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PERSONAL BANKRUPTCY AND CREDIT SUPPLY AND DEMAND*

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This paper examines how personal bankruptcy and bankruptcy exemptions affect the supply and demand for credit. While generous state-level bankruptcy exemptions are probably viewed by most policy-makers as benefiting less-well-off borrowers, our results using data from the 1983 Survey of Consumer Finances suggest that they increase the amount of credit held by high-asset households and reduce the availability and amount of credit to low-asset households, conditioning on observable characteristics. Thus, bankruptcy exemptions redistribute credit toward borrowers with high assets. Interest rates on automobile loans for low-asset households also appear to be higher in high exemption states.

Over the last decade, increasing numbers of individuals and married couples have filed for personal bankruptcy in the United States. In 1983 (the year of our data set) there were 313,000 personal bankruptcy filings. An upper bound estimate of the resulting loss to creditors that year was about $12.5 billion (1983) dollars.[1] Since 1983, the number of personal bankruptcy filings per year has risen steadily, and it peaked in 1992 at 900,000. In total, over the decade 1983–1992 about 5,300,000 individuals or married couples filed for bankruptcy, which implies that nearly 6 percent of U. S. households experienced a personal bankruptcy filing during this period.[2]

    1. This figure equals the number of personal bankruptcy filings in 1983 times the mean debt level in Sullivan, Warren, and Westbrook's [1989, p. 64] sample of personal bankruptcy filings, which was $38,000 in 1981 dollars or $41,600 in 1983 dollars. The estimate is an upper bound because it assumes that no debt is repaid in bankruptcy. In practice about 1 percent is repaid in bankruptcy [White 1987; Sullivan, Warren, and Westbrook 1989, Chapter 12].

    2. The figure of 5,300,000 is overstated to the extent that debtors have made repeat bankruptcy filings. According to Sullivan, Warren, and Westbrook [1989], the repeat rate is about 8 percent. Since 1992, the number of bankruptcy filings has fallen slightly. Data on number of personal bankruptcy filings and number of U. S. households are taken from *Statistical Abstract of the U. S. 1994,* Tables 865 and 65.

Households that file for personal bankruptcy under Chapter 7 of the United States Bankruptcy Code are required to give up any assets that exceed the applicable, state-specific exemption levels, but are not required to devote any of their future income to debt repayment. In return for giving up nonexempt assets, they receive a discharge from most types of debt. Thus, even households with both high income and high assets can avoid repaying their debts in bankruptcy as long as their assets are below the applicable exemption level. Debtors can often increase their financial benefit from bankruptcy by shifting assets from nonexempt to exempt categories before filing.

Personal bankruptcy law became much more favorable to debtors following the passage of the Bankruptcy Reform Act of 1978 (BRA78). Prior to 1978, bankruptcy exemptions were specified by the states and tended to be very low. The Commission on the Bankruptcy Laws of the United States [1973] argued that a high and uniform bankruptcy exemption would be beneficial to less-well-off households. The argument was that with the rise of the consumer credit industry and its aggressive advertising and sales techniques, households tended to accumulate substantial debt but little savings, and therefore were vulnerable to unexpected events such as illness, layoff, or wives quitting work due to pregnancy. Given harsh collection practices by creditors, debtor households often found it difficult to recover from these setbacks and would suffer further adverse consequences such as ill health, family strain, divorce, and job loss, unless a generous exemption in bankruptcy left them with adequate assets for a "fresh start." Thus, the Commission advocated the adoption of a high and uniform Federal bankruptcy exemption on the grounds that it would help households whose financial situation was marginal before bankruptcy and who would otherwise have difficulty recovering from financial setbacks.

While the House adopted the Commission's populist view, the Senate preferred to continue allowing the states to set their own bankruptcy exemptions.[3] In a compromise the BRA78 specified a uniform bankruptcy exemption of $7500 for equity in "homesteads" (owner-occupied principal residences) and $4000 for nonhomestead property, with the exemption values doubled when married couples filed for bankruptcy. However, the Act permitted

3. See Commission on the Bankruptcy Laws of the United States [1973] and House of Representatives Report [1977].

states to opt out of the Federal exemption by adopting their own bankruptcy exemptions. By 1983 all states had done so, although twelve allowed debtors to choose between the state and the Federal bankruptcy exemptions. Many states raised their bankruptcy exemptions when they passed opt-out legislation, but they adopted widely varying exemption levels.[4] At the two extremes, Iowa's exemption as of 1983 was $500 for homestead equity and $5000 for nonhomestead property, while Texas' exemption was unlimited for homestead equity and $30,000 for nonhomestead property (see below).

Because U. S. households tend to have few financial assets and are not required to use their incomes to repay debt in bankruptcy, more households could benefit financially by filing for bankruptcy than actually file.[5] In addition, Congress recently made filing for bankruptcy even more attractive by doubling the Federal bankruptcy exemption.[6] This suggests that in the future the practice of filing for personal bankruptcy could become much more common as households become increasingly knowledgeable about the bankruptcy system. But despite the importance of personal bankruptcy, the subject has been almost completely neglected by economists.

In this paper we begin to address the issue of how personal bankruptcy and the bankruptcy exemption affect credit markets. Bankruptcy exemptions are likely to affect both the supply and demand for credit. As the bankruptcy exemption rises, debtors are more likely to file for bankruptcy and repay less in bankruptcy, holding other factors constant. Also, the bankruptcy exemption provides partial wealth insurance; and the higher the exemption level, the greater the insurance coverage. Even when lenders raise interest rates to offset increases in the exemption level, greater wealth insurance makes risk-averse debtors better off and causes their demand for credit to rise. But higher bankruptcy exemptions also reduce the amount that creditors receive in repayment of debt and may make them more likely to refuse to lend in the first place. Thus, higher bankruptcy exemptions are predicted to reduce credit supply. We estimate a model of the

4. See Duncan [1981] for discussion of the legislative history of the Bankruptcy Reform Act and of the opt-out legislation adopted by Nebraska.
5. White and Petropolous [1996] estimate that between 15 and 50 percent of U. S. households would benefit financially from filing for bankruptcy as of 1992, with the range depending on what strategies households are assumed to pursue before filing in order to increase their financial benefit from bankruptcy.
6. This provision was part of the Bankruptcy Reform Act of 1994.

effect of bankruptcy exemptions on credit supply and demand, using data from the 1983 *Survey of Consumer Finances* and information on bankruptcy exemptions in each state.

We find that state personal bankruptcy exemptions have a significant, positive effect on the probability that households will be turned down for credit or discouraged from borrowing. We also find that the amount of debt held by households in the top half of the asset distribution is positively related to state bankruptcy exemptions, suggesting that high-asset households have higher demand for credit in high-exemption states. Households with large amounts of assets have the most to gain from generous bankruptcy exemptions. Hence it is these households for whom we would expect demand effects to be greatest. This result is reversed for households in the lowest quartile of the asset distribution, where the amount of debt held is negatively related to the level of the bankruptcy exemption. For these households, supply effects appear to dominate, and lenders either deny credit completely or loan smaller amounts. This raises the possibility that low-income households in states with high exemptions receive less credit than otherwise equivalent borrowers in states with low exemptions. We also present evidence that interest rates on automobile loans are higher for low-asset households in states with higher bankruptcy exemptions than they are in states with low exemptions. Thus, while generous state-level bankruptcy exemptions are probably viewed by most policy-makers as benefiting less-well-off borrowers, our results suggest that they increase the amount of credit held by high-asset households and reduce the availability of credit to low-asset households; i.e., they redistribute credit toward borrowers with high assets.

I. BACKGROUND LITERATURE

Previous empirical papers on personal bankruptcy have focused on the effect of the BRA78 on the number of filings over time. Shepard [1984], Peterson and Aoki [1984], and Boyes and Faith [1986] find evidence that the BRA78 increased the number of bankruptcy filings relative to what would be predicted based on time series patterns prior to 1978, but Domowitz and Eovaldi [1993] find that the BRA78 had no effect. Boyes and Faith also suggest that risky borrowers may have been excluded from the credit market by BRA78. White [1987] found that the number of Chapter 7 bankruptcy filings in 1981 was positively and sig-

nificantly correlated with the level of the state bankruptcy exemption.[7]

There is a large theoretical literature on credit markets with asymmetric information that explores when credit rationing occurs, how it is reduced by borrowers pledging collateral, and whether low-risk or high-risk borrowers are affected when credit rationing occurs.[8] Because these models assume that borrowers are corporations rather than individuals, they do not consider the role of bankruptcy exemptions on credit markets because there is no equivalent of the bankruptcy exemption for corporations in bankruptcy.[9]

II. LEGAL AND INSTITUTIONAL BACKGROUND

When debtors file under Chapter 7 of the U. S. Bankruptcy Code, they receive a discharge from unsecured debt in return for giving up assets in excess of the relevant state's bankruptcy exemption. Several provisions of the Bankruptcy Code prevent debtors from waiving their right to benefit from the Chapter 7 bankruptcy exemption and hence make it impossible to use private contracts as a means of voiding statutory bankruptcy exemptions. Creditors may not enforce claims against debtors' assets if the assets are covered by the Chapter 7 bankruptcy exemption. This provision prevents creditors from taking a blanket security interest in all of debtors' possessions.[10] Creditors can only enforce secured claims against debtors' assets if creditors provided the money to finance a particular asset's purchase. (See below for further discussion of Chapter 7 bankruptcy exemptions.)

7. Also see Luckett [1988] for an overview of economic aspects of personal bankruptcy; Sullivan, Warren, and Westbrook [1989] for discussion of the characteristics of a sample of bankruptcy filers from the early 1980s; and White [1991] for discussion of sociological versus economic approaches to bankruptcy. Paxson [1986], using a sample of households from 1951, 1957, 1962, and 1967, provides evidence that state laws such as interest rate ceilings can affect credit market behavior, but she does not examine bankruptcy provisions.

8. See Bester [1985, 1994], Besanko and Thakor [1987], and Boot, Thakor, and Udell [1991].

9. Another strand of the literature on credit markets with asymmetric information derives from Stiglitz and Weiss [1981]. In their model, lenders cannot observe the riskiness of the investment project that borrowers engage in. They show that changes in the interest rate alter the riskiness of the pool of borrowers, which causes lenders to deny loans to some borrowers and to charge less than the market-clearing interest rate. Mankiw [1986] explores a similar model of the student loan market and emphasizes that a small increase in lenders' opportunity cost of funds may cause the loan market to collapse.

10. 11 U.S.C. §§ 522(e) and (f).

There is a second U. S. personal bankruptcy procedure, Chapter 13 of the U. S. Bankruptcy Code, and debtors may not waive their right to choose between Chapters 7 and 13.[11] Under Chapter 13 bankruptcy, debtors are not obliged to give up any assets, but they must propose a plan to repay a portion of their debts from future income over several years. Debtors have an incentive to choose Chapter 7 rather than Chapter 13 whenever their assets are less than the bankruptcy exemption, since doing so allows them to avoid repaying debt from either assets or future income. Because many states' exemption levels are high relative to the assets of typical households that file for bankruptcy, around 70 percent of all personal bankruptcy filings occur under Chapter 7 [White 1987]. Even when households file under Chapter 13, the amount that they are willing to repay is strongly affected by the Chapter 7 bankruptcy exemption. For example, suppose that a household with assets of $20,000 living in a state whose exemption level is $10,000 considers filing for bankruptcy. Because the household would have to give up $10,000 in assets if it filed under Chapter 7, it would be willing to pay creditors no more than $10,000 (in present value) from future income if it filed under Chapter 13. As a result of this close relationship between Chapter 7 and Chapter 13 bankruptcy filings, we ignore the distinction between them.[12]

Household debt can be divided into secured and unsecured loans. Secured loans include mortgages, home equity lines of credit, and automobile loans. These loans allow lenders the right to foreclose on the house or repossess the automobile if the debtor defaults, regardless of whether the debtor files for bankruptcy. Unsecured loans include credit card and other consumer loans. When debtors file for bankruptcy, they are only obligated to repay

11. 11 U.S.C. § 706(a) provides that cases filed under Chapter 7 may not be converted to Chapter 13 unless the debtor requests such a conversion. In 1986 an amendment to the Bankruptcy Code (11 U.S.C. § 707(b)) was adopted that allows bankruptcy judges to dismiss Chapter 7 personal bankruptcy filings if discharge of debt would be a "substantial abuse" of Chapter 7. However, this provision was not in effect during 1983, the year of our data set, and in any case has rarely been used.

12. Other reasons why debtors might choose to file for bankruptcy under Chapter 13 are that certain types of debts, such as those incurred by fraud, are dischargeable only under Chapter 13. In some Bankruptcy Courts, judges encourage debtors to file under Chapter 13, and this leads to many plans being filed that call for only token repayment of debt. Another reason that debtors sometimes file under Chapter 13 is that they have filed under Chapter 7 within the past few years. Debtors who file under Chapter 7 are barred from filing again for six years, but there is no limit on the number of filings allowed under Chapter 13. See Elias, Renauer, and Leonard [1993].

unsecured loans if they have assets that exceed the exemption level and are not subject to creditors' liens.

Unsecured loans would seem more likely to be affected by bankruptcy exemptions than secured loans would. In practice, however, the distinction is blurred, and households are often able to arbitrage assets and debts across categories and thereby increase their financial benefit from bankruptcy. For example, debtors might borrow on their credit cards or obtain new consumer loans in order to reduce their mortgage debt. These transactions convert nondischargeable secured debt into unsecured debt that is dischargeable in bankruptcy. Or debtors might sell personal property that is in excess of the personal property exemption and use the proceeds to reduce their mortgages or to buy exempt property.[13] In addition, bankruptcy undermines the value of collateral to lenders, since lenders may be delayed in repossessing it or may be unable to repossess it at all. Lenders also incur extra legal costs because they must obtain the permission of the bankruptcy trustee in order to repossess collateral. For these reasons, we examine the effects of bankruptcy exemptions on total debt, rather than distinguishing between secured and unsecured debt.

While debtors may arbitrage assets and debts across categories, in the empirical work that follows, we assume that debtors do not make interstate moves before filing for bankruptcy. For typical debtors contemplating bankruptcy, the cost of such moves is prohibitive, since moving usually requires paying a moving company in cash and making a cash deposit to a new landlord, in addition to leaving friends and family and finding a new job. For affluent debtors these costs are less prohibitive, and there have been some well-publicized cases of debtors moving to states that have unlimited homestead exemptions.[14] But the practice is uncommon because of transactions costs and the fact that Bankruptcy Courts have occasionally dismissed bankruptcy filings by debtors who used this strategy [Elias, Renauer, and Leonard 1993, p. 2/21].

13. Debtors may have to wait 90 days before filing for bankruptcy if they use these strategies, since the transfers may otherwise be considered "preferences" that the bankruptcy trustee can set aside (11 U.S.C. §§ 547(b),(c)(7)). Debtors may also conceal assets or transfer them to relatives, but if discovered, there is a small risk that their bankruptcy filings may be dismissed on grounds of fraud.

14. For example, Martin Siegel, an investment banker, purchased a $3.25 million dollar home in Florida when investors filed a civil lawsuit against him demanding $2.75 million in damages. See "Rich Debtors Finding Shelter under a Populist Florida Law," *New York Times,* July 25, 1993.

IV. EMPIRICAL HYPOTHESES

Suppose that in period 1 consumers borrow some amount B at interest rate r. Consumers' period 2 wealth, denoted W_2, is unknown as of period 1 but is distributed according to the distribution $f(W_2)$. The overall bankruptcy exemption in the borrower's state of residence is denoted E, where we assume that assets are fungible across categories. In period 2 the loans come due, consumers learn their period 2 wealth, and they must decide whether to repay the debt in full or default and file for personal bankruptcy. If consumers file for bankruptcy, their obligation to repay the loan depends on their wealth. They are obliged to repay nothing if $W_2 \le E$ and to repay an amount $W_2 - E$ if $E < W_2 \le E + B(1 + r)$. If wealth W_2 exceeds $E + B(1 + r)$, then consumers must repay their debts in full and cannot benefit by filing for bankruptcy. Borrowers therefore benefit financially from filing for bankruptcy whenever their wealth W_2 turns out to be below $E + B(1 + r)$.[15]

Borrowers' period 2 wealth distribution can be divided into three regions of no repayment (a), partial repayment (b), and full repayment (c), as shown in Figure I. The level of the bankruptcy exemption affects the sizes of the three repayment regions. A higher exemption causes the boundaries between regions (a) and (b) and regions (b) and (c) to shift to the right. Thus, as E rises, the probability that debtors file for bankruptcy and repay nothing rises, and the probability that they avoid bankruptcy and repay in full falls. Also, debtors repay an amount $W_2 - E$ if their period 2 wealth falls into region (b), so that they repay less as E rises.

If the exemption rises, lenders will raise the interest rate. Suppose that the interest rate rises enough that expected repayments remain the same. Bankruptcy provides borrowers with partial wealth insurance. If borrowers are risk averse, an increase in the exemption raises expected utility because the amount of insurance has increased. When borrowers' period 2 wealth falls into region (b), the exemption increase raises their wealth, which makes them better off. When borrowers fall into region (c), the increase in the interest rate that offsets the exemption increase lowers their wealth, which makes them worse off. But these changes make borrowers better off ex ante, since the

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15. Wealth W_2 and the distribution of wealth $f(W_2)$ are assumed to be measured after debtors have pursued any strategies that they use to conceal or reduce their wealth before filing for bankruptcy (moral hazard).

(a) Bankruptcy, Repay zero	(b) Bankruptcy, Repay W_2 - E	(c) No Bankruptcy, Repay B(1+r)

W_2

E   E+B(1+r)
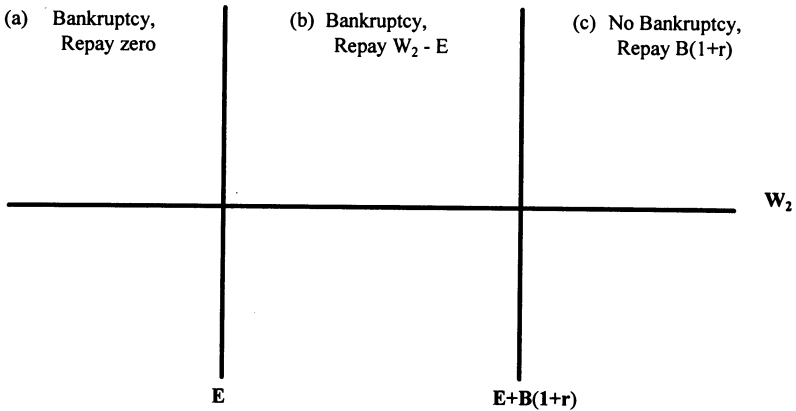
FIGURE I

The Relationship between Wealth and Debt Repayment under Bankruptcy

This figure divides the distribution of period 2 wealth W_2 (the distribution can take any form) into three regions of no repayment, partial repayment, and full repayment. E is the bankruptcy exemption, B is the amount borrowed, and r is the interest rate.

wealth increase occurs when their marginal utility of wealth is high and the wealth decrease occurs when their marginal utility of wealth is low. Thus, a higher exemption level in bankruptcy makes risk-averse borrowers better off, which increases their demand for loans. The hypothesis that demand for loans rises with the bankruptcy exemption is examined below.[16]

An increase in the interest rate that fully offsets the increase in the default rate when the exemption level rises must leave lenders equally well off. In this case, the supply of loans would be unaffected as long as lenders are risk neutral. But if borrowers are heterogeneous, it may become worthwhile for lenders to adjust the supply of credit in response to changes in the exemption level.

As an example, suppose that some borrowers are opportunists, while others are not. Assume that it is too costly for lenders to attempt to distinguish between types when borrowers apply for loans. Opportunistic borrowers file for bankruptcy whenever their period 2 wealth falls into regions (a) or (b) in Figure I. In contrast, nonopportunistic borrowers file for bankruptcy only if

16. Creditors may not be able to raise interest rates enough to offset the effect of the increase in the bankruptcy exemption. In this case they may stop lending completely or, if they can distinguish among borrowers, ration loans to the least creditworthy. Rea [1984] and Dye [1986] discuss the insurance effect of bankruptcy exemptions.

illness or job loss occurs and their period 2 wealth falls into re-
gions (*a*) and (*b*). A rise in the bankruptcy exemption, therefore,
increases the probability that opportunistic debtors will file for
bankruptcy by more than it increases the probability that non-
opportunistic debtors file for bankruptcy.[17] The increase in the
exemption level may make it worthwhile for lenders to invest in
efforts to identify opportunistic borrowers in advance. Thus, as
the exemption level rises, lenders may devote more resources to
checking potential borrowers' credit histories, and as a result,
they may be more likely to turn down loan applicants. The hy-
pothesis that otherwise similar borrowers are more likely to be
turned down for credit in states with higher exemption levels is
also examined below. In addition, increased losses from opportu-
nistic behavior by borrowers in high exemption states may cause
lenders to reduce the amount they lend or charge higher interest
rates to otherwise similar borrowers in these states. We cannot
directly identify credit demand and supply, but we examine
whether the negative effect of a high exemption on the supply of
credit is larger or smaller than the positive effect of a high exemp-
tion on the demand for credit. We also examine whether lenders
charge higher interest rates in high-exemption states.

V. DATA, IDENTIFICATION, AND DESCRIPTIVE EVIDENCE

We use data from the 1983 Survey of Consumer Finances
(SCF) to examine the empirical hypotheses.[18] For a sample of
3706 households, the SCF gives detailed information on the types
and amounts of credit held by households, their assets, sources
of income, demographic characteristics, credit market experience,
and state of residence.[19]

We supplement the 1983 SCF with information on states'
bankruptcy exemptions in 1983. Most states have separate ex-
emptions for equity in homesteads, equity in motor vehicles, per-
sonal property, tools of the trade, the cash value of life insurance
and pensions, household goods and clothing, and a miscellaneous

17. For simplicity we assume that the probability of illness or job loss oc-
curring is less than perfectly correlated with the period 2 wealth distribution.
18. See Avery and Elliehausen [1988] for details about the data and Juster
and Kuester [1991]; Curtin, Juster, and Morgan [1989]; and Avery, Elliehausen,
and Kennickell [1988] for a discussion of the 1983 SCF's good data quality.
19. Later SCFs do not identify state of residence, so we are unable to use
them for this paper. The 1983 SCF includes data on a subsample of high-income
households, but because state of residence is not provided for this group, we drop
these households.

("wild card") category. Some states allow debtors to choose between the state's exemption and the (uniform) Federal exemption, while the rest require that the state's exemptions be used. Some states also allow married couples who file for bankruptcy to double the exemptions. Table I lists the homestead exemption and the combined value of the personal property, tools of the trade, automobile, and wild card exemptions in each state in 1983.[20] The table also indicates whether each state allows its residents to use the Federal bankruptcy exemption (listed at the end of the table) and whether the state allows married couples to double the exemption.

The exemption values vary widely across states, and there appears to be no strong geographic pattern.[21] Seven states have unlimited homestead exemptions, while three states and the District of Columbia have zero homestead exemptions (although they allow their residents to use the Federal exemptions). The combined value of nonhomestead exemptions range from $0 in Connecticut to $30,000 in Texas and is unlimited in two states.

For each household in the SCF, we compute a value for the homestead plus nonhomestead exemptions in bankruptcy. Because assets are fungible, for the empirical work below we combine exemptions.[22] The overall exemption is assumed to be unlimited if either the homestead or the nonhomestead exemption in the relevant state is unlimited. If the state allows its residents to choose between the state or the Federal exemption, then households are assumed to choose whichever exemption is greater. We also double the exemption if the SCF household is married and the relevant state allows doubling for married couples.

The SCF contains a set of questions that ask whether respondents have been turned down for credit in the three years prior to the survey or whether they were discouraged from applying to borrow because they thought they would be turned down. While it is common in the literature to interpret these questions as indi-

20. We exclude the pension and life insurance exemptions because in many cases they involve specific conditions, such as requiring that the insurance only benefit dependents. We also exclude the exemption for household goods and clothing since it is generally not subject to a dollar limitation.

21. Exemptions change infrequently, which increases our confidence in treating the cross-state variation in exemptions as exogenous to credit market behavior.

22. Elias, Renauer, and Leonard [1993, p. 2/20] gives this advice on asset substitution: "If you have an asset that is not exempt, you may want to sell it before you file for bankruptcy. You can use the proceeds to buy exempt property."

TABLE I
STATE BANKRUPTCY EXEMPTIONS IN 1983

State	Home-stead	Non-homestead	Use federal exemption?	Double for spouse?	Other provisions
Alabama	$5,000	$3,000	no	yes	
Alaska	27,000	1,500	no	yes	
Arizona	50,000	7,600	no	no	
Arkansas	no limit	950	no	no	
California	45,000	2,500	no	no	
Colorado	20,000	5,000	no	no	
Connecticut	0	0	yes	yes	
D. of Columbia	0	1,200	yes	yes	
Delaware	5,000	75	no	no	
Florida	no limit	1,000	no	yes	
Georgia	5,000	4,500	no	no	
Hawaii	20,000	1,000	yes	no	if over 65, homestead = $30,000
Idaho	1,200	4,000	no	yes	
Illinois	7,500	2,750	no	yes	
Indiana	7,500	4,100	no	no	
Iowa	500	4,000	no	no	
Kansas	no limit	500	no	no	
Kentucky	5,000	6,000	no	no	
Louisiana	15,000	no limit	no	no	
Maine	7,500	2,300	no	yes	if over 60, homestead = $60,000
Maryland	2,500	3,500	no	no	
Massachusetts	60,000	3,500	yes	no	
Michigan	3,500	1,000	yes	no	
Minnesota	no limit	9,500	yes	no	
Mississippi	30,000	8,000	yes	no	
Missouri	8,000	3,500	no	no	$1,000 if mobile home
Montana	40,000	200	no	no	
Nebraska	6,500	5,500	no	no	
Nevada	90,000	9,000	no	no	
New Hampshire	5,000	5,500	no	no	
New Jersey	0	1,000	yes	no	
New Mexico	20,000	6,500	yes	yes	
New York	10,000	5,600	no	yes	
N. Carolina	7,500	8,500	no	no	
N. Dakota	80,000	10,000	no	no	
Ohio	5,000	3,700	yes	no	
Oklahoma	no limit	5,000	no	no	
Oregon	15,000	2,650	no	no	homestead $20,000 for couples

TABLE I

(CONTINUED)

State	Home-stead	Non-homestead	Use federal exemption?	Double for spouse?	Other provisions
Pennsylvania	300	0	yes	no	
R. Island	0	1,800	yes	no	
S. Carolina	5,000	3,750	no	no	
S. Dakota	no limit	2,400	no	no	
Tennessee	5,000	4,750	no	no	homestead $7,500 for couples
Texas	no limit	30,000	yes	no	
Utah	8,000	3,000	no	no	can add $2,000 for a spouse and $500 per dependent to the homestead exemption.
Vermont	30,000	no limit	yes	no	
Virginia	3,500	5,000	no	yes	
Washington	30,000	6,750	yes	no	
West Virginia	5,000	1,000	no	no	
Wisconsin	25,000	900	yes	no	
Wyoming	10,000	3,000	yes	yes	
Federal	7,500	4,000	n.a.	yes	

Observations are the dollar amounts of homestead and nonhomestead bankruptcy exemptions for each state in 1983 and are taken from individual state legal codes. The homestead exemption amounts refer to the maximum amount of equity in a principal residence that debtors are allowed to retain in bankruptcy. The nonhomestead exemption amounts are the combined value of exemptions for personal property, tools of the trade, equity in automobiles, and wild card exemptions. The column labeled "Use Federal exemption?" refers to whether the state allows residents who have filed for bankruptcy to choose between the state's bankruptcy exemption and the Federal bankruptcy exemption, which is listed at the bottom of the table. The column labeled "Double for spouse?" refers to whether the state allows married couples who file for bankruptcy to double the value of the state's exemption.

cating that a borrower is credit constrained (see, for example, Jappelli [1990]), people could, in principal, be turned down because they asked for inappropriately large amounts of credit. Cox and Jappelli [1993] and Duca and Rosenthal [1993], however, show that the observed level of credit for SCF households who were turned down or discouraged from borrowing is roughly $10,000 lower on average than would be predicted, where the predictions come from a selection model of credit demand estimated using the characteristics of the subsample of households who were not turned down or discouraged from borrowing. This result supports the idea that SCF households who were turned down

or discouraged from borrowing are in fact constrained by credit supply (also see Perraudin and Sorensen [1992]). These questions allow us to examine the empirical hypothesis that borrowers in high-exemption states are more likely to be turned down for loans than observationally equivalent borrowers in low-exemption states.

For households that are not supply constrained, observed levels of credit reflect some mix of supply factors, which should decrease the amount of credit made available to borrowers in high-exemption states, and demand factors, which should increase the amount of credit held by borrowers in high-exemption states. Thus, an increase in the bankruptcy exemption will have an ambiguous a priori effect on the amount of debt held by unconstrained households. However, if we observe that unconstrained households in high-exemption states hold more debt than households in low-exemption states, controlling for other characteristics, then we can infer that higher bankruptcy exemptions stimulate demand for credit. Thus, the SCF data on debt held by households can be used to make inferences about the effects of bankruptcy exemptions on demand for credit. Additionally, this discussion implies that credit should be more expensive in states with high exemptions.

Two figures help illustrate our hypotheses. Figure II plots the probability of being turned down for credit or discouraged from borrowing after we split the sample into bankruptcy exemption quartiles and asset quartiles.[23] Households with "low" exemptions are in the bottom quartile of the combined exemption distribution. Households with "unlimited" exemptions are located in states that have either an unlimited homestead exemption or an unlimited nonhomestead exemption. In each of the asset quartiles, households in unlimited-exemption states are more

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23. The combined bankruptcy variable is discrete, hence the "quartiles" include uneven shares of the population. The first quartile (up to $12,700) includes 27.1 percent of the population, the second (up to $25,400) includes 31.5 percent and the third (up to $70,400) includes 22.7 percent of the population. The remaining households live in states with unlimited exemptions (the top quartile, equaling 18.7 percent of the population). We refer to this breakdown as quartiles throughout the rest of the paper. The results are not sensitive to alternative, sensible specifications of the exemption variable.

Total assets are composed of financial and real assets. Financial assets are the sum of checking accounts, money market accounts, saving accounts, IRAs and Keoghs, CD's, savings bonds, bonds, stocks, mutual funds, and trust accounts. Real assets are net equity in the home plus net equity in other assets such as cars and artwork. The quartile breakpoints for the total asset distribution are $7855, $48,535, and $109,637.
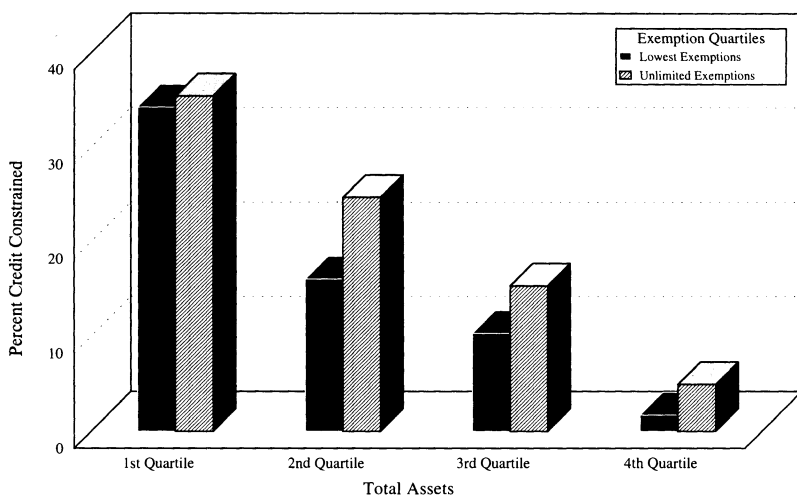
FIGURE II
Probability of Being Turned Down or Discouraged from Borrowing by Asset
and Exemption Quartiles, 1983
Source. 1983 Survey of Consumer Finances.

likely to be turned down for credit than are households in low-exemption states. The increased probability of being turned down or discouraged from borrowing in an unlimited-exemption state ranges from 1.2 percentage points in the bottom quartile of the asset distribution to 8.7 percentage points (or 54 percent) in the second quartile.

The effect of the bankruptcy exemption on households' demand for credit should depend nonlinearly on assets. To illustrate, suppose that the bankruptcy exemption in a state increases to $40,000 from $30,000. This change should increase the demand for credit by a household having $35,000 in assets, since the increase in the exemption level lowers the household's expected cost of borrowing, but it would have little or no effect on the demand for credit by a household having $10,000 in assets. In the extreme case of households that will never have assets, the bankruptcy exemption will not affect demand for credit because there is (and will be) nothing for these households to shelter in bankruptcy.

Figure III graphs median total debt against quartiles of the distribution of total assets and the bankruptcy exemption. The figure shows the importance of accounting for potential nonline-
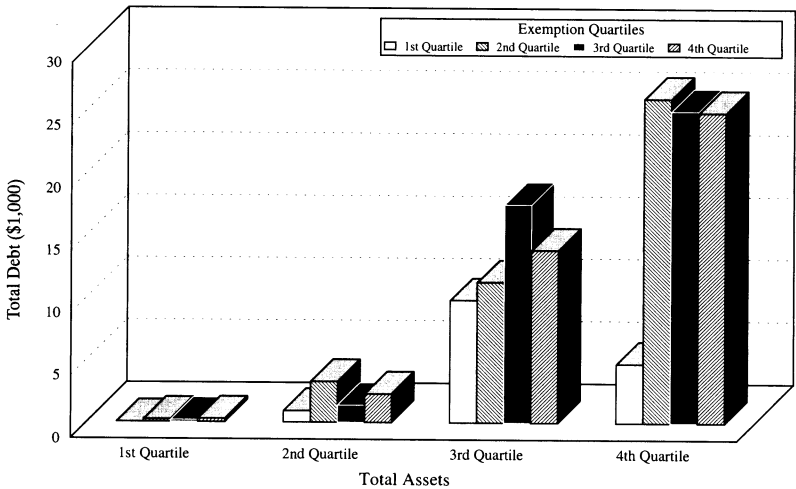
FIGURE III
Median Total Household Debt by Asset Exemption Quartiles, 1983
Source. 1983 Survey of Consumer Finances.

arities in the asset-exemption relationship. For households in the bottom half of the asset distribution, median holdings of debt change little across exemption levels. For households in the top half of the asset distribution, median holdings of debt generally increase with the size of the exemption (although the relationship is not monotonic).

The figures display patterns that are consistent with the empirical hypotheses. The probability of being turned down for credit or discouraged from borrowing is positively related to the bankruptcy exemption within asset quartiles. Households in the top half of the asset distribution in states with high exemptions appear to have stronger demand for credit than their counterparts in states with low exemptions. We measure the size, significance, and robustness of these effects, conditioning on other characteristics, in the following section.

VI. REGRESSION ANALYSIS

Our first hypothesis is that the higher a state's bankruptcy exemption, the more likely that lenders turn down credit applicants or that applicants will be discouraged from borrowing. We examine this hypothesis using probit regression.

Probability of Being Denied Credit

The central variable of interest in the empirical model is the bankruptcy exemption. We use dummy variables to represent quartiles of the exemption distribution, with the lowest quartile being the excluded category. A number of other factors are also likely to affect the probability that a household gets turned down for credit or is discouraged from borrowing. The life-cycle hypothesis suggests that younger households are more likely to borrow than older households. Consequently, we include age and age squared in the regression. Income affects households' access to credit and may affect their demand for credit, so income and income squared are included.[24] In a manner similar to income, assets affect households' access to credit and may also affect their demand, so we include the level of total assets in our analysis. We use several additional variables to proxy for tastes: family size, education of the household head, and dummy variables for whether the household head is married or is nonwhite.

There may be geographic variation across credit markets that could spuriously influence our exemption variables.[25] We include the Herfindahl index for financial institutions in the area as a crude proxy variable for the competitiveness of the local lending market, and dummy variables indicating whether branch banking was allowed statewide and whether multibank holding companies were prohibited in the state. We include the county unemployment rate in 1982, a dummy variable for rural households, and three dummy variables for the region of the country (the West is the excluded category) to account for potential geographic variation in credit markets.

We also include additional observable characteristics that enter the credit scoring function used by financial institutions. Following Boyes, Hoffman, and Low [1989], we include the mean income of the profession of the household head (also see Cox and Jappelli [1993]) and years working at the household head's current employer.[26] Descriptive statistics for the variables used in the analyses are given in Appendix 1.

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24. For example, income tends to be positively correlated with tax rates. Households with high marginal tax rates may find it profitable to borrow because the after-tax interest rate on borrowing is lower than the after-tax rate of return on investments (recall that in 1983 interest on all loans was tax-deductible).

25. One potential source of geographic variation in credit markets might be state usury laws, but they had been abolished by 1983.

26. Boyes, Hoffman, and Low [1989] had access to confidential credit history information (especially credit bureau reports) when estimating their score function of being turned down for a credit card.

Table II shows the results of a probit regression examining the factors correlated with being turned down for credit or discouraged from applying to borrow. Standard errors are computed using Huber's method [StataCorp 1995] to account for potential correlation in the error terms at the state level. We find that the exemption variable for households in unlimited exemption states is positively and significantly related to the probability of being turned down for credit or discouraged from borrowing. This result is consistent with the descriptive evidence presented in Figure II. The fourth column of the table shows the effect of a marginal change in a given covariate on the probability of not receiving credit. It shows that the economic significance of the bankruptcy variable is substantial. In the sample, 17.3 percent of households were denied credit or discouraged from borrowing. The exemption variables suggest that the probability of being turned down for credit or discouraged from borrowing is 5.5 percentage points higher in states with unlimited exemptions than in states in the bottom quartile of the exemption distribution. The other two exemption dummies are not significantly different from zero, but the point estimates show a roughly 2.7 percentage point difference.[27]

As expected, the magnitude of the estimated exemption coefficients increases if the sample is restricted to households with low assets. If we restrict the sample to households in the bottom half of the asset distribution, the marginal effect for the unlimited exemption increases to 7.9 percentage points. If we further restrict the sample to households in the bottom quarter of the asset distribution, the marginal effect increases to 10.2 percentage points. It is statistically significant in each specification. Thus, it appears that the bankruptcy exemption is strongly correlated with the probability of being turned down for credit or discouraged from borrowing, particularly for low-asset households.

The other coefficient estimates conform to intuition and previous empirical estimates (for example, Jappelli [1990]). The probability of being denied credit or discouraged from applying falls at an increasing rate with age and falls at a decreasing rate with income. The banking market variables suggest that house-

27. The results are robust to a large number of alternative specifications and the inclusion of additional geographic characteristics. Dropping the regional dummies increases the magnitude of the exemption variables by roughly one percentage point, makes the second exemption dummy significant at the 7 percent level, and the others significant at all usual levels of confidence.

TABLE II

PROBABILITY OF BEING TURNED DOWN FOR CREDIT OR DISCOURAGED
FROM BORROWING

Variable	Coefficient	Std. error	Huber *T*-statistic	$\frac{dF}{dX}$
Constant	−0.100	0.241	0.41	
Second exemption quartile	0.133	0.107	1.25	0.0277
Third exemption quartile	0.126	0.144	0.87	0.0264
Unlimited bankruptcy exemption	0.249	0.081	3.06	0.0550
Age (in 100)	0.058	0.821	0.07	0.0118
Age squared (in 10,000)	−3.052	0.986	3.10	−0.6166
Education	−0.003	0.010	0.33	−0.0007
Income (in $10,000)	−0.158	0.026	6.08	−0.0320
Income squared (in $100,000,000)	0.003	0.001	5.74	0.0006
Total assets (in $1,000,000)	−0.164	0.331	0.50	−0.0331
Married dummy	−0.272	0.075	3.62	−0.0570
Family size	0.049	0.018	2.72	0.0099
Nonwhite dummy	0.375	0.091	4.13	0.0869
Male dummy	0.016	0.058	0.28	0.0033
Northeast dummy	−0.033	0.114	0.29	−0.0065
Midwest dummy	−0.171	0.135	1.26	−0.0330
South dummy	−0.011	0.128	0.08	−0.0021
Rural dummy	−0.137	0.072	1.92	−0.0273
Average income of household's profession (in $10,000)	0.013	0.019	0.69	0.0027
Herfindahl index for financial institutions in the area (in 1,000)	−0.092	0.026	3.51	−0.0186
Years working at current employer	−0.019	0.006	3.21	−0.0038
Statewide branch banking	0.068	0.061	1.12	0.0139
No multibank holding companies in state	−0.176	0.079	2.23	−0.0330
County unemployment rate in 1982 × 10	0.002	0.001	3.09	0.0005

Pseudo R^2 = .1880.

The dependent variable equals one if the household has been turned down for credit or discouraged from applying to borrow. In the sample, 642 out of 3706 households report being turned down for credit or discouraged from borrowing. Data are from the 1983 Survey of Consumer Finances combined with individual state bankruptcy exemptions. The column labeled *dF/dX* gives the simulated derivatives evaluated at the means of the independent variables. For dummy variables these are for a discrete change of the relevant variable from zero to one. For definitions of all variables see text.

holds are less likely to be turned down for credit or discouraged from applying in more highly concentrated financial markets and states that prohibit multibank holding companies. All the binary covariates are interpreted as the effect of switching the variable to one from zero. The largest economic effects are that nonwhite households are 8.7 percentage points more likely to be denied credit and married households are 5.7 percentage points less likely to be denied credit, relative to baseline characteristics evaluated at the mean.

Household Debt[28]

We write households' desired level of debt, D, as

$$D = X\beta_1 + \alpha_1 E + \varepsilon_1,$$

where E is the bankruptcy exemption in the household's state of residence and X denotes a vector of other factors influencing the demand for debt. We do not observe D, however, because the household may be turned down for credit or discouraged from applying and therefore the observed level of debt, D^*, may be less than D. In addition, the distribution of D^* is truncated at zero. Therefore, we define two indicator variables,

$$I_1^d = 1 \quad \text{if } D^* = D$$
$$I_1^d = 0 \quad \text{otherwise}$$

and

$$I_2^d = 1 \quad \text{if } D^* > 0$$
$$I_2^d = 0 \quad \text{otherwise},$$

where I_1^d distinguishes households that are not turned down or discouraged from applying for loans, and I_2^d distinguishes households with positive observed amounts of debt. We parameterize the indicator functions using a bivariate probit model,

$$I_1^d = X_T\beta_T + \varepsilon_T$$
$$I_2^d = X_Z\beta_Z + \varepsilon_Z,$$

where X_T represents a vector of factors influencing the decision of banks to deny credit to applicants, X_Z represents a vector of

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28. The selection model of household debt is similar to Cox and Jappelli [1993] and Duca and Rosenthal [1993]. Neither previous study examines the effect of bankruptcy exemptions on credit markets.

factors affecting the incidence of positive debt, and ε_T and ε_Z are distributed bivariate normal.[29]

The empirical model of the demand for debt is

$$D^* = X\beta_1^* + \alpha_1^* E + \theta_T^d \lambda_T^d + \theta_Z^d \lambda_Z^d + \eta_1,$$

where, under the assumptions of normality, formulas for the two selection terms are straightforward extensions of the usual Mill's ratio in selection models, calculated from the bivariate probit model, and η_1 is a normally distributed error term.

Because the distribution of household debt is highly skewed, we use the natural logarithm of total household debt as the dependent variable in our primary specification. To account for potential nonlinearities between the bankruptcy exemption and assets, we treat the combined bankruptcy exemption as a continuous variable for states whose exemptions are not unlimited and interact this exemption variable with asset quartile dummies, leading to four asset-exemption interaction variables (where states with unlimited exemptions are coded as zeros). Because any specific coding of the unlimited exemption states is arbitrary, we also add a second set of four variables that interact the dummy variable for states with unlimited exemptions with the four asset quartile dummies. We also include an age spline (defined in Appendix 1) for the age of the household head to capture life-cycle patterns in the use of debt, and a series of dummy variables measuring the educational attainment of the household head (where the omitted category is no high school diploma). Otherwise, the covariates are the same as in the probit equation for positive debt.

Table III gives estimates for the amounts of debt held by households that were not denied credit or discouraged from borrowing. As in Figure III, debt holdings are positively and signifi-

29. Estimates for the bivariate probit model are given in Appendix 2. The specification for the denied or discouraged from borrowing portion of the model is identical to Table II, with the coding of the dependent variable reversed. The covariates for having positive amounts of credit differ by dropping one of the variables included as part of the bank's credit scoring function (average income in the household head's profession) and by adding a dummy variable for "attitude toward credit." The latter variable comes from an SCF question that asks whether respondents think "it is a good idea or a bad idea for people to buy things on the installment plan." Three answers are possible: "good idea," "good in some ways, bad in others," and "bad idea." We expect households answering the question that credit is a "bad idea" are less likely to apply for credit and therefore more likely to have zero debt without ever having been turned down for credit, making this a useful exclusion restriction.

TABLE III
DOUBLE SELECTION MODEL OF LOG DEBT, ESTIMATED WITH THE UNCONSTRAINED
SAMPLE WITH POSITIVE DEBT.

Variable	Coefficient	Std. error	t-statistic
Constant	6.465	1.487	4.35
Combined bankruptcy exemption (in $10,000) × dummy variable for first quartile of the total asset distribution	−0.534	0.047	11.39
Bankruptcy exemption × 2nd asset quartile dummy	−0.223	0.041	5.43
Bankruptcy exemption × 3rd asset quartile dummy	0.084	0.038	2.22
Bankruptcy exemption × 4th asset quartile dummy	0.156	0.040	3.93
Unlimited bankruptcy exemption × 1st asset quartile dummy	−1.157	0.213	5.43
Unlimited bankruptcy exemption × 2nd asset quartile dummy	−0.168	0.195	0.86
Unlimited bankruptcy exemption × 3rd asset quartile dummy	0.578	0.175	3.30
Unlimited bankruptcy exemption × 4th asset quartile dummy	0.750	0.179	4.20
Age spline under 24 (See Appendix Table 1)	0.130	0.055	2.38
Age spline 25–34	−0.006	0.016	0.39
Age spline 35–44	−0.044	0.014	3.01
Age spline 45–54	−0.042	0.017	2.48
Age spline 55–64	−0.051	0.023	2.24
Age spline over 65	−0.055	0.037	1.47
High school diploma dummy	0.121	0.100	1.21
Some college dummy	0.395	0.116	3.41
College degree or more dummy	0.516	0.129	4.02
Income (in $10,000)	0.141	0.052	2.73
Income squared (in $100,000,000)	−0.004	0.001	2.65
Total assets (in $1,000,000)	0.284	0.102	2.79
Married dummy	0.023	0.166	0.14
Family size	0.121	0.034	3.53
Nonwhite dummy	0.146	0.159	0.92
Male dummy	0.147	0.089	1.65
Northeast dummy	−0.673	0.137	4.92
Midwest dummy	−0.426	0.170	2.51
South dummy	−0.582	0.161	3.63
Rural dummy	0.020	0.088	0.23
Herfindahl index for financial institutions in area (in 1000)	−0.104	0.044	2.36
Years working at current employer	−0.020	0.006	3.37
Dummy for "thinks credit is a bad idea"	0.023	0.113	0.20
Statewide branch banking	−0.009	0.104	0.09
No multibank holding companies in state	−0.022	0.131	0.17

TABLE III
(CONTINUED)

Variable	Coefficient	Std. error	*t*-statistic
County unemployment rate in 1982 × 10	0.001	0.001	0.57
Lambda-unconstrained	−1.544	0.614	2.51
Lambda-positive debt	−0.245	0.591	0.41

Adjusted R^2 = .434.
The dependent variable is the natural logarithm of the level of debt. The sample consists of all households in the 1983 Survey of Consumer Finances (excluding the high-income subsample) that have positive debt and are not credit constrained. The sample size is 2118. The results for the first-stage model are given in Appendix 2.

cantly correlated with the bankruptcy exemption for households in the top half of the asset distribution. The effects are larger for almost all households in states with unlimited exemptions than for similar households in states without unlimited exemptions. This result is consistent with the hypothesis that increases in the personal bankruptcy exemption increase demand for debt by high-asset households. The estimated coefficient on the exemption for households in the bottom quartile of the asset distribution is negative and significant, indicating that households with no or few assets hold less debt in high-exemption states than observationally equivalent borrowers in low-exemption states. The mean effects are considerably larger for households in states with unlimited exemptions. Thus, the evidence suggests that the demand effect exceeds the supply effect for high-asset households in high-exemption states, while the supply effect exceeds the demand effect for low-asset households in high-exemption states.

We find a life-cycle pattern of debt in which households under age 35 have higher levels of debt, and debt declines almost monotonically for older households. Debt increases with education, income (though at a decreasing rate), assets, being married, family size, and living in the West. Debt is negatively related to the concentration of the financial market and the number of years that the household head has worked at the current employer.

The selection term for the probability of being credit constrained is negative and significant. This result implies that unobserved factors that increase the probability of being denied credit are negatively correlated with the unobserved factors that affect credit demand. This selection result is similar to Cox and Jappelli [1993].

Selection models of the type described above impose strin-

gent distributional assumptions on the error terms and, when violated, can generate misleading inferences [Goldberger 1983]. To examine the robustness of our results, we also estimate the debt equation using median regression. This alternative specification provides a useful check for the sensitivity of our analysis to distributional assumptions and outliers.[30] The results are given in Table IV, where the dependent variable is defined as the log of total household debt (adding $1 to total household debt to avoid taking the log of zero). Standard errors are bootstrapped. The sign, size, and significance of the central variables of interest—the bankruptcy exemption interacted with assets—are consistent across the two specifications.[31]

In Table V we examine the economic significance of the coefficient estimates from the double selection model of log debt. Our baseline household is defined as having the following characteristics: gross assets of $100,000 (third quartile), 45 years old, college degree, income of $75,000, married, family size of four, white, male head of household, living in the Midwest, ten years of job tenure, and living in an area with a county unemployment rate of 9.64 percent and a Herfindahl index of financial market concentration of 1.377. We estimate that this household would have $31,014 of debt in a state with a combined bankruptcy exemption of $6000 (such as Maryland or West Virginia). If the household lived in a state with an exemption of $50,000 (roughly the size of California's exemption), we estimate that the household would have debt of $49,725. Other characteristics also have large effects, particularly for households in high exemptions states. Thus, state bankruptcy exemptions appear to have a substantial effect on households' debt levels.

VII. DO INTEREST RATES ADJUST?

Creditors may respond in a number of ways to the phenomenon of bankruptcy relative to a situation where borrowers never default: raise interest rates, set higher minimum standards to qualify for loans, increase collateral requirements, or screen loan applicants more vigorously. In this section we examine whether households that live in states with higher bankruptcy exemptions pay higher interest rates on loans than households that live in

30. The largest value of debt in our sample is $1,247,000.
31. The other covariates generally retain their patterns and significance, with the exception of the age spline, assets, and several of the indicator variables.

TABLE IV
MEDIAN REGRESSION ESTIMATES OF LOG DEBT, WITH BOOTSTRAPPED
STANDARD ERRORS

Variable	Coefficient	Std. error	t-statistic
Constant	−1.029	4.109	0.25
Combined bankruptcy exemption (in $10,000) × dummy variable for first quartile of the total asset distribution	−0.655	0.121	5.41
Bankruptcy exemption × 2nd asset quartile dummy	−0.155	0.077	2.01
Bankruptcy exemption × 3rd asset quartile dummy	0.171	0.058	2.95
Bankruptcy exemption × 4th asset quartile dummy	0.243	0.057	4.23
Unlimited bankruptcy exemption × 1st asset quartile dummy	−1.203	0.287	4.18
Unlimited bankruptcy exemption × 2nd asset quartile dummy	−0.024	0.235	0.10
Unlimited bankruptcy exemption × 3rd asset quartile dummy	0.736	0.204	3.61
Unlimited bankruptcy exemption × 4th asset quartile dummy	0.813	0.299	2.72
Age spline under 24 (See Appendix Table 1)	0.360	0.173	2.08
Age spline 25–34	0.010	0.023	0.42
Age spline 35–44	−0.059	0.015	3.86
Age spline 45–54	−0.008	0.023	0.34
Age spline 55–64	−0.567	0.049	11.66
Age spline over 65	−0.073	0.027	2.66
High school diploma dummy	0.293	0.191	1.54
Some college dummy	0.524	0.156	3.35
College degree or more dummy	0.801	0.169	4.73
Income (in $10,000)	0.276	0.055	5.03
Income squared (in $100,000,000)	−0.006	0.002	2.91
Total assets (in $1,000,000)	0.033	0.285	0.12
Married dummy	0.891	0.165	5.41
Family size	0.104	0.040	2.58
Nonwhite dummy	−0.256	0.144	1.77
Male dummy	−0.063	0.100	0.63
Northeast dummy	−0.765	0.139	5.52
Midwest dummy	−0.571	0.146	3.92
South dummy	−0.477	0.134	3.56
Rural dummy	0.003	0.100	0.03
Herfindahl index for financial institutions in area (in 1000)	−0.023	0.054	0.43
Years working at current employer	0.004	0.009	0.48
Dummy for "thinks credit is a bad idea"	−0.361	0.124	2.92
Statewide branch banking	−0.030	0.142	0.21

TABLE IV
(CONTINUED)

Variable	Coefficient	Std. error	*t*-statistic
No multibank holding companies in state	−0.240	0.171	1.40
County unemployment rate in 1982 × 10	0.001	0.001	0.78

Pseudo R^2 = .334.
The dependent variable is the natural logarithm of the level of debt ($1 was added to zero levels of debt). The model was estimated for the entire sample of 3706 observations. Data are from the 1983 Survey of Consumer Finances (excluding the high-income subsample) and individual state bankruptcy exemptions. For definitions of all variables see text.

TABLE V
ESTIMATES OF MEDIAN TOTAL DEBT IMPLIED BY THE DOUBLE SELECTION MODEL
OF LOG DEBT

	Median total debt	
Characteristics	Low exemption ($6,000)	High exemption ($50,000)
Baseline	34,303	49,725
Assets = $47,000 (second quartile)	28,105	10,551
Assets = $150,000 (highest quartile)	36,316	72,076
Income = $30,000	21,823	31,641
Income = $250,000	44,387	64,354
Age = 65	13,390	19,413
Years with current employer = 20	28,119	40,768
No high school degree	20,466	29,672
Family size = 2	26,906	39,010
Live in Northeast	31,014	44,966

In this table we calculate the total amount of debt held by households, using the estimates in Table III. In the baseline case the household with a 45-year old male head has gross assets of $100,000, income of $75,000, a college degree, is married, and has ten years of job tenure, a family size of four, lives in the Midwest, and lives in an area with a county employment rate of 9.64 percent and a Herfindahl index of financial market concentration of 1.377. The baseline household is predicted to have $34,300 of debt if it lives in a state with a bankruptcy exemption of $6,000 and to have nearly $50,000 of debt if it lives in a state with a bankruptcy exemption of $50,000. The rows below the top row show the effect on total debt of altering the listed characteristics holding the other baseline characteristics fixed.

states with lower bankruptcy exemptions. Our sample is house-holds in the 1983 SCF that purchased new or used cars during 1982 or the first quarter of 1983 and financed their purchases with loans, which gives us a homogeneous sample of loans. We further limited our sample to households that obtained their loans from commercial banks, savings and loans, or credit unions.[32] This process yields a sample of 310 households.

32. We eliminated households that obtained credit from friends, dealers, and automobile financing companies, since interest rates on these loans clearly would reflect a host of other factors. For example, a car dealer can offer a lower interest rate by adjusting the purchase price of the car.

Because the sample consists only of households that purchased cars with credit, we estimate a standard Heckit selection model.[33] All other independent variables are defined as above, but we also include quarterly dummy variables that allow for quarterly variation in the level of interest rates. The exemption variables are defined exactly as in Tables III and IV.

Results for the interest rate model are presented in Table VI. Bankruptcy exemptions are significantly and positively related to the interest rate for households in the two lowest asset quartiles. In order to quantify the magnitude of the effects, we again use the baseline household defined in Table V, with the exception that the household owns only $30,000 in assets, which would put it in the second quartile of the asset distribution (effects are insignificant in the top two asset quartiles). In a state with a $5000 bankruptcy exemption, this household would pay an interest rate of 17.8 percent on its car loan. In a state with a $50,000 exemption, the household would pay an interest rate of 20.1 percent, or 230 basis points higher. This 13 percent increase is well within the range of rates observed in the sample during this high-interest-rate sample period.[34]

This result is consistent with the results found in previous sections of the paper. It appears that low-asset households do not demand more debt in high exemption states, because they pay higher interest rates than they would pay in low exemption states. However, high-asset households do not pay significantly higher interest rates in high-exemption states than in low-exemption states, probably because they have assets greater than the bankruptcy exemption level or they offer lenders greater collateral.[35]

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33. In addition to functional form, the selection model is identified using the attitudinal variable whether the household thinks that it is a "good idea" to borrow. As before, households that think it is not a good idea to borrow are less likely to be in the selected sample. The probit results are given in Appendix 3.

34. Most other variables conform to expectations. Even controlling for differences in market structure, some regional variation in interest rates remains, as households in the Northeast face lower interest rates than anywhere else in the country. Interest rates varied considerably even during this short time frame of fifteen months, reflecting the volatility of interest rates during the 1982–1983 sample period.

35. We also ran a similar regression for the term to maturity of loans. The thought was that loans with shorter terms to maturities would be considered "safer" by banks. Indeed, using the exact same model as before, we find that high bankruptcy exemptions appear to reduce the term to maturity by about twelve months for low-asset households. Again we find that car loans to high-asset households are not significantly affected by changes in exemption levels. The results are available from the authors upon request.

TABLE VI
SELECTION MODEL OF THE INTEREST RATE PAID ON CAR LOANS

Variable	Coefficient	Std. error	*t*-statistic
Constant	20.196	9.403	2.15
Combined bankruptcy exemption (in $10,000) × dummy variable for first quartile of the total asset distribution	0.874	0.359	2.43
Bankruptcy exemption × 2nd asset quartile dummy	0.510	0.290	1.76
Bankruptcy exemption × 3rd asset quartile dummy	0.088	0.249	0.35
Bankruptcy exemption × 4th asset quartile dummy	0.287	0.324	0.89
Unlimited bankruptcy exemption × 1st asset quartile dummy	5.724	1.821	3.14
Unlimited bankruptcy exemption × 2nd asset quartile dummy	2.833	1.419	2.00
Unlimited bankruptcy exemption × 3rd asset quartile dummy	−0.086	1.461	0.06
Unlimited bankruptcy exemption × 4th asset quartile dummy	−0.024	1.692	0.01
Age (in 100)	−0.288	0.153	1.88
Age squared (in 10,000)	0.003	0.002	1.94
High school diploma dummy	−0.650	0.841	0.77
Some college dummy	−1.548	0.972	1.59
College degree or more dummy	−0.036	1.034	0.04
Income (in $10,000)	0.217	0.488	0.44
Income squared (in $100,000,000)	−0.029	0.044	0.66
Total assets (in $1,000,000)	2.410	3.090	0.78
Married dummy	−1.339	0.867	1.54
Family size	0.475	0.208	2.28
Nonwhite dummy	−1.395	0.791	1.76
Male dummy	−0.128	0.540	0.24
Northeast dummy	−1.627	0.887	1.83
Midwest dummy	−1.093	0.985	1.11
South dummy	0.186	1.045	0.18
Rural dummy	−0.850	0.644	1.32
Herfindahl index for financial institutions in the area (in 1000)	0.478	0.272	1.76
Years working at current employer	−0.043	0.039	1.09
Statewide branch banking	−0.836	0.877	0.95
No multibank holding companies in state	−0.251	0.871	0.29
County unemployment rate in 1982 × 10	−0.014	0.081	0.18
1982: first quarter dummy	−0.346	1.400	0.25
1982: second quarter dummy	−2.007	1.153	1.74
1982: third quarter dummy	0.907	1.201	0.76

TABLE VI
(CONTINUED)

Variable	Coefficient	Std. error	t-statistic
1982: fourth quarter dummy	−1.193	1.123	1.06
Lambda–auto loan?	−3.136	1.522	2.06

Adjusted R^2 = .21.

The dependent variable is the interest rate on car loans in percentage terms. The sample includes all households who purchased a car on credit and financed it with a loan from a commercial bank, savings and loan, or credit union. The sample size is 310. The results of the first-stage model are given in Appendix 3. Data are from the 1983 Survey of Consumer Finances (excluding the high-income subsample) and individual state bankruptcy exemptions. For definitions of all variables see text.

VIII. CONCLUSIONS

In this paper we find a number of empirical results that are consistent with simple hypotheses about the effects of the bankruptcy exemption on credit markets. We find that the size of the relevant state's bankruptcy exemption has a statistically and economically significant, positive effect on the probability that potential borrowers in the state are denied credit or are discouraged from applying to borrow. We also find that households in the lower half of the asset distribution have less debt and face higher interest rates on car loans in states with high bankruptcy exemptions than borrowers in low-exemption states, after conditioning on observable characteristics. In contrast, households in the upper half of the asset distribution have more credit in states with high bankruptcy exemptions, suggesting that these households have higher credit demand that lenders are willing to accommodate. Thus, while generous state-level bankruptcy exemptions would probably be viewed by most policy-makers as benefiting less-well-off borrowers, our results suggest that they increase the amount of credit held by high-asset households and reduce the availability of credit to low-asset households; i.e., they redistribute credit toward borrowers with high assets.

Given the explosion in the number of personal bankruptcy filings (to roughly 900,000 in 1992, from roughly 300,000 in 1983), we suspect that the empirical magnitudes documented in this paper are conservative estimates of the current economic effects of personal bankruptcy exemption levels on credit markets. Moreover, in 1994 Congress passed the National Bankruptcy Review Commission Act, which, among other provisions, doubled

the Federal personal bankruptcy exemption and, therefore, increased the number of households that would benefit financially from filing for bankruptcy. Thus, personal bankruptcy may become an even more important influence on credit markets in the future.

APPENDIX 1: SAMPLE STATISTICS TABLES II–VI, N = 3706

Variable	Mean	Std. dev.	Minimum	Maximum
Dummy variable for credit constrained	0.173	0.378	0.00	1.00
Natural log of total debt	6.186	4.350	0.00	14.04
Dummy variable for positive debt	0.701	0.458	0.00	1.00
Second exemption quartile	0.315	0.465	0.00	1.00
Third exemption quartile	0.227	0.419	0.00	1.00
Unlimited bankruptcy exemption	0.187	0.390	0.00	1.00
Age (in 100)	0.458	0.172	0.16	0.98
Age squared (in 10,000)	0.240	0.173	0.03	0.96
Education	12.168	3.250	6.00	17.00
Income (in $10,000)	2.562	2.898	−2.41	53.04
Income squared (in $100,000,000)	14.962	83.373	0.00	2813.24
Total assets (in $1,000,000)	0.112	0.375	0.00	17.41
Married dummy	0.616	0.486	0.00	1.00
Family size	2.716	1.530	1.00	13.00
Nonwhite dummy	0.170	0.376	0.00	1.00
Male dummy	0.517	0.500	0.00	1.00
Northeast dummy	0.200	0.400	0.00	1.00
Midwest dummy	0.280	0.449	0.00	1.00
South dummy	0.351	0.477	0.00	1.00
Rural dummy	0.401	0.490	0.00	1.00
Average income of household's profession (in $10,000)	1.529	1.939	0.00	50.61
Herfindahl index for financial institutions in the area (in 1000)	1.378	1.007	0.00	4.92
Years working at current employer	5.525	8.131	0.00	55.00
Statewide branch banking	0.445	0.497	0.00	1.00
No multibank holding companies in state	0.144	0.351	0.00	1.00
County unemployment rate in 1982 × 10	96.391	36.232	25.00	224.00
Combined bankruptcy exemption (in $10,000) × dummy variable for first quartile of the total asset distribution	0.472	1.185	0.00	7.04

APPENDIX 1: CONTINUED

Variable	Mean	Std. dev.	Minimum	Maximum
Bankruptcy exemption × 2nd asset quartile dummy	0.453	1.103	0.00	7.04
Bankruptcy exemption × 3rd asset quartile dummy	0.508	1.222	0.00	7.04
Bankruptcy exemption × 4th asset quartile dummy	0.556	1.301	0.00	7.04
Unlimited bankruptcy exemption × 1st asset quartile dummy	0.055	0.228	0.00	1.00
Unlimited bankruptcy exemption × 2nd asset quartile dummy	0.043	0.203	0.00	1.00
Unlimited bankruptcy exemption × 3rd asset quartile dummy	0.043	0.204	0.00	1.00
Unlimited bankruptcy exemption × 4th asset quartile dummy	0.045	0.207	0.00	1.00
Age spline under 24 (age1)	23.832	0.753	16.00	24.00
Age spline 25–34 (age2)	8.011	3.446	0.00	10.00
Age spline 35–44 (age3)	5.780	4.600	0.00	10.00
Age spline 45–54 (age4)	4.027	4.635	0.00	10.00
Age spline 55–64 (age5)	2.547	4.069	0.00	10.00
Age spline over 65 (age6)	1.624	4.337	0.00	34.00
High school diploma dummy	0.325	0.468	0.00	1.00
Some college dummy	0.200	0.400	0.00	1.00
College degree or more dummy	0.191	0.393	0.00	1.00
Dummy for "thinks credit is a bad idea"	0.238	0.426	0.00	1.00
Total debt (in $10,000)	1.631	4.181	0.00	124.67

This table gives sample statistics for all variables used in the models reported in Tables II–VI and Appendices 2 and 3. The sample is all households in the 1983 SCF (excluding the high-income subsample). The sample size is 3706. The age spline is defined as follows:

age1 = age   if age ≤ 24;   age1 = 24 otherwise;
age2 = min(age-24,10)   if age > 24;   age2 = 0 otherwise;
age3 = min(age-34,10)   if age > 34;   age3 = 0 otherwise;
age4 = min(age-44,10)   if age > 44;   age4 = 0 otherwise;
age5 = min(age-54,10)   if age > 54;   age5 = 0 otherwise;
age2 = age-64   if age > 64;   age6 = 0 otherwise.

APPENDIX 2: BIVARIATE PROBIT ESTIMATES FOR DOUBLE SELECTION MODEL
IN TABLE III

Variable	Coefficient	Std. error	*t*-statistic
Probability of not being credit constrained (3064 out of 3706)			
Constant	0.092	0.325	0.28
Second exemption quartile	−0.133	0.083	1.60
Third exemption quartile	−0.126	0.124	1.01
Unlimited bankruptcy exemption	−0.250	0.097	2.58
Age (in 100)	−0.057	1.093	0.05

Variable	Coefficient	Std. error	t-statistic
Age squared (in 10,000)	3.063	1.168	2.62
Education	0.003	0.011	0.33
Income (in $10,000)	0.159	0.039	4.07
Income squared (in $100,000,000)	−0.003	0.004	0.74
Total asets (in $1,000,000)	0.170	0.112	1.53
Married dummy	0.273	0.080	3.40
Family size	−0.050	0.022	2.27
Nonwhite dummy	−0.377	0.070	5.39
Male dummy	−0.018	0.060	0.31
Northeast dummy	0.034	0.115	0.29
Midwest dummy	0.173	0.150	1.15
South dummy	0.013	0.139	0.09
Rural dummy	0.139	0.067	2.07
Average income of household's profession (in $10,000)	−0.012	0.019	0.64
Herfindahl index for financial institutions in the area (in 1000)	0.093	0.034	2.70
Years working at current employer	0.019	0.005	3.90
Statewide branch banking	−0.068	0.079	0.86
No multibank holding companies in state	0.177	0.102	1.73
County unemployment rate in 1982 × 10	−0.002	0.001	2.67
Have positive amounts of debt (2599 out of 3706)			
Constant	−0.767	0.282	2.72
Second exemption quartile	0.026	0.074	0.35
Third exemption quartile	0.137	0.103	1.33
Unlimited bankruptcy exemption	0.203	0.089	2.30
Age (in 100)	5.697	0.932	6.11
Age squared (in 10,000)	−8.523	0.943	9.04
Education	0.019	0.009	2.21
Income (in $10,000)	0.161	0.020	8.22
Income squared (in $100,000,000)	−0.004	0.001	6.57
Total asets (in $1,000,000)	−0.116	0.088	1.32
Married dummy	0.368	0.069	5.35
Family size	0.067	0.019	3.48
Nonwhite dummy	−0.184	0.067	2.73
Male dummy	−0.214	0.055	3.91
Northeast dummy	−0.160	0.099	1.61
Midwest dummy	−0.122	0.128	0.96
South dummy	0.040	0.118	0.34
Rural dummy	−0.048	0.062	0.78
Herfindahl index for financial institutions in the area (in 1000)	−0.017	0.030	0.57
Years working at current employer	0.006	0.003	1.91
Dummy for "thinks credit is a bad idea"	−0.328	0.058	5.65

APPENDIX 2: CONTINUED

Variable	Coefficient	Std. error	t-statistic
Statewide branch banking	0.003	0.074	0.04
No multibank holding companies in state	−0.109	0.091	1.19
County unemployment rate × 10	0.001	0.001	0.96
Correlation of error terms	−0.045	0.040	1.14

Log-likelihood = −3102.1.
The dependent variables equal one if the household is not credit constrained and if the household has positive amounts of debt, respectively. Data are from the 1983 Survey of Consumer Finances (excluding the high-income subsample) and individual state bankruptcy exemptions. The sample size is 3706. For definitions of all variables see text.

APPENDIX 3: PROBIT ESTIMATES FOR SELECTION MODEL IN TABLE VI

Variable	Coefficient	Std. error	t-statistic
Constant	−2.058	1.212	1.70
Combined bankruptcy exemption (in $10,000) × dummy variable for first quartile of the total asset distribution	−0.068	0.046	1.49
Bankruptcy exemption × 2nd asset quartile dummy	0.005	0.038	0.14
Bankruptcy exemption × 3rd asset quartile dummy	0.064	0.034	1.92
Bankruptcy exemption × 4th asset quartile dummy	−0.061	0.043	1.42
Unlimited bankruptcy exemption × 1st asset quartile dummy	−0.334	0.215	1.56
Unlimited bankruptcy exemption × 2nd asset quartile dummy	0.023	0.189	0.12
Unlimited bankruptcy exemption × 3rd asset quartile dummy	−0.287	0.183	1.57
Unlimited bankruptcy exemption × 4th asset quartile dummy	−0.283	0.204	1.39
Age (in 100)	−0.027	0.017	1.63
Age squared (in 10,000)	0.014	0.014	0.97
High school diploma dummy	0.178	0.102	1.75
Some college dummy	0.155	0.115	1.35
College degree or more dummy	0.140	0.124	1.13
Income (in $10,000)	0.081	0.051	1.57
Income squared (in $100,000,000)	−0.005	0.004	1.06
Total assets (in $1,000,000)	−0.827	0.365	2.26
Married dummy	0.260	0.102	2.55
Family size	0.033	0.027	1.21
Nonwhite dummy	−0.068	0.104	0.65
Male dummy	0.015	0.072	0.21
Northeast dummy	−0.073	0.117	0.63

APPENDIX 3: CONTINUED

Variable	Coefficient	Std. error	*t*-statistic
Midwest dummy	0.001	0.128	0.00
South dummy	0.011	0.135	0.08
Rural dummy	0.168	0.080	2.10
Herfindahl index for financial institutions in the area (in 1000)	0.002	0.004	0.57
Years working at current employer	0.010	0.005	2.12
Statewide branch banking	0.097	0.108	0.90
No multibank holding companies in state	−0.166	0.112	1.48
County unemployment rate in 1982 × 10	−0.020	0.010	1.94
1982: first quarter dummy	0.089	0.135	0.66
1982: second quarter dummy	−0.072	0.110	0.65
1982: third quarter dummy	0.078	0.094	0.83
1982: fourth quarter dummy	−0.071	0.088	0.81
Dummy for "thinks credit is a bad idea"	−0.183	0.083	2.20

Log-likelihood = −1816.9

The dependent variable equals one if the household purchased a car during 1982 or the first quarter of 1983 and financed it with a loan from a bank, savings and loan, or credit union. Data are from the 1983 Survey of Consumer Finances (excluding the high-income subsample) and individual state bankruptcy exemptions. The sample size is 3706. For definitions of all variables see text.

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