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Bankruptcy, Credit Constraints, and Insurance: Some Empirics

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Abstract

Bankruptcy acts as insurance if the decision to default is negatively correlated with income shocks. However, whether bankruptcy provides insurance is dependent on the punishment for default. Such rules can instead cause the consumer to be credit constrained. If debts are not fully enforceable, then a rational lender may limit how much debt any borrower will be allowed to hold. This limit will be higher if the punishment for defaulting on the debt is increased. The US provides a natural test of the theory since rules about which assets may be kept by the debtor, the state exemptions, when filing for bankruptcy differ dramatically across the different states. This paper shows that increasing the level of these exemptions causes less debt to be held by consumers, and offers an explanation for the differing ability of consumers to smooth consumption.

Keywords: Bankruptcy, Consumer Borrowing, Credit Constraints.
JEL classification: D91.

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1 Introduction

One of the main issues in the consumption literature in recent times is to explain why consumers seem to consume more in the middle of their life, in their 40's and 50's, than either at the beginning or at the end of their life. Carroll and Summers (1991) have shown how income and consumption seem to track each other over the lifecycle. Several explanations have been suggested in the literature, including: (1) household's prefer this as their needs are greatest in the middle of their life, suggested by Attanasio and Weber (1993,1995), Blundell, Browning, and Meghir (1994), Attanasio and Browning (1995); (2) households are risk averse, prudent and impatient in the sense of Zeldes (1989b) and Carroll (19xx); and (3) households are credit constrained and can not borrow, Deaton (1991). However, so far little progress has been made in distinguishing the relative importance of these different explanations. It seems that, if we restrict attention to income and consumption, then it is difficult to convincingly argue which theoris is the best explanation for relationship between income and consumption. It would be useful to have some other instrument that could be used to test these theories: something that implied qualitively different behaviour as the potential instrument changed. This paper attempt to argue that bankruptcy legislation is just such an instrument.

The last of the three possible explanations given above seems particularly problematic. Hayashi (1987) has defined credit constraints as either a limit on the level of debt that may be held, or as the interest rate changing with the amount being borrowed (and/or not equalling the lending rate). While it is widely believed that consumers are credit-constrained, no completely satisfactory explanation of how these credit constraints are generated has been proposed, at least in the consumption literature.[1] Some authors, for example Stigliz and Weiss (1981), X-others-X, have have suggested that these constraints exist because some consumers would default. The decision to

[1]In most of the consumption literature, credit-constraints are usually imposed at some arbitrary level, typically zero. This is the approach of Deaton (1991). Alternatively, more indirect methods are employed as the population is divided between those that are and those who are not credit constrained, as in Zeldes (1989), or consumers might be asked whether they are or are not credit constrained, as in Jappelli (1990). In part these papers, and the literature generally has attempted to answer whether people are credit constrained, and what implications these credit constraints have for consumer behaviour, rather than why consumers are credit constrained.

default is not modelled: it is assumed that some consumers just exogenously default. This seems to contradict the simple lifecycle/permanent income model in which a no default condition is normally imposed; either as a no-Ponzi game condition in an infinite horizon model, or as an end condition. If some consumers can default, why don't all consumers default? To be an explanation of consumer behaviour, it would be necessary to explain who would default and why. In particular, why some consumers default and others do not.[2]

If the reason for consumption following income over the lifecycle is that consumers are worried about uncertainty, then any action that reduced uncertainty will be welfare improving. Bankruptcy legislation can reduce uncertainty if the consumer can default on his debt when his income is low. For bankruptcy legislation to act as insurance, default must be negatively correlated with income.[3] Bankruptcy legislation can have very different or even perverse effects if this is not the case. Section 2 starts with a very simple discussion of how the sharing rule - how much the creditor and the debtor each receive when the debtor defaults - affects the debtor's incentives to default. When debtors default they have to pay a penalty. They are punished by losing a portion of their assets; by being denied any credit for a period afterwards; and perhaps by losing, or having garnished, some of their future income. There may also be a social stigma attached to default. This section shows that bankruptcy rules do not necessarily provide insurance, but may instead create credit- constraints. For example, if a consumer earns more in the middle of his life than early on in his career, then he should be borrowing when he is young. However, this would require a substantial level of debt to be held in the middle of the consumer's life, and consumers do not hold this level of debt. Perhaps this is because when it comes to repaying the debt, the consumer has an incentive to default. They have an incentive to default if the dis-utility of being punished is smaller than the utility gain from not repaying their debts and they only repay the debt if it is optimal to do so. A rational lender can anticipate this, and will only lend up until the point at which the debtor is indifferent between repaying the loan, and default-

[2]Of course, the model that these authors have developed is an attempt to explain why banks might restrict credit, or charge an interest rate premium. They try to explain the bank's behaviour given the behaviour of consumers rather than to explain why some borrowers might default. Their argument is based on imperfect information, heterogeneity, and the borrowers default risk being predetermined.

[3]Or, more generally, whatever the consumer faces uncertainty about.

ing on his debt. Borrowers are thus credit constrained since when they are young they would prefer to borrow and repay the money later, rather than be denied credit. However, having borrowed more money, when it comes to repaying the loan, it now becomes optimal to default and be punished. They face a time consistency problem: when they borrow, they can not commit themselves to repaying the debt in the future. This model allows the level of debt to be endogenous: it relies on the punishment being exogenous. It can also explain why some debt is held, but the level of debt is limited.

The punishment for debt differs across the different states of the United States quite substantially, as different levels of assets can be kept in different states. It is difficult to argue that there are other substantial differences in the credit markets in the different states, and lenders face no constraints as to which state they will lend in. This allows the theory to be tested by comparing the level of debt held by households in the different states of America. The level of debt should be systematically related to the level of assets that may be kept in bankruptcy. The empirical section investigates some of the implications of the theory. This section is very similar to the work of Gropp, Scholz and White (1997). However, this paper uses the Consumer Expenditure Survey rather than the Survey of Consumer Finances and this paper restricts itself to unsecured debt. Their study includes both secured (mainly mortgage) debt, and unsecured debt, but since failure to honour these secured debts results in the loss of the security, it is questionable whether they should be included. Their study is limited to a single cross section as state data is only available in 1983 in that survey. In contrast, this paper is able to exploit data changes over time as well as across states, since the CEX releases information on the state of residence. The results reported here also relate to a later period of time. A further advantage is that this paper attempts to create a framework whithin which the results can be understood. The regressions are linked much more directly to the theory, and attempt, in some sense, to test the underlying consumer behaviour. Nevertheless, the results reported here should be seen as complementary to the results reported by Gropp et.al. (1997).

The paper is organized in the following way. Section 2 expounds the theory stated above. In section 3 a brief account of the rules in personal bankruptcy as they pertain to the United States is given. Section 4 contains a description of the data. In section 5 there is a description the regression results, and the paper concludes in section 6.

2 Theory

One of the suggested explanations of why consumption follows income over the lifecycle, is that consumer are risk-averse, impatient and cautious in the sense outlined by Zeldes (1989b). If this were true then anything that reduced uncertainty would be welfare improving. This is a possible motive for having bankruptcy legislation. If, for some reason, a contingent claims market, in which consumer could insure themselves against bad income draws, did not exist, then a bankruptcy rule could imitate some of the useful features of such a market. Bankruptcy legislation can act as insurance since it allows consumers with low income draws to default on their debt. To illustrate these ideas consider the following discussion.

Suppose the consumer lives for two periods, but second period income is uncertain and drawn from some distribution $y_2 \in \Gamma$. Suppose that the moments of y are bounded and the utility function is strictly increasing and strictly concave in all its arguments. Then uncertainty about future income causes the consumer to reduce consumption in period 1. In general, if higher moments are ignored, consumption in period 1 can be written as:

$$c_1 = c_1 \left[y_1, E\left(y_2\right), var\left(y_2\right) \right] \tag{1}$$

Consumption in period 1 is increasing in the first two arguments are falling in the third. Increasing the variance of period 2 income reduces period 1 consumption, and thus also the level of borrowing at the end of period 1. Assets evolve according to the equation:

$$A_2 = \left(1 + r\right)\left(y_1 - c_1\right) \tag{2}$$

Suppose the consumer could default on his debt if it were larger than some critical level. If the bank operates in a competitive environment, then it will make zero profits.[4] In any period the banks zero profit condition is:

$$\int_{default} q\left(y_t, A_t\right)\, dy_t + \int_{no-default} \tfrac{1+r}{1+r^f}\, A_t\, dy_t = A_t \tag{3}$$

Here r^f is the risk free rate and $q\left(\cdot\right)$ is the 'punishment' in the event of default: it is the amount that the bank can make the consumer pay when he defaults

[4] This formulation implicitly imposes that the bank is risk neutral. More generally, the qualitative arguments hold as long as the bank is less risk-averse than the consumer.

on his debt.[5] In this model, assuming the interest rate is small, the extra interest rate paid $r - r^f$is exactly that needed to offset the loss the bank makes when the consumer defaults. It acts in exactly the same way as an insurance premium. Suppose some debt will be held, that is $A_2 < 0$. Then second period wealth, allowing for default, can be defined as:

$$W_2 = \begin{cases} y_2 - q & \text{default} \\ \\ y_2 + \frac{1+r}{1+r^f} A_2 & \text{no default} \end{cases} \tag{4}$$

Remembering that debts are negative assets, define $\widehat{y}$ in the following way:

$$\widehat{y_2} = \begin{cases} y_2 - q - A_2 & \text{default} \\ \\ y_2 + \frac{r-r^f}{1+r^f} A_2 & \text{no default} \end{cases} \tag{5}$$

It is clear that $q(\cdot) \in [0, y_2]$, while it is optimal for the consumer to default if and only if $q < -A_2$. The consumer would be indifferent between receiving y with default allowed, or receiving $\widehat{y}$ with default not allowed. Clearly, remembering $A_2 < 0$, when default occurs $\widehat{y} > y$ while $\widehat{y} < y$ when the consumer does not default. If default happens when income is low then $var(\widehat{y}) < var(y)$ and so allowing default acts in the same way as compressing the distribution of income.[6] This will increase consumption in period 1 and the level of debt (that is A_2 falls). In period two, consumption is higher when default occurs, and lower when it does not. Overall, allowing default is unambiguously welfare improving since expected lifetime utility has increased.

(insert figure 1 here)

The possibility of default acts as insurance. In low income states the consumer does not have to repay any debts. The bank bears the risk of low

[5]Of course the punishment can also include being denied credit in the future and any stigma that is attached to bankruptcy. However, the bank does not receive these costs. The bank may also face the cost of enforcing the debt or punishment. These additional costs do not qualitatively change the analysis and they have been ignored in the discussion that follows.

[6]The banks no-profit condition ensures that $E(\widehat{y}) = E(y)$. Implicit in this statement is that income is exogenous, and that there are no moral hazard issues.

income realisations rather than the consumer. Crucial to this argument is that default occurs when income is low. Insurance only happens when default is negatively correlated with income. If this is not true then any bankruptcy rule will not act as insurance. To illustrate these ideas consider the following example.

Example 1:

Consider a consumer who lives for two periods and maximises utility over two goods; a durable d, that depreciates at rate α and a non-durable good c. The price of the non-durable good is normalised to one, while the price of the durable good is p. Second period income is drawn from some distribution Γ (with bounded moments) while the utility function is strictly increasing, strictly concave, and continuously differentiable. Thus the consumer (uniquely) chooses his first period consumption bundle (c_1, d_1) which also defines his level of assets at the beginning of period 2. That is:

$$A_2 = (1 + r)(y_1 - c_1 - p\, d_1) \tag{6}$$

In the second period the consumer realises y_2 which defines his second period consumption bundle (c_2, d_2). That is, in the second period, period two wealth W_2 is distributed over the two goods. Now consider the following bankruptcy rule. Suppose the punishment consisted of having the durable good, in excess of some exempt level E, seized and sold. Once the debt has been repaid in full, the consumer can retain any remaining value of the durable good. That is:

$$q_2 = \min\left[A_2, \max\left(\alpha\, p\, d_1 - E, 0\right)\right] \tag{7}$$

It is optimal to default if $W_2\left(default\right) > W_2\left(repay\right)$. Thus the consumer will default if the following holds:

$$y_2 + \alpha\, p\, d_1 - q_2 > y_2 + \alpha\, p\, d_1 + A_2 \tag{8}$$

Clearly it does not make sense to default if the debt can be fully enforced, or if $A_2 > 0$, so assume that neither of these is true. In which case the consumer will default if:

$$-A_2 > \alpha\, p\, d_1 - E \tag{9}$$

That is, the consumer will default whenever second period debts can not be fully enforced. The important point here is that the decision to default is independent of the realisation of second period income. No matter what income the consumer receives in the second period, he will default as long as his debt is sufficiently large. If his durable good is entirely exempt from seizure, then the consumer will always default whenever he holds any debt. Since default is independent of income, bankruptcy can not insure consumers against low income.

Example 1(a):

Suppose that in addition, second period income is certain while the utility function takes the form: $u(c_1, d_1, c_2, d_2) = \ln c_1 + \ln d_1 + \beta \ln c_2 + \beta \ln d_2$. Then the level of debt for which the consumer is indifferent between default and repayment can be calculated for as the exemption E changes. This has been graphed in figure1.

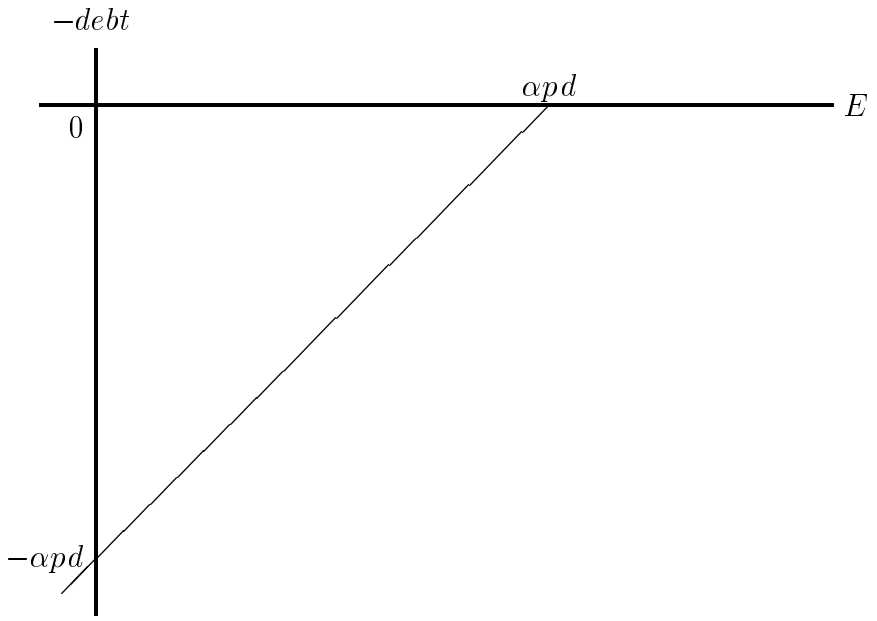

Figure 1: The feasible region for debt holdings.

The diagram shows that for any level of net assets below a certain critical level, default is assured. This critical level rises linearly as the level of the exemption, assets that may be kept when the debtor defaults, increases. Each unit increase in the exemption increases this critical level by one unit. This suggests that the consumer's optimal strategy is to borrow an arbitrarily large amount and default in the second period. To rule this out it is necessary to consider the lenders decision.

The game:

Suppose the game consisted of two periods. In the first period, the consumer chooses (c_1, d_1) and thus A_2. The bank decides whether to allow A_2 and if it does allow A_2 it specifies an interest rate r. In period 2 the consumer decides whether to repay any debts and consume (c_2, d_2) or to default and consume (c_2^*, d_2^*).

This problem can be solved by backward induction. We have already found conditions under which default occurs in period 2. A rational lender can anticipate this. The lender will never lend more than $\alpha\, p\, d_1 - E$ if the consumer will default with certainty for any larger quantity. Further, for any level of assets above the default level, repayment is certain regardless of income, and there is no interest rate premium. This is equivalent to adding an additional constraint to the consumer's problem, namely $-A_2 \leq \alpha\, p\, d_1 - E$.

In this framework, assuming the constraint is binding, the consumer is credit constrained, and there is no reduction in uncertainty about second period income. The fact that his debts are not fully enforceable has caused a limit to be placed on the level of debt that is allowed. The problem is a time consistency problem. The consumer would like to borrow more in the first period and repay his debts in the second period. However, when the second period arrives, it is not optimal to repay these debts, and the consumer reneges on his repayments. Since he can not commit himself to repaying any debt in the second period, his access to credit in the first period is constrained. Even if there is no uncertainty about second period income in the example above, the consumer will still be denied credit even though second period income will cover his debt. The fact that debts are not fully enforceable also means that there is a reduction in welfare compared to the case where debts are fully enforceable.

So far we have looked at two period problems. However, the analysis extends to any number of time periods, so long as the number of time periods

is finite. This is essentially because such problems have only one subgame perfect equilibrium.

Example 1(b):

Suppose that example 1 is extended to T time periods. Then in period T default will occur if:

$$-A_T > \alpha\, p\, d_{T-1} - E \tag{10}$$

Thus a rational lender limits the amount of debt that the consumer is allowed to hold in period T. This limit is independent of income, and of whether the consumer has defaulted in the past. Thus these factors will not be considered by the bank when extending credit. Consumers can anticipate this, and so any threat to deny credit in the future will not be credible. This means that in period $T-1$, when the consumer considers whether to default, he does not consider how default affects his access to credit at the end of the period: access to credit is independent of his default history. This means that in period $T-1$ default occurs if:

$$-A_{T-1} > \alpha\, p\, d_{T-2} - E \tag{11}$$

By backward induction, this reasoning can be extended to all periods. In all periods the consumer's decision to default is independent of his default history and his current income.

In this example, default is punished by the loss of some portion of current assets. For any finitely lived consumer, the imposition of bankruptcy exemptions has caused the consumer to be credit constrained, and has not reduced the level of uncertainty about future income. This is because any threat to deny credit in the future will not be credible. This result has depended crucially upon the form of the punishment that the consumer suffers if he defaults. It also depends on there being a finite number of periods. Example 2 considers what would happen if the consumer was infinitely lived. Thus figure 2 highlights the 'feasible' region, the combination of debt and exemption that can be observed in the data.

Example 2:

Kocherlakota (1996) and Kehoe and Levine (1993) among others have considered models in which there is an infinitely lived consumer, and a single non-durable good, and asked how much lending could be supported as a subgame perfect Nash equilibrium. Default is punished by being denied credit in the future for a period of time. They added an additional constraint that total assets equal zero (they had a large number of ex ante identical consumers all facing the same stochastic process). Since the consumer is infinitely lived the backward induction reasoning can no longer hold. In general, there are many subgame perfect Nash equilibria to this problem, including the belief that no debt will ever be honoured, and no debt is ever allowed (as the consumer would immediately default on any debt). However, these papers asked what is the highest level of lending that can be supported as a subgame perfect equilibrium. The solution will obviously entail that default is punished by never having access to any credit in the future. The exact solution depends on the income process which is assumed to be bounded and drawn from a stochastic markov process. In this model, default happens when income is high. This is because, as the income process is mean-reverting, default occurs when the value of having access to credit in the future has the least value. This is precisely when current income is high.

Recall that a possible motivation for bankruptcy legislation is that it reduced uncertainty about future income. The consumer receives $\widehat{y}$ rather than y. Here we have a model where default occurs when income is high. The banks zero profit condition still holds and so the consumer pays extra in low income realisations, and pays nothing in high income realisations. However, in this example, $var\left(\widehat{y}\right)$ exceeds $var\left(y\right)$. The bankruptcy rule, rather than compressing the distribution of period two outcomes, widens the distribution. In the model presented by Kocherlakota (1996) and Kehoe and Levine (1993), default is never allowed Indeed, not allowing bankruptcy gives the equilibrium that generates the most welfare. Not allowing bankruptcy will place a limit on the amount of debt that is allowed, since consumers will never be allowed to hold enough debt for it to be optimal for them to default. This is another model that endogenously derives credit constraints.

In both the examples above, and in general, it is of interest to consider what happens as the level of exemption increases. Suppose that income

is exogenous.[7] Suppose the insurance function of bankruptcy held. As the exemption becomes more generous, the punishment falls. Since default occurs if $q < -A_t$, while repayment takes place if $q < A_2$, then reducing $q(\cdot)$ will reduce the level of default. Further, as long as default is negatively correlated with income, increasing the level of the exemption will further compress the distribution of second period outcomes, and will provide more insurance. That is, the consumer will want to hold more debt. Lastly, if the bank's zero profit condition holds, a simple application of Leibniz's rule shows that the level of the exemption will raise the interest rate.

The implications of example 1 and 2 are different. Suppose default is not allowed. Then reducing the punishment will reduce the level of debt that the consumer will be allowed to hold. It will have no effect on the default rate, since default is never allowed. Interest rates will not change either, all consumers will pay the riskless rate r^f. There is no interest rate premium as default never happens.

Table 1: Expected effect of increasing the punishment for default.

	Credit Constraints	Uncertainty
Borrowing	increases	falls
Defaults	no default	fall in the level
Interest rate	no change	increases
Optimal Punishment	very high	very low

In section 4 these ideas about holdings of debt are tested using data. A consumer could be observed in any period of his life, and, in any given period, it is not known whether the consumer is credit constrained. To make these insights operational it is necessary to consider what happens if the consumer

[7] This is important since it rules out moral hazard problems. If income is a function of the punishment then, despite the bank's zero profit condition holding $\frac{\partial E(y)}{\partial E} \neq 0$ and thus it becomes more problematic to describe how borrowing behaviour changes as the punishment for default changes.

is credit-constrained in period t but isn't in either period $t-1$ or $t+1$. It is instructive to consider the following proposition.

Proposition:

Suppose that consumer who lives for three periods has a time separable utility function $u(\cdot)$ defined over two normal goods; a durable good d, and a non-durable good c. Suppose that the utility function is strictly increasing, strictly concave, and continuously differentiable, and that the durable good depreciates at a rate $a*(1+r)$ each period. Suppose income is exogenous. Then:

1. Increasing the level of assets in period 2, increases the level of assets in the next period.

2. Increasing the level of assets in period 3 reduces the level of assets in period 2.

The second part is somewhat unhelpful. If the average level of debt is calculated over a large number of periods, in some of which the consumer is credit constrained, part two of the proposition suggests that this average could increase or decrease as the punishment increases. However, (recall diagram XX,) a typical life-cycle pattern of income looks hump-shaped. Income increases in the early part of the life-cycle, reaches a peak in the middle part of the life-cycle, and then declines at the end of the lifecycle. It seems reasonable to believe that if consumers are credit constrained, then they are credit constrained in the early part of their lifecycle. Thus the following assumption seems reasonable:

Assumption:

If the consumer is credit constrained in period t, in that they would like to hold more debt than , then they are also credit constrained in period $t-1$.

Using this we can see that if bankruptcy legislation causes people to be credit constrained then increasing the level of the exemption will reduce the level of debt in every period.

3 Personal Bankruptcy in the United States:

The United States contains some of the most lax bankruptcy regulations for default on debt in the world. The present rules date from the Federal Bankruptcy Act of 1978 (Title 11, Section 522 of the annotated federal code). In this act individuals could file for personal bankruptcy under either Chapter 7 of the act, or under Chapter 13, in cases which were not deemed a substantial abuse of the bankruptcy regulations.[8] Chapter 7 was limited to those with assets of less than $750,000 and the aim of the act was to allow those genuinely unable to repay their debts the chance to have a fresh start. Under the act, the debtor had his debts expunged, in return for surrendering all his assets except those deemed by the court necessary for him to make his fresh start: the federal exemptions shown in table 2. Case law has created an obligation for these exemptions to be "liberally construed" by the courts. These exempt assets would only be surrendered if a valid lien had been created for them, which actually meant they would only be surrendered if the lender had lent the money specifically to purchase the assets. [9] The act specifically disallowed the creation of liens that were not related to the purchase of the asset. Under Chapter 13, the debtor agreed a repayment schedule for part or all of the debt: in practise a ceiling to how much was going to be repaid under Chapter 13 was set by the amount that the debtor could forced to surrender under Chapter 7. Many courts preferred the debtor to file under chapter 13, but enforced purely nominal repayment schedules. Around 70% of personal bankruptcy cases resulted in a filing for Chapter 7, with the remainder under Chapter 13.

The federal legislation also allowed (with some limits) insurance policies, pensions and annuities, social security payments, and awards adjudicated by the courts to be exempted. These are not included in table 2 but should be remembered when considering the punishment for bankruptcy. In cases where the value of the property was in excess of the exemption, the asset

[8] In practise this meant that bankruptcy would not be allowed if the money had been borrowed with no intention of repaying the money; in cases where the debtor could reasonably repay their debts without resulting in substantial hardship; and in cases where the debtor had changed jurisdiction in order to take advantage of more generous exemptions in the new regime. However, the meaning of substantial abuse did not extend to the ability to repay out of current income, even in cases where current income was high.

[9] For some debts the exemptions could not be claimed. These debts included state and federal taxes, fines issued by the courts, and alimony and child support.

would be sold and the amount in excess of the exemption went to satisfy the debt. Cash up to the value of the exemption is retained by the debtor. In some cases the courts insisted that the money had to be reinvested in an exempt asset within a certain amount of time.

State Exemptions:[10]

Since bankruptcy had traditionally been regulated by the individual states, the 1978 act allowed debtors to choose between the exemption allowed by the state and the exemption set by the federal government. It also allowed each state to refuse to allow the federal exemptions: the states that have enacted such legislation has been given in table 3 below. In the survey used in this paper, roughly 18% of people are better off claiming the federal exemption rather than the state exemption.

Naturally, in cases where he had the option, the debtor would choose the larger of the state and the federal exemption. The paper will exploit the differences in the level of the exemption to assess how the punishment in bankruptcy affects the level of debt and the amount of consumption smoothing. This paper is able to exploit changes in the level in two dimensions; differences across the different states at a point in time, and changes over time.

Table 3 shows which states have opted out of the federally set bankruptcy exemptions.[11] As the table shows, most states have disallowed the federal exemptions, and in most cases where the state has not opted out, the state has enacted its own exemptions which may be chosen instead of the federal exemption: in these cases the state exemptions are usually more generous than the exemptions contained in the federal legislation. In two cases, Arkansas and New Hampshire, the state later reversed legislation that refused the federal exemption, while in Illinois, the state opted out of the federal exemptions in 1981, only for the courts to rule that this opt-out, was illegal[12], causing fresh legislation to be re-enacted in the following year.

[10]The source for all the legislation, and legal comments, is derived from the Annotated State Codes published by Westlaw.

[11]Since residents of Montana, North Dakota, Rhode Island, and Wyoming are not identified in the CEX survey, these states have been excluded from the analysis below.

[12]The courts insisted that if Illinois was to opt out of the federal exemptions then it must set its own exemptions. It could not allow all of the assets of a debtor to be seized.

Table 2: Federal exemptions for Chapter 7 bankruptcy.

Description	Amount $	Comments
Current exemptions:		
1. House	15,000	
2. Car	2,400	
3. Household Goods	8,000	$400 each item (furnishings, goods, clothes, appliances, books, animals, musical instruments) for personal use only.
4. Jewellry	1,000	personal use only.
5. Other Property	800	+ $7,500 of (1) that is unused.
6. Tools of Trade	1,500	Items needed for job.
Prior to 1994:		
1. House	7,500	
2. Car	1,200	
3. Household Goods	4,000	$200 each item.
4. Jewellry	500	
5. Other Property	400	+ $3.750 of (1) that is unused.
6. Tools of Trade	750	
Prior to 1984:		
3. Household Goods		no limit on aggregate amount that can be claimed under this category.
5. Other Property		Allowed all of unclaimed exemption from (1).

Source: Title, 11, Section 522(d) of the annotated federal code.

Similarly as for the federal exemptions, each state has set a variety of things that are exempt from seizure or forced sale for the satisfaction of a debt. The federal law demanded that the state exemptions should act in the same way as the federal exemptions, except in regard to what was exempt, and to what value. In many cases the courts have chosen to interpret legislation in slightly different ways. For example, all states have allowed tools and equipment needed for work to be exempted, up to a limit. However, some jurisdictions have chosen to allow a car used to drive to work to fall under this definition, while other jurisdictions have not allowed this. The courts have allowed debtors substantial room for manoeuvre in fully exploiting all the exemptions available: in most cases they have allowed the debtor to rearrange his portfolio of assets prior default and substitute exempt assets for non-exempt assets.

Since there is considerable scope for substituting between assets when filing for bankruptcy, the exemptions have been added together, to arrive at a total money value of the exemption for each state.[13] This paper has summed the exemption on the homestead to the exemption on other assets. It has excluded the exemption on 'tools of trade' from the sum, as well as any exemption for pension and insurance policies, annuities, and crime payments. Including the 'tools of trade' exemption does not substantially change any of the reported results. The calculated exemption value differs between states and across time. It can also differ across subgroups of the population within the state: many states increase the value of exemptions for older, disabled, or married people, or if the debtor has other dependants. In cases where the federal exemption is allowed, the state and federal exemption has been compared and the household has been assigned the larger of the two exemptions. In each case it is the overall household's exemption that has been calculated rather than the individuals in the household. In several cases the household has an option of choosing which of two menus that they wish to claim within the household (California is a good example of this), the household has been assigned the most advantageous of its options.

In calculating the level of exemptions a number of simplifications had

[13]Care must be taken as some categories of assets have not had any limit set on the value that may be claimed as exempt. For example, many states allow clothes and household furniture to be exempt, as is reasonable (with the interpretation of 'reasonable' continuously evolving and differing across states). In cases like this a value has been assigned. Further, some states have specifically stated the house, or homestead, is to be exempt, no matter how great its value.

Table 3: Whether, and in which year, the state passed legislation to not allow the federal exemptions to be claimed.

Alabama	1980	Mississippi	1982
Alaska	1982	Missouri	1982
Arizona	1980	Nebraska	1980
Arkansas	1981-1991	Nevada	1983?
California	1984	New Hampshire	no
Colorado	1981	New Jersey	no
Connecticut	no	New Mexico	no
Delaware	1981	New York	1982
District of Columbia	no	North Carolina	1981
Florida	1979	Ohio	??(yes)
Georgia	1981	Oklahoma	1978
Hawaii	no	Oregon	1981
Idaho	1983	Pennsylvania	no
Illinois	1982	South Carolina	1980
Indiana	1980	South Dakota	1980
Iowa	1981	Tennessee	1980
Kansas	1980	Texas	no
Kentucky	1980	Utah	1981
Louisiana	1979	Vermont	no
Maine	1981	Virginia	1979
Maryland	1982	Washington	yes
Massachusetts	no	West Virginia	1981
Michigan	no	Wisconsin	no
Minnesota	no		

Source: Westlaw (various) annotated state codes.

to be made. The homestead exemption is simply that stated in the state legislation. In cases where the homestead exemption was unlimited, then a dummy was included in the regressions that are in the text. In many states no specific limit was put on a particularly category of goods. For instance some states had an allowance for "all necessary wearing apparel". To construct an overall level for the level state exemption it is necessary to assign a value to the exemption of the good in these cases. This paper has adopted the following values. If no limit has been assigned then the clothes are assigned a value of $1000, books $1000, pictures $1000, other personal possessions $500, jewellery (including watches and wedding rings) $1500, home furnishings $5000, and fuel and provisions $500. For the purposes of table 4, in cases where the exemption could either be allowed under the homestead or 'other assets', the exemption has been assigned to the homestead exemption; and in cases where it could either be assigned to 'other assets' or 'tools of trade', it has been assigned to 'other assets'. Having constructed both the state and the federal exemption for each household, the state and federal exemptions have been compared, and in cases where the federal exemption is allowed, and the federal exemption exceeds the state exemption then the household has been assigned the federal exemption.

The final issue is to consider what happens when either the state or the federal exemption changes, due to local or national legislation. In cases where the month in which the legislation was passed is known (to me), then any observation that is within three months of this legislation has been removed. In cases where the month in which the legislation is not known then all observations for that year have been removed. In Ohio, so far, I have not been able to date the legislation, hence I have only included observations from 1991, since I was able to confirm that there has been no change in the level of the exemption after this date.

Table 4 shows the level of exemptions and how they evolve over time. In each state, the exemptions rarely change (observe that the quartiles do not change much) but in most years at least one state changes its level of exemptions (notice how the means change). The homestead exemption is typically much larger than the total exemptions for other property (excluding the 'tools of trade' exemption) and this in turn is usually larger than the 'tools of trade' exemption. The level of the exemption is growing over time, and there is evidence of the distribution being skewed to the left, as the mean is larger than the median in all the cases shown above.

As an example of how much the legislation can differ, it is instructive

Table 4: The level of exemptions (in dollars) over the sample period.

Year	mean	25%	50%	75%
homestead*:				
1988	25,824	8,000	20,000	45,000
1992	28,543	8,000	20,000	100,000
1996	39,821	10,000	30,000	100,000
other assets				
1988	9,507	5,400	7,400	12,700
1992	11,276	5,400	7,400	12,700
1996	14,901	5,825	11,500	19,500
'tools of trade':				
1988	2,389	0	750	5,000
1992	2,504	0	750	5,000
1996	3,053	0	1,000	5,000

**In calculating the mean for the homestead exemptions, the unlimited homestead exemptions have been omitted.*

to compare the most, and the least generous jurisdictions. West Virginia is the state where the lowest level of assets can be kept in the bankruptcy (there are other states with less generous rules but they allow the debtor to claim the federal exemptions instead of the state exemptions). West Virginia passed its legislation in 1974 and the only important amendment took place in 1981, when it refused to allow the federal exemption. The exemptions are recorded in Chapter 38, Title 9, Section 1 of the annotated state code. In West Virginia a bankrupt has a homestead exemption of up to $5,000 and can also keep up to $1,000 of other personal property. This contrasts with Texas, which is the most generous state. The Texas legislation, in Chapter 41 of the property code, allows the home to be exempt from seizure, no matter what the value of the house. This legislation dates from 1973. In 1979, as recorded in Chapter 42.001 to 42.005 of the property code, an individual was allowed to keep up to $15,000 of other assets (which could include two cars) while other types of households could keep $30,000. In May 1991, these limits were doubled.

Both table 4 and the comparison between Texas and West Virginia show that there is considerable heterogeneity among states with regard to the the level of exemptions that may be claimed as exempt in bankruptcy. It is precisely this heterogeneity that will be exploited in this paper.

4 Data Description:

The data used is the Consumer Expenditure Survey released by the Bureau of Labor Statistics in the United States. In this survey, households are interviewed five times at 3-month intervals. Each quarter one fifth of the households leave the survey and are replaced by a new household, thus the survey is constructed as a rotating panel. Data is available for the years 1980-1995. In this survey, income, debt, and saving data is recorded for the 2nd and 5th interview, together with a large number of household characteristics, while spending is recorded in the 3rd and 4th interview as well. The state in which the household is resident is given as long as this information does not breach the criterion for releasing geographic information: any area geographically identifiable (perhaps combined with other information available in the survey) must have a population of over 100,000 people. As a result, information on state of residence has been suppressed for some states in some years (and some states have always been suppressed).

From 1988 the survey has also included additional information on the household debts. The debts that are examined in the paper are the unsecured debts held by the household. Included are debts held in revolving credit accounts (including store, gasoline, and general purpose credit cards), in installment credit accounts, credit at banks or savings and loan companies, in credit unions, at finance companies, unpaid medical bills, and other credit sources. It also includes negative balances held in checking or brokerage accounts. For this paper, these different types of debt have been summed together to arrive at a total debt held by the household. Excluded from the total is the mortgage, and other secured debts. Hynes and Berkowitz (1998) argue that the impact of bankruptcy exemptions on secured and unsecured debt ought to be very different. In their study they consider mortgage debt: this paper will instead consider unsecured debt. Mortgage (and other secured) debt is also likely to be important for the household, but the creditor has an additional claim to such assets in the event of bankruptcy. The creditor has a valid lien against this debt and can always claim the house (or other security) in the event of bankruptcy and the debtor defaulting. That is, the housing exemption will not affect the creditors rights in this case, and hence it does not make sense to include such debts in the analysis. Other secured debts (for instance on cars) have also been excluded.

The data used in this analysis includes households from the CEX survey for the years 1988-1996. It excludes farming households, since these households are covered by separate bankruptcy legislation, as well as the self-employed. Self-employed households have been excluded because the emphasis of this paper is on personal loans, and not business loans. Large households, with eight or more members, have also been excluded, as have households in which the respondent answers that they have received no education. All income, debt and exemption values have been deflated by the CEX price index so that they are in real terms. The households were then assigned to cohorts, based on the year-of-birth of the household head.[14] This is explained in table 5 below. The oldest cohort has been excluded in 1995 and 1996, while the youngest cohorts enter towards the end of the survey period. The other variables in the regressions are self-explanatory.

Table 6 gives a brief summary of the data, and compares the different exemption quartiles of the state exemptions. It shows that the level of debt

[14]The year-of-birth is not directly observable: instead it is constructed as the year minus the age.

Table 5: The Definition of the cohort used in this paper.

cohort	year-of-birth	'mid-age' in 1992	years included
1	1925-31	64	88-94
2	1932-38	57	all
3	1939-45	50	all
4	1946-52	43	all
5	1953-59	36	all
6	1960-66	29	89-96
7	1967-73	22	96

changes from quartile 1 (in which the lowest level of assets may be kept) to quartile 4. From this we can see that the average level of debt held is around $2,100 but that there is no discernable pattern to the level of debt. It is also difficult to see a pattern to the number of people holding at least some debt in the sample. In all cases around 60% of people hold debt. However, when the interest rate is looked at there is a very striking pattern: laxer rules implies a higher interest rate. The interest rate is constructed as the reported costs divided by the reported level of debt. The interest rate is thus the average interest rate on all debts and not the marginal rate of interest, which is what decides the marginal borrowing decision. This pattern of interest rates falling as the level of the exemptions increases remains if larger debts only are looked at. These results are significant in themselves (at the 10% level) if a rank-order test is done.

The rate of default is much higher for the first quartile. The figure has been calculated as the ratio of the number of bankruptcy filings, divided by the number of households. The number of households is calculated by finding the number of people resident in the state (available from the government statistical office), and dividing this number by the average family size, calculated from the CEX survey. The household rather than the individual rate has been calculated since, overwhelmingly, this is the unit that defaults in bankruptcy. The level of defaults is highest for the quartile with the highest exemptions, but there does not seem to be a clear pattern to the defaults. The pattern for defaults and the interest rate is similar, but does

Table 6: Summary statistics for the whole sample and different quartiles of the bankruptcy rules.

	all	quartile			
		1	2	3	4
total debt ($)	2123	2085	1974	2291	2096
holds debt (%)	62.63	63.15	58.99	64.16	64.36
interest rate (%)	14.70	15.45	14.85	14.34	14.27
interest rate (%) if owe $1,000+	19.01	19.60	19.08	19.03	18.03
defaults per 1000	8.58	11.39	8.19	7.11	8.09

not match completely: perhaps because the interest rate not only reflects the probability of default, but also the cost to the lender of default.

5 Regressions:

According to the theory outlined above, debtors will hold debt up to some maximum amount. This naturally suggests that the level of debt that individuals hold should be compared across states, and the impact of the state exemptions assessed. This can be done by using a simple tobit model. Suppose that the underlying level of debt d^* that the consumer wants to hold is given by:

$$d^* = \beta x + e \tag{12}$$

where the error term contains a state specific compenent and an i.i.d component. We observe zero debt when the consumer wants negative or zero debts. Thus we observe

$$d = \beta x + e^* \tag{13}$$

$$e^* = \begin{cases} e & if \quad e > -\beta x \\ -\beta x & if \quad e \leq -\beta x \end{cases} \tag{14}$$

instead. This can be estimated by maximum likelihood techniques that have become standard in the literature. The key assumptions here are that household characteristics are exogenous, and that the size of the exemption is also exogenous. Further assumptions are that the household's state of residence is also exogenous, and that any changes in the level of exemptions over time are unexpected. In reality, household's decisions about education, residence and fertility may well be related to the ability to smooth consumption: at some level all economic decisions are endogenous. However, for this discussion it is assumed that these issues are of secondary importance, and they shall be ignored.

Results:

In table 7 the results of the tobit are displayed. They show that increasing the exemptions reduces the amount of debt that is held by households. The regrssions are for the level of debt, and the level of income: recall that example 1 implied that there should be a linear relationship. The first regression shows the coefficients on all the control variables, without including the exemption variables or income. These varaibles will partly account for preferences, and partly account for income. When the level of the exemption is included, (and also dummy for unlimited homestead exemption,) we find that the coefficients are significant at the 1% level. A joint test of the level and including a dummy for the an unlimited homestead exemption is significant at the 5% level. Increasing the level of the exemption seems to reduce the level of lending that takes place. The coefficients suggest that moving from the 25th centile to the 75th centile reduces the amount of debt that may be held by nearly $ dollars. This is consistent with the simple theory of credit constraints expounded earlier. Other things to note are that households headed by females or non-white people seem to hold lower levels of debt. Better educated people also hold higher levels of debt as well. While interesting, these results are not the main focus of this paper.

The table highlights that increasing the level of the exemptions reduces the level of debt that households hold. The difference between the 25th percentile and the 75th percentile of the state exemptions amount to almost $400. This is quite substantial, since, as shown in table 6, the average level of debt is around $2,100 dollars. Since the regression is a simple tobit regression, while credit constraints argue for an upper bound to the level of debt, this suggests that the estimated number is under-estimated. The correct re-

gression to run is a tobit which is truncated at zero and at the point where the credit constraints bite, which, however, is unknown. Unfortunately, it is not even known if the consumer is credit constrained. The level of debt that the consumer will hold will only change for the higher level of exemptions, the consumer is credit constrained, and he is able to borrow more money at the lower level of exemptions (where the punishment for default is bigger). For households that are not credit-constrained, there will be no change in the level of debt that they hold. Thus the amount calculated in the table will under-estimate the true effect.

A second feature of table 7 is that including income in the regression does not substantially change the results. Included in the regression is the current level of income. This will include both temporary and permanent components. If the temporary component is high then this will reduce the level of borrowing in the current period, while if the permanent component is high, then the effects would be a little more ambiguous. Suppose individual i's income, denoted y, follows the following process:

$$y_{it} = \theta x_{it} + f_i + \varepsilon_{it} \tag{15}$$

where x is a set of other explanatory factors (that evolve over the lifetime), f_i can be thought of as permanent income, and ε_{it} is temporary income. The permanent effect will unambiguously raise consumption, and it will raise debt in periods where θx_{it} is unusually low. This is indeed what the regressions find: increasing income does raise the level of debt that the individual holds.

Table 8 shows the effect of including state specific dummies. Including these state specific effects ought to control for other state specific effects that are not included in the regression. When these dummies are included, the control variables do not change substantially. However, the effect on the exemption coefficient is substantial: the effect is almost 10 times as large. This time increasing the level of the exemption from the 25th centile to the 75th centile entails a reduction in almost \$3000. This is a very large figure. The F-test is highly significant.

Table 9 tabulates the effect of a probit regression on whether any debt will be held by the household. The results show that better educated people seem to be more likely to have debts, and again non-white people are less likely to hold debt. The results also show that households headed by a woman and households headed by a married couple are also less likely to hold debts.

Columns (2) and (3) show that the level of the exemption is marginally insignificant, and the chi-sqaured tests are significant at the 5% level. Having an unlimited homestead exemption does not seem to be significant, and, if anything, has the wrong sign. In equations (3) and (6) the level of income seems to be a highly significant predictor of whether any debt will be held. Wealthier people seem to be more likely to hold debt. In table 10 state specific dummies are included. While the coefficients on the control variables, and income, do not change, the coeffients on the exemptions again changes quite substantialy, particularly the coefficients on the unlimited homestead dummy. Now the coefficients are highly significant at the 1% level, and further the sign is as the theory predicts. The chi-squared tests give extremely high figures. It seems that the state exemptions are good predictors of whether any debts will be held.

In the simple argument about credit constraints, a prediction of the model was that credit constraints should not predict whether any debt is held, it should only create an upper bound on the level of debt. These results suggest that the level of the exemption can predict whether any debt will be hold. One way to attempt to reconcile this with the theory is to argue that the upper bound is being driven down to zero as the level of the exemptions is increased. Previously, some consumers may have been able to borrow some small, but non-zero, amount, while the bankruptcy exemption has no meant they can not borrow anything. Alternatively, if there are any fixed costs involved, then it could be the case that the level of allowed lending becomes too small for it to be optimal to hold any debt (either from the viewpoint of the bank, or the viewpoint of the individual).

Since regressions have been run on whether any debt will be held, and on the level of debt that is to be held, this might naturally suggest a two step estimator for the tobit equation. This is becoming standard in the literature, but to identify the model (other than on functional form), it is necessary to find exclusion restrictions: things which predict whether any debt is held, but do not predict the level of debt. Unfortunately, the theory developed in section 2 does not provide any such restrictions. However, if the errors in the tobit equation and in the probit equation are independent then estimation reduces to separately estimating the two equations. This is what has been done here, and the identifying assumption is that the equations are independent.

The effect of the exemptions on the interest rate that is charged is reported in tables 11 and 12. The interest rate is the self reported interest rate from

the 5th interview and it is only calculated for those who hold at least some debt. This explains why the sample size is much smaller than in the other regression. Again, the identifying assumption is that the interest rate charged is independent (in a statistical sense) of whether any debt will be held: we are not just selecting the low interest rate people. This may not be a particularly appealing assumption in this case. The results suggest that perhaps better educated people face lower interest rates, although the effects are small. In table 12 neither the level of the exemptions nor the level of income enter significantly into the results. This is disappointing given table 6, where there is a clear monotonic relationship between the interest rate and the exemption quartiles. These results could be due to the small sample size and the fact that self reported interest rates are likely to be measured extremely inaccurately. However, while this can explain the insignificance of the results in table 11 it can not explain the sign (measurement error in the left-hand side does not bias the point estimates). Table 12 reports estimates when state specific dummies are included, and again the results are not significant. The identifying assumption may also be causing these results. As the interest rate increases, some households would decide not to hold debt, thus downward biasing the results if the sample is restricted to those holding any debt.

Table 13 shows the results from a regression of the bankruptcy rate on a set of explanatory variables, including the exemption rate. The bankruptcy rate is defined as the number of bankruptcies divided by the population for each year. The regression thus does not use household level data, but rather state level data. That is, the age, age-squared etc variables are constructed by using the state-year means, calculated using the CEX survey. As a result, the variables are likely to contain some measurement error. The regressions contain an age polynomial, and cohort dummies. This specification rules out time effects (more generally age, cohort, and time are not separably identifiable). This specification will mean that, in the presence of time effects, the coefficients on age and cohort are not properly identified.

The table shows that there do not seem to be strong age effects (and the cohort effect, not reported, were small too). However, states with a large number of educated people have a lower incidence of bankruptcy. Increasing family size and being married also reduce the probability of default, while states with a larger proportion of women as the household head also have lower rates of default. Columns (2) and (3) show that increasing the level of the exemption reduces the proportion of people defaulting on their loan. We have the same effect as we found for the interest rate. Income also comes

in negatively. In an equilibrium framework there is no particular reason for there to be any sign on the exemption.

One caveat, is that these regressions have included the level of bankruptcy, as reported in national account statistics. Of course, the statistic of interest is the level of default (which may be either total or partial). In general, these are not the same. The fact that default involves bankruptcy can be due to many state specific factors, rather than the exemption rules. It is important to consider this when examining the reported results.

6 Conclusion:

The results show that as the level of the exemptions increases, households hold less debt. These households are also less likely to hold debt. There does not seem to be a strong effect on the interest rate (although this may well be due to the interest rate being extremely poorly measured). Lastly, these households have a slightly increased chance of defaulting. Including state specific dummies has a large effect on the estimated coefficients.

The fact that the tobit regressions showed that the exemptions were negatively related to the level of debt held suggests that credit constraints are important. This result can not be interpreted as resulting from either uncertainty, or from the fact that consumption changes with household needs. The insurance argument would seem to imply the opposite effect. This could be a way of comparing the comparative importance of these two arguments. However, a much more realistic model would fully interact the two effects. Such models may find extremely complicated interactions between insurance and credit-constraints. The argument for credit constraints seems to be an incomplete argument, not least because simply observation shows that a great many people default in the United States. The fact that some people default and more people default in high exemption states would seem to support the view that incomplete insurance is still an important additional factor that helps to explain the inability of consumers to fully smooth consumption. The results for the interest rate were much more disappointing, although measurement error may be the reason for these results not being significant.

These results have suggested an indirect way of testing for credit constraints and for incomplete insurance. They offer testable implications for the way that increasing the level of the bankruptcy exemptions will affect the level of borrowing, the interest rate, and the rate of bankruptcy. The

fact that credit constraints and insurance suggest that the effect of increasing the bankruptcy exemptions have different effects on the level of borrowing can potentially offer a test of their relative importance. Gropp *et.al.* showed results that suggested that for low asset people, the increasing the state exemptions reduced the level of borrowing, while the results were reversed for high asset people. This is what might be expected: for low asset people credit constraints dominate; while for high asset people insurance dominates.

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Table 7: Results of a tobit regression on the level of debt that the household holds (probability in parenthesis).

parameter	(1)	(2)	(3)
age/10	-607.26	-573.04	-644.39
	(0.000)	(0.000)	(0.000)
age-squared/100	-356.93	-357.61	-246.73
	(0.000)	(0.000)	(0.005)
age-cubed/1000	-82.01	-81.89	-57.04
	(0.199)	(0.199)	(0.370)
completed high school	1881.45	1870.27	1635.36
	(0.000)	(0.000)	(0.000)
some college	2929.09	2925.34	2538.27
	(0.000)	(0.000)	(0.000)
college graduate	3351.37	3345.26	2620.62
	(0.000)	(0.000)	(0.000)
Black	-1289.82	-1305.20	-1169.76
	(0.000)	(0.000)	(0.000)
Asian	290.04	266.97	409.21
	(0.619)	(0.647)	(0.482)
Native American	-2151.92	-2172.26	-2102.33
	(0.000)	(0.000)	(0.000)
female household head	-361.59	-359.46	-233.54
	(0.001)	(0.001)	(0.030)
not married	-1016.66	-1034.04	-700.82
	(0.000)	(0.000)	(0.000)
family-size	254.40	260.34	165.87
	(0.000)	(0.000)	(0.006)
famsize-size squared	-36.26	-36.94	10.82
	(0.436)	(0.428)	(0.816)
exemption x 1000	-	-5.48	-5.41
		(0.012)	(0.013)
unlimited homestead exemption	-	-146.28	-68.74
		(0.341)	(0.654)
income x 1000	-	-	35.13
			(0.000)
F-test*	-	3.26	3.09
		(0.038)	(0.045)
no. of observations	35,591	35,591	35,591

*The F-test is a joint test for the exemption and the dummy for unlimited homestead exemption. All regressions include a constant and cohort dummies.

Table 8: Results of a tobit regression on the level of debt that the household holds, including state dummies (probability in parenthesis).

parameter	(4)	(5)	(6)
age/10	-556.21	-438.55	-548.76
	(0.001)	(0.008)	(0.001)
age-squared/100	-361.80	-348.43	-245.58
	(0.000)	(0.000)	(0.005)
age-cubed/1000	-86.39	-87.93	-62.84
	(0.175)	(0.168)	(0.323)
completed high school	1833.98	1810.60	1585.67
	(0.000)	(0.000)	(0.000)
some college	2889.92	2857.32	2490.81
	(0.000)	(0.000)	(0.000)
college graduate	3320.90	3285.06	2595.98
	(0.000)	(0.000)	(0.000)
Black	-1240.63	-1249.48	-1102.27
	(0.000)	(0.000)	(0.000)
Asian	296.63	293.09	436.21
	(0.587)	(0.615)	(0.454)
Native American	-2504.50	-2513.95	-2369.08
	(0.000)	(0.000)	(0.000)
female household head	-355.72	-334.81	-211.60
	(0.001)	(0.002)	(0.050)
not married	-1007.94	-1152.24	-799.87
	(0.000)	(0.000)	(0.000)
family-size	262.75	294.86	195.08
	(0.000)	(0.000)	(0.001)
famsize-size squared	-30.29	-45.14	3.88
	(0.516)	(0.333)	(0.934)
exemption x 1000	-	-40.16	-32.50
		(0.000)	(0.000)
unlimited homestead exemption	-	-6750.41	-5569.93
		(0.000)	(0.000)
income x 1000	-	-	34.39
			(0.000)
F-test*	-	18.23	12.04
		(0.000)	(0.000)
no. of observations	35,596	35,596	35,596

*The F-test is a joint test for the exemption and the dummy for unlimited homestead exemption. All regressions include a constant cohort dummies, and state dummies.

Table 9: Results of a probit regression on whether any debt is held by the level household (probability in parenthesis).

parameter	(1)	(2)	(3)
age/10	-0.234	-0.230	-0.236
	(0.000)	(0.000)	(0.000)
age-squared/100	-0.022	-0.022	-0.011
	(0.090)	(0.089)	(0.393)
age-cubed/1000	-0.012	-0.012	-0.010
	(0.197)	(0.194)	(0.313)
completed high school	0.399	0.400	0.373
	(0.000)	(0.000)	(0.000)
some college	0.565	0.567	0.523
	(0.000)	(0.000)	(0.000)
college graduate	0.497	0.499	0.413
	(0.000)	(0.000)	(0.000)
Black	-0.262	-0.265	-0.248
	(0.000)	(0.000)	(0.000)
Asian	-0.216	-0.214	-0.195
	(0.015)	(0.017)	(0.030)
Native American	-0.370	-0.364	-0.355
	(0.000)	(0.000)	(0.000)
female head	-0.038	-0.038	-0.016
	(0.015)	(0.016)	(0.296)
not married	-0.076	-0.076	-0.066
	(0.000)	(0.000)	(0.000)
family-size	0.011	0.012	-0.001
	(0.204)	(0.173)	(0.990)
family-size squared	-0.008	-0.008	-0.003
	(0.232)	(0.228)	(0.679)
exemption	-	-0.001	-0.001
		(0.070)	(0.074)
unlimited homestead exemption	-	0.023	0.034
		(0.307)	(0.138)
income x 1000	-	-	0.004
			(0.000)
chi-squared test*	-	6.47	8.36
		(0.039)	(0.015)
No. of observations	35596	35596	35596

*The chi-squared test is a joint test for the significance of the exemption level and the dummy for unlimited homestead exemption. All regressions include a constant and cohort dummies.

Table 10: Results of a probit regression on whether any debt is held by the level household, including state dummies (probability in parenthesis).

parameter	(4)	(5)	(6)
age/10	-0.230	-0.210	-0.221
	(0.000)	(0.000)	(0.000)
age-squared/100	-0.027	-0.024	-0.013
	(0.044)	(0.068)	(0.311)
age-cubed/1000	-0.013	-0.014	-0.011
	(0.172)	(0.154)	(0.269)
completed high school	0.397	0.393	0.367
	(0.000)	(0.000)	(0.000)
some college	0.551	0.546	0.502
	(0.000)	(0.000)	(0.000)
college graduate	0.491	0.485	0.399
	(0.000)	(0.000)	(0.000)
Black	-0.249	-0.251	-0.232
	(0.000)	(0.000)	(0.000)
Asian	-0.230	-0.231	-0.212
	(0.011)	(0.010)	(0.019)
Native American	-0.418	-0.418	-0.401
	(0.000)	(0.000)	(0.000)
female head	-0.025	-0.024	-0.002
	(0.118)	(0.016)	(0.880)
not married	-0.076	-0.083	-0.072
	(0.000)	(0.000)	(0.000)
family-size	0.014	0.020	-0.006
	(0.120)	(0.026)	(0.458)
family-size squared	-0.007	-0.010	-0.004
	(0.287)	(0.148)	(0.543)
exemption	-	-0.006	-0.006
		(0.001)	(0.000)
unlimited homestead exemption	-	-1.097	-0.966
		(0.000)	(0.000)
income x 1000	-	-	0.004
			(0.000)
chi-squared test*	-	43.27	33.19
		(0.000)	(0.000)
No. of observations	35596	35596	35596

*The chi-squared test is a joint test for the significance of the exemption level and the dummy for unlimited homestead exemption. All regressions include a constant, cohort dummies and state dummies.

Table 11: Results of a linear regression on the interest rate that the household pays (probability in parenthesis).

parameter	(1)	(2)	(3)
age/10	0.007	0.008	0.008
	(0.598)	(0.578)	(0.556)
age-squared/100	-0.007	-0.007	-0.008
	(0.420)	(0.398)	(0.319)
age-cubed/1000	0.003	0.003	0.002
	(0.627)	(0.630)	(0.675)
completed high school	-0.024	-0.024	-0.022
	(0.126)	(0.119)	(0.151)
some college	-0.004	-0.004	-0.001
	(0.779)	(0.779)	(0.925)
college graduate	-0.038	-0.039	-0.033
	(0.016)	(0.014)	(0.044)
Black	0.025	0.023	0.022
	(0.078)	(0.103)	(0.115)
Asian	-0.034	-0.034	-0.034
	(0.521)	(0.520)	(0.517)
Native American	0.034	0.033	0.033
	(0.151)	(0.170)	(0.168)
not married	-0.001	-0.001	-0.002
	(0.741)	(0.708)	(0.581)
female head	0.014	0.016	0.013
	(0.140)	(0.132)	(0.174)
family-size	-0.008	-0.008	-0.006
	(0.165)	(0.169)	(0.256)
family-size squared	-0.006	-0.006	-0.007
	(0.121)	(0.169)	(0.093)
exemption x 1000	-	-2.99e-04	-1.95e-04
		(0.331)	(0.330)
unlimited homestead exemption	-	-0.020	-0.021
		(0.157)	(0.123)
income x 1000	-	-	-3.68e-04
			(0.123)
F-test*	-	1.24	1.34
		(0.288)	(0.262)
No. of observations	6262	6262	6262

*The F-test is a joint test for the significance of the exemption level and the dummy for unlimited homestead exemption. All regressions include a constant and cohort dummies.

Table 12: Results of a linear regression on the interest rate that the household pays, including state dummies. (probability in parenthesis).

parameter	(1)	(2)	(3)
age/10	0.003	0.006	0.007
	(0.822)	(0.682)	(0.641)
age-squared/100	-0.007	-0.007	-0.008
	(0.394)	(0.392)	(0.312)
age-cubed/1000	0.003	0.003	0.002
	(0.600)	(0.610)	(0.655)
completed high school	-0.021	-0.021	-0.019
	(0.178)	(0.181)	(0.230)
some college	-0.002	-0.002	0.000
	(0.854)	(0.860)	(0.981)
college graduate	-0.036	-0.036	-0.030
	(0.021)	(0.022)	(0.067)
Black	0.022	0.022	0.021
	(0.119)	(0.119)	(0.137)
Asian	-0.026	-0.026	-0.026
	(0.620)	(0.617)	(0.613)
Native American	0.059	0.059	0.058
	(0.031)	(0.033)	(0.035)
not married	-0.001	-0.001	-0.002
	(0.884)	(0.755)	(0.606)
female head	0.013	0.013	0.012
	(0.160)	(0.162)	(0.220)
family-size	-0.007	-0.007	-0.005
	(0.188)	(0.226)	(0.346)
family-size squared	-0.007	-0.007	-0.008
	(0.110)	(0.098)	(0.070)
exemption x 1000	-	-0.001	-0.001
		(0.271)	(0.231)
unlimited homestead exemption	-	-0.093	-0.103
		(0.418)	(0.370)
income x 1000	-	-	-3.99e-04
			(0.236)
F-test*	-	0.66	0.77
		(0.516)	(0.463)
No. of observations	6262	6262	6262

*The F-test is a joint test for the significance of the exemption level and the dummy for unlimited homestead exemption. All regressions include a constant, cohort dummies and state dummies.

Table 13: Results of a linear regression of the bankruptcy probability using state-year means (probability in parenthesis).

parameter	(1)	(2)	(3)
age/10	0.21	0.06	-0.58
	(0.930)	(0.978)	(0.805)
age-squared/100	2.43	1.85	0.44
	(0.338)	(0.461)	(0.865)
age-cubed/1000	-0.16	0.14	0.32
	(0.940)	(0.948)	(0.884)
some high school	4.95	3.19	5.70
	(0.283)	(0.490)	(0.231)
completed high school	15.42	13.91	16.10
	(0.002)	(0.004)	(0.001)
some college	14.60	13.28	17.23
	(0.003)	(0.006)	(0.001)
college graduate	4.87	9.80	14.96
	(0.016)	(0.044)	(0.006)
Black	7.00	3.19	4.35
	(0.015)	(0.301)	(0.163)
Asian	30.74	37.15	32.35
	(0.110)	(0.052)	(0.092)
Native American	-7.79	-8.77	-7.27
	(0.001)	(0.000)	(0.004)
female head	-8.36	-7.18	-8.19
	(0.017)	(0.038)	(0.019)
not married	-2.51	-2.10	-2.42
	(0.059)	(0.113)	(0.068)
family-size	-5.83	-5.37	-5.32
	(0.002)	(0.004)	(0.004)
family-size squared	0.52	0.93	0.17
	(0.752)	(0.574)	(0.917)
exemption x 1000	-	-0.02	-0.02
		(0.003)	(0.007)
unlimited homestead exemption	-	-1.68	-1.58
		(0.026)	(0.036)
income x 1000	-	-	-0.13
			(0.045)
F-test*	-	5.11	4.39
		(0.006)	(0.013)

*The regressions are on the state average in each quarter for the variables. The F-test is a joint test for the exemption and the dummy for unlimited homestead exemption. All regressions include a constant and cohort dummies.