of the Chapter 13 plan explicitly depends on a debtor's expected repayment performance in Chapter 7. Second, the sampling scheme overrepresents Chapter 13 cases relative to their incidence in the population of debtor households. Finally, we have a sample design con-

sisting of a choice-based sample of bankrupt households from both chapters, combined with a supplemental random sample containing unidentified households that may be bankrupt. Estimation must, therefore, depend on information about the distribution of variables explaining the bankruptcy choice.

A. The Data

The United States General Accounting Office (1983) compiled a random sample of Chapter 7 and Chapter 13 cases from a population of 17,565 bankruptcies filed in five court districts in the second and third quarters of 1980. The districts selected were in Southern and Eastern New York, Southern Ohio, Eastern Kentucky, and Central California. The data were collected directly from the bankruptcy petitions.

The database constructed for the analysis in this paper contains observations on 575 Chapter 7 cases and 252 Chapter 13 filings.² Debts and assets are classified by type and source, which is the strongest feature of the data.³ Court records omit demographic considerations, and we discuss this issue further below. Petitions with evidence of business operations are removed, given our desire to study consumer bankruptcy and not bankruptcy related to business concerns. Household business-related debt and businesses are clearly identified in the records. The data include information on joint petitions and marital status, and we are able to treat each observation as a household unit. This allows comparisons with households in the general population. All amounts are normalized to real terms by deflating by regional Consumer Price Index figures, and are in 1977 dollars.⁴

Matching data on households not in bankruptcy must have good asset and debt information in a form that allows comparisons with the bankruptcy sample. The Survey of Consumer Finances (SCF) provides the only such data at the time of this study.⁵ The database used here consists of 1862

² Hard copy was provided by the United States General Accounting Office on a loan basis, and the data were double-punched for accuracy. Cases including business-related debts were excluded. Chapter 13 cases converted to Chapter 7 prior to the confirmation of the repayment plan were reclassified accordingly.

³ Cars and homes represent the majority of value in a debtor's estate. Bankruptcy judges examine such items relative to resale markets for obvious discrepancies. Debtors have clear incentives to underreport the value of assets such as clothes and furniture, but risk penalties of perjury and charges of fraud, which provides some disincentive to misreport on a large scale. Sullivan et al. (1989) also note that debtors often evaluate assets by original cost, rather than depreciated value, reducing any underreporting in dollar terms.

⁴ Validity of the data for more recent history is examined by Sullivan et al. (1989, pp. 19–20), echoing the conclusion of the American Bankruptcy Institute (1987), which found that the 1984 legal change produced remarkably small differences in behavior. Sullivan, Warren, and Westbrook (1994) also find that the financial conditions of debtors in 1991 are extremely similar in a variety of dimensions to debtors in 1981.

⁵ The in-depth version of the survey is conducted every ten years, and the data used here are from the 1983 survey. To the extent that no significant trends existed in household behavior in the acquisition of debt and relative to asset holdings over the late 1980 to 1983 period, this is not a problem. The period is short, and aggregate annual personal bankruptcy filings show no significant trend over the period despite the recession of 1981–1982; see White (1988). There was no rewriting of bankruptcy law.

households.⁶ Discussion of the survey design is contained in Avery, Elliehausen, and Canner (1984a, 1984b). These data are also deflated by appropriate regional Consumer Price Indexes.

B. The Statistical Model

Random utility maximization leading to a nested logit specification is a natural way to handle the interdependence between Chapter 7 and Chapter 13 alternatives. The model is a decision tree, in which the household decides to declare bankruptcy, and then consults with an attorney and the court with respect to chapter choice. The utility of the three choices is specified as

$$U_{in} = \mu_{in} + \epsilon_{in}, \quad (1)$$

where the subscripts n and i index household and bankruptcy alternative, respectively; $i = 0$ denotes no bankruptcy, and $i = 1, 2$ are the Chapter 7 and Chapter 13 alternatives.

The errors ϵ_{1n} and ϵ_{2n} are assumed to be jointly distributed according to the Gumbel Type B bivariate extreme-value distribution, with correlation coefficient $1 - \lambda^2$, $0 < \lambda \leq 1$. The random disturbance ϵ_0 is taken to be Weibull distributed. Utility maximization yields the probability of not filing for bankruptcy to be (McFadden (1981))

$$P(i = 0 | \Omega) = \frac{\exp(\mu_0)}{\exp(\mu_0) + [\exp(\mu_1/\lambda) + \exp(\mu_2/\lambda)]^\lambda}. \quad (2)$$

The probability of the Chapter 7 choice conditional on bankruptcy is given by

$$P(i = 1 | i \neq 0, \Omega) = \frac{\exp(\mu_1/\lambda)}{\exp(\mu_1/\lambda) + \exp(\mu_2/\lambda)}. \quad (3)$$

In both expressions, the notation Ω denotes information conditioning the choice set. The overall filing and Chapter 13 filing probabilities are easily deduced from equations (2) and (3).

⁶ The subset of the data corresponding to an oversampling of high-income households (400 observations) is removed. Households with business-related debt are deleted, based on SCF questions K25 and K26, reducing sample size to approximately 2570 from 3263. The remainder of the reduction in sample size is due to the fact that the SCF contains no direct information on loan amortizations for such items as homes and cars. Households with insufficient information to permit amortization calculations are deleted from the sample. Given that we create a subsample, we do not use the SCF sampling weights in the estimation. Avery et al. (1984a) report that tabulations based on weighted and unweighted data do not differ as a practical matter (p. 691). Three of the four weighting factors (including population weights and stratification weights) are identical for all households. The only variation is observed in the nonresponse weights, which is on the order of 10 percent. The overall weights for our sample are relatively constant across observations.

The statistical criterion function governing the Chapter 7/Chapter 13 choice is based on the Manski–McFadden (1981) estimator for choice-based sampling:

$$L_1(\theta_1) = \sum_{n=1}^N \ln \frac{P(i_n|\Omega_n, \theta_1)w_i}{\sum_{j \in C} P(j_n|\Omega_n, \theta_1)w_j}, \quad (4)$$

where $P(i_n|\Omega_n, \theta_1)$ is the conditional probability of the n th household choosing alternative i from the set of $C = \{1, 2\}$ choices, given the information set Ω_n and a parameter vector θ_1 . There are $N = N_1 + N_2$ bankrupt households. The weights, w_i are defined as $w_i = H_i/Q_i$, where Q_i is the population distribution of choice i conditional on θ_1 and H_i is the distribution according to which the choice is sampled. The fact that H is not taken to be equal to Q takes care of the oversampling of Chapter 13 cases.

A pseudolikelihood for the overall bankruptcy choice is based on Cosslett (1981), given by

$$L_2(\theta_2) = \sum_{n=1}^N \ln \frac{w_{1 \cup 2} P(i_n|\Omega_n, \theta_2)}{\sum_{j \in C} w_j P(j_n|\Omega_n, \theta_2) + H_0} - \sum_{n=N+1}^{N+N_0} \ln \left[\sum_{j \in C} w_j P(j_n|\Omega_n, \theta_2) + H_0 \right], \quad (5)$$

where subscripts of zero denote quantities related to the SCF sample and the set C now is $\{0, (1 \cup 2)\}$. This formulation corrects for the problem of unidentified bankrupt households in the SCF data.

The pseudolikelihood function for the decision problem is

$$L(\theta_1, \theta_2) = L_1(\theta_1) + L_2(\theta_2). \quad (6)$$

C. Specification and Estimation

The information sets in equations (2) and (3) are characterized through the parameterization

$$\mu_{on} = Y_n' \gamma \quad (7)$$

and

$$\mu_{in} = X_n' \beta + Z_{in}' \alpha \quad i = 1, 2. \quad (8)$$

The vectors X and Y are composed of variables indicating household and financial status. The variables contained in Z relate to characteristics of Chapters 7 and 13 that may be relevant to the choice between bankruptcy alternatives.

Distinguishing the relative impact of alternative sources of debt is important for debates over extension of credit, as well as for bankruptcy law and policy. The probability of filing for protection is examined in terms of disaggregated categories of secured and unsecured debt, normalized by income. Unsecured debt is classified by credit and retail card debt, unsecured personal loans, unsecured loans from banks and finance companies, and miscellaneous debt. Secured debt is broken down into the combination of bank and finance company debt and all other. Medical debt is included here in binary form, with a positive value indicating expenses in excess of 2 percent of income. Home ownership is included, based on the hypothesis that home owners may be less likely to choose bankruptcy, given the treatment of mortgage and home equity under bankruptcy law.

In terms of demographics, we are able to control only for marriage. The evidence with respect to the potential importance of missing demographic information is mixed, but generally appears to mitigate the problem.

Data contained in Sullivan et al. (1989, pp. 151–152) indicate no significant gender differences in total and nonmortgage debt relative to income. For example, at the median, total debt relative to income is 1.23 for males and 1.37 for females. The same employment tenure prior to the bankruptcy for males and females is also reported by these authors. Divorce and race considerations are economically and statistically insignificant in explaining aggregate filing rates (see Domowitz and Eovaldi (1993)). Demographic considerations are not given as “underlying” and “immediate” influences on the bankruptcy decision in 400 interviews conducted by Stanley and Girth (1971). Differences in location may matter, but such effects are empirically weak (see Peterson and Aoki (1984)). Further, locational differences have little to do with levels of debt relative to income, employment, or other financial variables in samples of bankrupt households (Lockett (1988)).⁷ Bankrupt debtors are represented by relatively larger numbers of young families with more children (Lockett (1988)). However, the impact of this age structure is not quantified so as to determine its importance in any modeling effort.

The model is augmented with respect to financial variables in the choice of bankruptcy alternative, conditional on filing for protection. The differential treatment of asset holdings suggests the inclusion of disaggregated categories of assets, normalized to income level. Our data allow examination of liquid assets, automobile equity, household assets, equity in real property other than the main domicile, home equity, and miscellaneous assets, as well as the overall debt to asset ratio.⁸

⁷ Differences in exemption levels across locations are taken into account in the empirical analysis to follow. We attempt to include a complete set of geographic controls into the final probability model, but obtain no statistically or economically significant results due to the nature of the overall sample design.

⁸ Household assets here also include “personal” assets as contained in our data. Liquid assets consist of cash, other liquid assets such as the cash value of life insurance and miscellaneous stock investments, and tax refund payments. The miscellaneous category cannot be broken down further.

The selection of variables entering the vector Z is dictated by the discussion in Section I. Exemptions relative to debt are factors in both the personal choice of alternative and in the court's decision to confirm Chapter 13 plans.⁹ Higher exemption levels have been argued to be a motivation for filing for protection under Chapter 7, as opposed to Chapter 13. Student loans receive differential treatment across the two chapters, and the loan amount is normalized to income. Chapter 13 households are allowed to refile for protection, subject to repayment conditions, unlike Chapter 7 debtors, who must wait at least six years. We calculate the expected debt repayment, and include a positive indicator if the household meets the repayment requirements. Finally, the use of a specialist attorney may be a factor in the choice between alternatives.

Coefficient estimates for the bankruptcy/no bankruptcy choice are reported in Table I.¹⁰ Homeownership discourages bankruptcy. The effect of marriage is statistically negligible. This is not too surprising, given that 50 percent of households in bankruptcy contain married couples, compared to 56 percent in the SCF sample.¹¹ All debt categories contribute positively to bankruptcy.

The estimated correlation between Chapter 7 and Chapter 13 alternatives is fairly high, at 0.42. Parameter estimates for chapter choice are presented in Table II. Homeownership motivates the Chapter 13 decision, as expected. Moreover, increased levels of home equity, over and above simple ownership, provide extra incentive to choose Chapter 13. In terms of other categories of assets, only stocks of liquid and household assets encourage the Chapter 7 choice. Equity in large securable assets leads to Chapter 13. Marriage and employment tend to promote Chapter 13 over 7. Larger medical debts lead to Chapter 7.

Coefficient estimates characterizing chapter-specific differences generally are in accord with the incentives envisioned under the law. Student loan debt is dischargeable only in Chapter 13, and higher levels of such loans relative to income do promote the Chapter 13 choice. Higher exemptions are conjectured to favor Chapter 7, and the data support this (relative to either debt or assets). The ability to pay 100 percent of debt, allowing earlier re-filing, positively contributes to the probability of Chapter 13. We run regressions to further investigate this result. Higher exemptions relative to either debt or assets and lower debt/asset ratios increase the repayment percentage in Chapter 13. Larger credit card debt decreases the percentage, suggesting that credit card companies are taking the losses. Higher levels of mortgage debt also increase repayment, possibly reflecting payment of arrears.

⁹ Exemptions relative to assets also play a role, and will be discussed in the context of estimation results.

¹⁰ All variables in the joint model enter the probability of filing for bankruptcy. It is convenient to differentiate between the variables entering the chapter choice decision (X, Z) in Table II, and the additional variables entering the bankruptcy decision (Y), in Table I.

¹¹ The use of occupational variables is also investigated, but the coefficients are estimated with large standard errors. Omission of occupational controls does not affect the estimates of other coefficients in the model.

Table I
Probability Model: Bankruptcy Choice

This table contains the estimated coefficients and standard errors of a nested logit model relating the probability of filing for consumer bankruptcy protection to household demographic and financial characteristics at the time of filing. The estimates are obtained by maximization of a pseudolikelihood function, designed for the case of a choice-based sample of bankrupt households combined with a supplementary random sample of the population, in which indicators with respect to bankruptcy status are not available. The choice-based sample is a random sample of 827 households who filed for bankruptcy protection. The supplementary sample is a random sample of 1,862 households from the Survey of Consumer Finances. Medical is a binary variable that equals 1 if household medical debt exceeds 2 percent of income. Homeowner is a binary variable that equals 1 if the household owns a home. Married is a binary variable that equals 1 if the filer is married. Debt/Asset is the ratio of total debt from all sources to total household assets. All other variables are defined as ratios of debt by category to income from all sources. Credit card includes credit card and retail store card debt. Unsecured bank includes unsecured bank and finance company debt. Unsecured individual is personal signature loan debt. Secured bank includes secured bank, finance company, and credit union debt. Secured other is composed of automobile company loans, personal secured loans, and miscellaneous debt secured by real property. Unsecured other also is miscellaneous unsecured debt. The correlation between Chapter 7 and Chapter 13 alternatives is $1 - \lambda^2$.

Variable	Coefficient	Standard Error
Intercept	-5.103	0.668
Medical	3.208	0.609
Homeowner	-2.262	0.825
Married	0.604	0.415
Debt/Asset	0.002	0.711
Credit card/Income	29.92	8.174
Unsecured bank/Income	82.65	22.41
Unsecured individual/Income	13.05	10.66
Unsecured other/Income	1.349	1.935
Secured bank/Income	2.663	0.812
Secured other/Income	0.966	0.683
λ	0.76	0.308

The predictive content of the model is quite good. More than 98 percent of households in the SCF sample have predicted filing probabilities of less than 0.10, and 22 of the SCF households are predicted to file for protection with probability exceeding 95 percent. The incidence of seemingly bankrupt households is a bit larger than in the United States as a whole, but the average debt of these SCF households is quite similar to that in bankruptcy. Unsecured debt relative to income is about ten times that of the typical household in the SCF sample; secured debt relative to income is more than four times that in the general population. No other SCF household is predicted to file with probability exceeding 0.30. More than 80 percent of households in the bankruptcy sample have filing probabilities exceeding 0.90, and the probability of filing for bankruptcy at the mean of the data is 100 percent.

The statistical classification of debtors into Chapter 7 and Chapter 13 also appears satisfactory. Misclassification, the predicted probability of choosing Chapter 13 conditional on being a Chapter 7 debtor, is 5 percent. Only 0.3 per-

Table II
Probability Model: Chapter Choice

This table contains the estimated coefficients and standard errors of the inclusive value describing the probability of filing for Chapter 13 relative to Chapter 7 bankruptcy protection, within a nested logit framework for the bankruptcy/no bankruptcy choice. The data consist of random samples of 575 households who filed for Chapter 7 protection and 252 households who filed for Chapter 13 protection, in 1980. Medical is a binary variable that equals 1 if household medical debt exceeds 2 percent of income. Homeowner is a binary variable that equals 1 if the household owns a home. Married is a binary variable that equals 1 if the filer is married. Employed is a binary variable that equals 1 if the filer is employed. Debt/Equity is the ratio of total debt from all sources to total household equity. Specialist Attorney is a binary variable equal to 1 if the household retained a bankruptcy attorney. Exemption/Debt is the ratio of all claimed exemptions to debt from all sources. Refile is a binary variable that equals 1 if the household plans to pay 100 percent of debt. All other variables are defined as ratios of equity or debt by category to income from all sources. Auto equity is equity in cars owned by the household. Liquid assets include cash, other liquid assets, and tax refund payments. Home equity is equity in the main domicile and Property equity is equity in other real property. Household assets include personal assets and household goods. Other equity is equity from any miscellaneous sources not listed above. Student loan is composed of government-supported student loan obligations.

Variable	Coefficient	Standard Error
Intercept	-3.019	0.619
Medical	-0.846	0.238
Homeowner	0.849	0.254
Married	0.689	0.263
Employed	0.875	0.385
Debt/Equity	-0.005	0.003
Auto equity/Income	9.299	1.434
Liquid assets/Income	-4.195	4.739
Home equity/Income	0.499	0.336
Household assets/Income	-3.985	1.667
Property equity/Income	0.519	1.577
Other equity/Income	0.258	2.820
Student loan/Income	2.255	1.752
Specialist attorney	0.377	0.546
Exemption/Debt	-0.909	0.502
Refile	6.513	0.874

cent of Chapter 7 households exhibit a Chapter 13 filing probability of 0.90 or greater, and a mere 1.5 percent of such debtors would be predicted to file for Chapter 13 protection with a probability exceeding 0.50. The predicted probability of a Chapter 13 household filing for protection under that chapter is 0.96 at the mean.

III. The Conditional Probability of Bankruptcy and Chapter Choice

A. Household Condition and the Probability of Bankruptcy

The condition of a household is important in evaluating the chances of filing for bankruptcy. Table III contains information on the conditional probability of filing. The deviation of the filing probability in each category

Table III
Predicted Bankruptcy Probabilities by Family
and Homeowner Status

This table contains predicted filing probabilities for households differentiated by marital status, medical obligations, homeownership, and income in the Probability column. The Deviation from Baseline column gives the percentage difference in predicted filing probabilities between households categorized as above and a baseline calculated as the overall predicted probability of filing in the Survey of Consumer Finances 1983, evaluated at the mean of the data for 1,862 households. Married indicates that the household consists of at least a married couple (1035 households). High medical indicates household medical debt in excess of 2 percent of income (29 households). High income is income greater than the median value in the sample (930 households). Home indicates homeownership at the time of the survey (1,078 households). Home, high income indicates income greater than the median and homeownership, jointly (647 households). Similarly, there are 431 households with low income, owning homes, 275 high income nonhomeowners, and 494 low income nonhomeowners.

	Probability	Deviation from Baseline
Married	0.013	-33.56
Not married	0.033	68.04
High medical	0.581	2,818
Low medical	0.019	-5.26
Home	0.009	-54.58
No home	0.061	205.0
High income	0.021	6.80
Low income	0.019	-6.28
Home, high income	0.013	-34.35
Home, low income	0.005	-73.61
No home, high income	0.068	239.9
No home, low income	0.057	187.4

from a "baseline probability" is given. The baseline is defined as the conditional probability of bankruptcy over all SCF households, evaluated at data means.

High medical debt has the greatest single impact of any household condition variables in raising the conditional probability of bankruptcy. Medical problems may have side effects, but we find little correlation of medical debt with other sources of financial distress. The latter result is confirmed by Sullivan et al. (1989, p. 169), using a different sample. Households with high medical debt exhibit a filing probability greater than 28 times that of the baseline. Approximately 1.6 percent of the SCF sample has medical debt exceeding 2 percent of income, implying that for an 87 million household economy, about 233,000 households could be declaring bankruptcy based on medical debt alone, which is approximately 30 percent of debtors in 1994, for example.

Homeownership deters bankruptcy. A debtor without a home is almost seven times more likely to file for bankruptcy than the average homeowner, all else equal. The nonhomeowner is twice as likely to file as the general population.

Income makes a difference only when combined with homeownership. A low income debtor without a home is eleven times more likely to file than a low income homeowner. This difference is sharply reduced for high income households.

B. The Impact of Increases in Debt on the Probability of Filing

Bankruptcy filings do not occur as a result of small changes in the debt structure of the household. We therefore examine the impact of increases in debt relative to income on the probability that the average household would declare bankruptcy using probability arc elasticities, rather than derivatives or point elasticities. The analysis is disaggregated by marital status, the extent of medical debt, homeownership, and total income. The numbers reported in Table IV are the percentage increases in the probability of filing due to a 1 percent increase in debt relative to income. They may be used to quantify the impact of changes in debt representative of that observed in bankruptcy.

The largest single contribution to bankruptcy at the margin is credit card debt. An increase in credit card debt to the level of an average Chapter 7 debtor is predicted to cause a 624 percent increase in the probability of filing.¹² If such debt is raised to the extent observed in Chapter 13 filings, the probability of bankruptcy jumps by 498 percent. The filing response with respect to credit card burden is fairly stable across types of households.

The strongest single influence with respect to secured bank debt is homeownership. For homeowners, secured bank debt is largely mortgage obligation. If the mortgage debt alone of the average household were raised to the level observed in bankruptcy of either chapter, the probability of default increases by 133 percent. This figure is somewhat larger for high income households (172 percent). If the household does not own a home, increases in secured debt to the level observed in bankruptcy have a negligible effect on the probability of filing.

Households with medical debts show the greatest sensitivity to other unsecured debt. A typical household with substantial medical debt experiences an 898 percent increase in filing probability if credit card debt is raised to the level observed in bankruptcy, compared to 627 percent otherwise. Conditional on medical debt, a household that takes on the same level of miscellaneous unsecured debt as a bankrupt debtor faces a 460 percent increase in the probability of filing, almost six times that for the same household with medical debt less than 2 percent of income. There are no real differences in the effects of secured debt across households differentiated by medical burdens.

¹² This figure is calculated by computing the percentage increase in credit card debt from the average level in the SCF population to the average level of Chapter 7 debtors in the bankruptcy sample, and multiplying that figure by the elasticity reported in the table. The analogous figures reported subsequently in text are derived similarly, with the precise levels used depending on the comparison discussed. Space restrictions preclude the reporting of all such levels in separate tables.

Table IV

Probability Arc Elasticities By Family and Homeowner Status

This table contains estimates of probability arc elasticities associated with individual debt categories, computed as the percentage increase in the conditional probability of filing for bankruptcy protection in the population, given a 1 percent increase in debt relative to total household assets (Debt/Asset) and debt by category relative to income from all sources (all other entries). All increases are measured relative to the relevant mean of the population, as estimated from a random sample of 1,862 households from the Survey of Consumer Finances. Each figure in the table represents an increase in one debt ratio, holding all others constant at the mean. Figures in the Overall column are based on the entire set of households. The High Medical column gives figures for families with medical debt exceeding 2 percent of income. Low Medical figures are calculated for families with less than that amount of medical debt. Married figures are calculated for married filers only. Single figures are calculated from single filers only. Home indicates that the increase is computed for homeowners only. No Home represents calculations for nonhomeowners. Home (High or Low Income) columns contain figures for homeowners differentiated by income, with High Income defined as income greater than the mean for homeowners. No Home (High or Low Income) represents calculations for nonhomeowners differentiated by income, with High Income defined as income greater than the mean for nonhomeowners.

Panel A: Family Status					
Debt Category	Overall	High Medical	Low Medical	Married	Single
Debt/Asset	0.002	0.003	0.002	0.002	0.003
Credit card	0.467	0.663	0.463	0.482	0.446
Unsecured bank	0.078	0.288	0.074	0.069	0.089
Unsecured other	0.066	0.349	0.061	0.036	0.104
Secured bank	0.517	0.507	0.517	0.705	0.268
Secured other	0.157	0.110	0.157	0.202	0.098

Panel B: Homeowner Status						
	Home (Overall)	No Home (Overall)	Home		No Home	
			High Income	Low Income	High Income	Low Income
Debt/Asset	0.001	0.005	0.001	0.000	0.001	0.007
Credit card	0.438	0.507	0.482	0.373	0.535	0.491
Unsecured bank	0.071	0.087	0.091	0.041	0.099	0.081
Unsecured other	0.015	0.138	0.022	0.004	0.027	0.199
Secured bank	0.822	0.068	1.064	0.444	0.086	0.058
Secured other	0.255	0.017	0.281	0.215	0.022	0.014

C. Household Status and the Bankruptcy Chapter Choice

For debtors in bankruptcy, the choice of alternative also depends on household condition. The information in Table V is arranged the same way as in Table III. The baseline now is the conditional probability of Chapter 7 bankruptcy. The predicted probabilities are those for making the Chapter 13 choice, conditioned on the mean of the data for Chapter 7 households. Differentiation by household status provides information as to what household conditions would make a typical Chapter 7 household more likely to file for Chapter 13 protection.

Table V

Predicted Chapter 13 Bankruptcy Probabilities by Household Status

This table contains predicted Chapter 13 filing probabilities conditional on bankruptcy for households differentiated by household status in the Probability column. The probabilities are calculated at the mean of the data for 575 Chapter 7 households, and are interpretable as the probability of filing for Chapter 13 given household conditions typical of a Chapter 7 debtor. The Deviation from Baseline column gives the percentage difference in predicted filing probabilities between households categorized as above and a baseline calculated as the overall predicted probability of filing, evaluated at the mean of the data for 575 Chapter 7 households. Married indicates that the household consists of at least a married couple. High medical indicates household medical debt in excess of 2 percent of income. High income is income greater than the median value in the sample. Home indicates homeownership at the time of the survey. High debt/income and High debt/equity indicate households with values of these ratios in excess of the median. Employed indicates employment at the time of filing.

	Probability	Deviation from Baseline
Married	8.186	47.96
Not married	4.067	-26.49
High medical	2.731	-50.63
Low medical	8.078	46.01
Home	9.979	80.37
No home	4.533	-18.07
High income	10.074	82.10
Low income	2.971	-46.31
High debt/income	4.145	-25.08
Low debt/income	7.349	-32.83
High debt/equity	7.986	44.34
Low debt/equity	3.802	-31.28
Employed	6.729	21.62
Not employed	2.074	-62.52
Attorney	6.056	9.469
No attorney	2.850	-48.48

The effect of marriage and unemployment goes beyond that expected by its incidence across families making the chapter choice. Approximately 60 percent of Chapter 13 households contain married couples, as opposed to 43 percent of Chapter 7 families. Marriage doubles the conditional probability of choosing Chapter 13 over Chapter 7, given that the debtor household otherwise looks like a Chapter 7 filer. Similarly, although the difference in unemployment rates across households in the two chapters is not terribly large (83 percent versus 92 percent), employment more than triples the probability of filing under Chapter 13.

With respect to debt and income characteristics, income levels have the largest differential effect across alternatives. High income households are predicted to gravitate to Chapter 13 with a probability more than three times greater than that for lower income families, given other characteristics typical of Chapter 7. Equity is clearly a factor. Higher levels of equity,

relative to debt, push debtors into Chapter 13 with a probability almost double that predicted for low equity relative to debt. High debt to income ratios clearly discourage Chapter 13 filing relative to Chapter 7.

D. The Impact of Increases in Debt and Equity on Chapter Choice

Table VI contains arc elasticities measuring the impact of a 1 percent increase in various debt and equity ratios on the Chapter 13 filing probability, conditional on bankruptcy. These effects are disaggregated by debt, income, and equity classifications in Panel A and by homeownership and income status in Panel B.

The results with respect to exemptions can be interpreted from both the household and policy perspectives. From the household point of view, suppose exemptions are fixed. As debt is more fully covered by exemptions, the household gravitates to the Chapter 7 choice. The exemption-related effect of increasing the unsecured burden of Chapter 13 households to the Chapter 7 level is negligible. On the other hand, if the secured debt of a household is decreased from Chapter 13 to Chapter 7 levels, the probability of filing for Chapter 13 protection is reduced by 21 percent. Exemptions now cover more of the secured property, reducing the need to pay off secured loans under a rescheduling agreement.

From the perspective of public policy, incentives that increase the incidence of Chapter 13 relative to Chapter 7 are considered desirable. For a given level and structure of household debt, suppose exemption levels are lowered across all categories by 50 percent.¹³ The estimates suggest that the effect on debtors would be to increase the probability of choosing Chapter 13 over 7 by approximately 18 percent. The anticipated impact on homeowners would be somewhat greater, and for low levels of debt relative to equity, the probability is increased by almost 25 percent. Exemption effects are insensitive to income level if homeownership is not taken into account.

We also reestimate the model, replacing the exemption/debt ratio with an exemption/asset ratio. Increasing exemptions relative to assets has no statistically significant effect on chapter choice, and the elasticity estimates are also economically very small. Given the nature of the law (with respect to forced debt repayment in Chapter 13, conditional on the interaction between exemptions and debt), this may not be surprising.

Debtors with homes and financial conditions characteristic of straight bankruptcy are more than twice as likely to file for Chapter 13 protection, given that they file at all. There is an additional substantive effect due to levels of home equity reported in Table VI. If home equity relative to income is increased from the value of the typical Chapter 7 homeowner to that observed in Chapter 13, the probability of filing for protection under Chapter 13 goes

¹³ There is no clear evidence that debt varies systematically in response to exemption changes, justifying partial equilibrium analysis (Domowitz and Eovaldi (1993)). Gropp, Scholz, and White (1997) find that the correlations between exemptions and debt may be either positive or negative, depending on asset holdings.

Table VI
Probability Arc Elasticities by Debt and Homeowner Status

This table contains estimates of probability arc elasticities associated with individual debt and equity categories, computed as the percentage increase in the conditional probability of filing for Chapter 13 bankruptcy protection in the sample of Chapter 7 households, given a 1 percent increase in debt relative to total household equity, the sum of equity across all categories identified in the data (Debt/Equity), exemptions relative to total debt (Exemption/Debt), student loan debt relative to income (Student Loan), and assets by category relative to income from all sources (all other entries). All increases are measured relative to the relevant mean of the Chapter 7 population, as estimated from a random sample of 575 households. Each figure in the table represents an increase in one ratio, holding all others constant at the mean. Figures in the Overall column are based on the entire set of households. The Debt/Income and Debt/Equity columns give figures for families with these ratios above the mean. Attorney denotes the use of a specialist attorney by the debtor. Home indicates that the increase is computed for homeowners only. No Home represents calculations for nonhomeowners. Home (High or Low Income) columns contain figures for homeowners differentiated by income, with High Income defined as income greater than the mean for homeowners. No Home (High or Low Income) represents calculations for nonhomeowners differentiated by income, with High Income defined as income greater than the mean for nonhomeowners.

Panel A: Debt and Equity Status					
	Overall	High Debt/Income	Low Debt/Income	High Debt/Income	Low Debt/Income
Liquid assets	-0.121	-0.145	-0.097	-0.099	-0.143
Home equity	0.032	0.056	0.008	0.019	0.045
Household assets	-0.614	-0.809	-0.416	-0.524	-0.702
Other equity	0.008	0.008	0.007	0.003	0.012
Student loan	0.042	0.077	0.008	0.063	0.020
Exemption/Debt	-0.358	-0.313	-0.400	-0.219	-0.499
Debt/Equity	-0.074	-0.072	-0.077	-0.182	0.039

Panel B: Homeowner Status						
	Home (Overall)	No Home (Overall)	Home		No Home	
			High Income	Low Income	High Income	Low Income
Liquid assets	-0.096	-0.129	-0.081	-0.119	-0.090	-0.161
Home equity	0.117	0.000	1.610	-0.015	0.000	0.000
Household assets	-0.453	-0.666	-0.308	-0.734	-0.321	-0.934
Other equity	0.005	0.008	0.004	0.007	0.009	0.007
Student loan	0.014	0.052	0.005	0.034	0.018	0.080
Exemption/Debt	-0.427	-0.332	-0.393	-0.451	-0.297	0.358
Debt/Equity	-0.023	-0.092	-0.011	-0.048	-0.111	-0.076

up by 24 percent. For a given income level, an increase in home equity from Chapter 7 levels to the average amount observed in the population is predicted to raise the Chapter 13 filing probability by 80 percent.

The level of household income is important in the home equity calculation. Increases in home equity for low income households have a negligible effect. For high income households, a shift in home equity from typical Chapter 7

levels to those observed in Chapter 13 implies an increase in the probability of choosing Chapter 13 over Chapter 7 of almost 325 percent. This virtually guarantees filing under Chapter 13 as opposed to Chapter 7. With the exception of household goods, all other impacts of an increase in equity by category relative to income are minor.

The ability to discharge student loan obligations in Chapter 13 encourages the choice of that alternative in the presence of such debt, but substantive effects are limited to low-income debtors without homes. Changes in the law passed in 1984 now make such student debt nondischargeable in either chapter. The result should be interpreted only in the sense that categories of nondischargeable debt are policy choices, and that they may matter in choice of bankruptcy chapter. Clearly the effects also may not be uniform across household circumstances, an argument that could be made for virtually any policy choice of nondischargeable debt.

IV. Concluding Remarks

Bankruptcy law exerts a powerful influence with respect to billions of dollars a year in discharged debt. Our results on the sensitivity of default to financial conditions have some implications for public policy relevant to bankruptcy.

The impact of medical debt on the conditional probability of bankruptcy is very large. Medical obligations also make the typical household much more sensitive to increases in other sources of unsecured debt. Our results suggest that further increases in health insurance coverage could curtail bankruptcy filings. In the presence of a bankruptcy decision, such reforms are predicted to encourage debt repayment through Chapter 13.

Credit card debt is the largest single contributor to bankruptcy on the margin, and the effect of increases in this debt category is essentially uniform across household status. This result, combined with those of Bizer and DeMarzo (1992) on sequential borrowing, suggests that debates on over-extended credit might focus on the impact of preapproved credit cards.

Congress now views Chapter 13 as an alternative to be encouraged over Chapter 7, a view shared by the credit industry. Property exemptions and the classification of dischargeable debt are tools that may be used to manipulate the choice. The evidence is weak with respect to the latter.¹⁴ However, policies that lower exemption levels are predicted to have a substantial predicted impact with respect to promoting Chapter 13. We also note that manipulation of exemptions may affect the bankruptcy choice itself—a topic not pursued in this paper, but deserving of further research. Suggestive results pertaining to credit supply, demand, and interest rates are contained in Gropp et al. (1997).

¹⁴ We examine student loan obligations, in particular. Legal debt relating to tort claims is another example currently written into the law. We cannot examine lawsuits because of severe ambiguities in the data. Our lawsuit data include activities involving collection activities, and such actions have nothing to do with financial strain. Tort actions are not identified separately.

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