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Consumer Bankruptcy Law, Credit Constraints and Insurance: Some Empirics

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Consumer Bankruptcy Law, Credit Constraints and Insurance: Some Empirics

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Abstract

Bankruptcy (defaulting on one's debts) acts as insurance if it allows default in cases of negative income shocks. However, whether bankruptcy provides insurance depends on the bankruptcy rules (the punishment for default) that is enforced. Bankruptcy rules can instead cause the consumer to be credit constrained. If debts are not fully enforceable, a rational lender may limit how much debt any borrowers are allowed to hold. This limit increases as the punishment for defaulting increases. 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. Regressions show that increasing the level of these exemptions causes less debt to be held by consumers. The paper also tests the theory more indirectly by regressing changes in the level, and in the standard deviation, of consumption, which suggests that bankruptcy provides insurance.

1 Introduction

In recent years, a great deal of attention by consumption economists has been devoted to the observation that consumption and income seem to follow each other, both over the comparatively short intervals[1] and over the whole lifecycle. 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 life-cycle. Several explanations have been suggested in the literature, two of the most popular are: (1) households are risk averse, prudent and impatient in the sense of Zeldes (1989) and Carroll (1997); and (2) households are credit constrained and can not borrow, Deaton (1991). However, it has been difficult to distinguish the relative importance of these different explanations. This paper will use bankruptcy legislation as an instrument that can shed light on these theories.

In a parallel literature, see Jackson (1986), bankruptcy rules have been motivated, particularly among lawyers, as a device that creates insurance when agents face uncertainty about the future. At the same time a theoretical literature has attempted to explain the fact that consumers can not fully insure all their idiosyncratic risk. Papers such as those by Kehoe and Levine (1993) and Kocherlakota (1996) argue that this limited insurance is due to the fact that debts can not be fully enforced.[2] In such a framework, as shall be shown in section

[1] See, for example, Hall (1978)

[2] For an earlier literature on credit constraints see, for instance, Stiglitz and Weiss (1981). In that literature credit constraints arise since agent's types are imperfectly observed, and different types have

2, the presence of a bankruptcy law which limits the punishment for default, may instead create credit-constraints. One aim of this paper is to bring together these two literatures, and to empirically test what effect bankruptcy rules may have.

In the literature on risk-sharing, any mean preserving 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, actually defaulting must be negatively correlated with income.[3] Bankruptcy legislation can have very different or even perverse effects if this is not the case. Section 3 starts with a very simple discussion of how the penalty[4], or sharing rule (how much the creditor and the debtor each receive when the debtor defaults) affects the debtor's incentives to default.

The punishment for debt differs across the different states of the United States quite substantially, as, when defaulting, different levels of assets can be kept in different states. Borrowers are assumed to be otherwise identical, and lenders face no constraints as to which state they will lend in. An identifying assumption of the paper is that any other differences in the operation of credit markets across the different states is orthogonal to the bankruptcy exemptions. This allows the theory to be tested by comparing the level of debt held by

different propensities to default.

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

[4]In general the punishment could be losing a portion of their assets; being denied any credit for a period afterwards; and perhaps losing (or having garnished) some of their future income. There may also be a social stigma attached to default.

households in the different US states. 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. The first part of this section uses an approach similar to that of Gropp, Scholz and White (1997). However, their study is limited to a single cross section as, they use the Survey of Consumer Finances for which state data is only available in 1983. In contrast, this paper is able to exploit data changes over time as well as across states. This allows us to potentially control for state specific effects that might be correlated with the bankruptcy legislation. The paper also reports results for consumption growth, which is a more direct test of consumption smoothing, at least for the ability to smooth relatively high frequency events, and for the change in the variance of consumption, which, as will be explained, is a direct test for the extra insurance induced by the bankruptcy rules. This part directly tests the claim that bankruptcy rules are providing insurance.

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 for why consumption follows income over the life-cycle, is that consumer are risk-averse, impatient and cautious in the sense outlined by Zeldes

(1989). If agents were risk-averse then anything that reduced uncertainty would be welfare improving: this could motivate 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 and continuously differentiable.) Then uncertainty about future income causes the consumer to reduce consumption in period 1 and we can write (ignoring higher moments):

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

Consumption in period 1 is increasing in the first two arguments and, if agents are risk-averse, 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 since assets evolve according to the equation:

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

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. The banks

zero profit condition is:

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

Here r^f is the risk free rate and $q(\cdot)$ is the 'punishment' in the event of default: it is the amount that the bank can make the consumer pay when he defaults 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 is conceptually the same as an insurance premium. If at least some debt will be held, so that $A_2 < 0$, then second period wealth, allowing for default, can be defined as:

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

Define $\widehat{y}$ in the following way:

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

Clearly $q(\cdot) \in [0, y_2]$, 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. 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 $var(\widehat{y}) < var(y)$

[5] 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. For simplicity it will also be assumed that there is no deadweight loss: the bank receives what the consumer pays.

and so allowing default acts in the same way as compressing the distribution of income.[6] This will increase both period 1 consumption and the level of debt (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.

The possibility of default acts as insurance since in low income states the consumer does not have to repay any debts. The bank bears the risk of low income realisations rather than the consumer. Crucial to this argument is that default occurs when income is low as insurance only happens when default is negatively correlated with income. If this is not true then any bankruptcy rule will not act as insurance. It is essentially trivial to devise rules where this is true. However, consider the following simple example where this is not true.

Example

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. Income and consumption are as before. 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:

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

[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.

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:

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

Given this framework, 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:

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

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 $\alpha\, p\, d_1 < E$ then the consumer

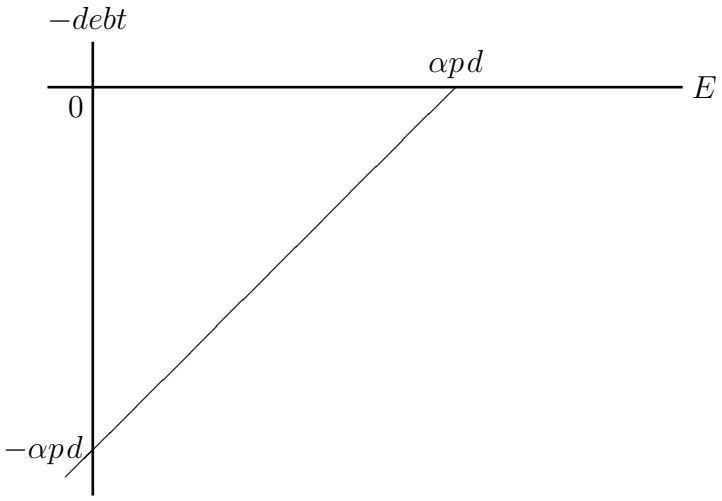

Figure 1: The feasible region for debt holdings when the utility function has the form $u(c_1, d_1, c_2, d_2) = \ln c_1 + \ln d_1 + \beta \ln c_2 + \beta \ln d_2$. Default is assured below the line.

will always default whenever he holds any debt. Since default is independent of income, bankruptcy can not insure consumers against low income draws.

Figure 1 shows the level of debt for which the consumer is just indifferent between default and repayment when the utility function takes the simple form $u(c_1, d_1, c_2, d_2) = \ln c_1 + \ln d_1 + \beta \ln c_2 + \beta \ln d_2$. It shows that more debt can be held, before defaulting, as the level of the exemption E increases. This suggests that the consumer's optimal strategy is to borrow an arbitrarily large amount and default in the second period. A rational lender can anticipate this, and will never lend more than $\alpha\, p\, d_1 - E$. Further, for any level of assets above the default level, repayment is certain regardless of income, and there is no interest rate premium.

Backward induction implies this would hold for any finitely lived consumer.

In this framework the ability to default has created a credit constraint, and there has been no reduction in uncertainty about second period income. 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. This limited enforceability unambiguously reduces welfare, in contrast to the case in which debts are fully enforceable.

Kocherlakota (1996) and Kehoe and Levine (1993) among others have considered models in which there are a large number of *ex ante* identical and infinitely lived consumers, and a single non-durable good. Default is punished by being denied access to credit. 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. However, these papers asked what is the highest level of lending that can be supported as a subgame perfect Nash equilibrium. This solution will obviously entail that default is punished by being permanently excluded from the credit market. The exact solution depends on the income process, which is assumed to be bounded and drawn from a stochastic Markov process. Since the income process is mean-reverting, default is most valuable when access to credit in the future has the least value, which is 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: here $var\left(\widehat{y}\right)$ exceeds $var\left(y\right)$. The bankruptcy rule, rather than compressing the distribution of period 2 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.

Table 1 shows what happens as the level of exemption increases. Suppose that income is exogenous,[7] and bankruptcy provided insurance. 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 $q\left(\cdot\right)$ 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

[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.

interest rate.

The implications of our example or of the model of Kehoe and Levine (1993) or Kocherlakota (1996) are different. Ruling out default means that 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	Insurance
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.

3 Personal Bankruptcy in the United States:

The United States contains some of the most generous bankruptcy regulations for default on debt in the world. The Federal Bankruptcy Act of 1978 specified individuals could choose to file for personal bankruptcy under either Chapter 7 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 are shown in table 2.[9] 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 be forced to surrender under Chapter 7. Many courts preferred the debtor to file under chapter 13, but enforced purely nominal repayment schedules. Around 70 percent of personal bankruptcy cases resulted in a filing for Chapter 7, with the remainder under Chapter 13.

[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]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: in practise this meant they would only be surrendered if the lender had lent the money specifically to purchase the assets. The exemptions also did not apply to debts arising from state and federal taxes, fines issued by the courts, alimony or child support. The act specifically disallowed the creation of liens that were not related to the purchase of the asset.

Where the value of the property was in excess of the exemption, the asset 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 re-invested in an exempt asset within a certain amount of time.

State Exemptions:

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.[10] 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 percent 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]

[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 sampled in the CEX

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. Jewelry	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. Jewelry	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. While not recorded, 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.

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.[12]

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 also allowed debtors substantial room for manouvre in fully exploiting all the exemptions available: in most cases they have allowed the debtor to re-arrange his portfolio of assets prior to default and substitute exempt assets for non-exempt assets (some limit is placed on the ability to re-arrange assets by 'abuse/fraud' provisions).

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

survey, these states have been excluded from the analysis below.

[12]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 causing fresh legislation to be re-enacted in the following year.

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	< 1991
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	< 1988
Massachusetts	no	West Virginia	1981
Michigan	no	Wisconsin	no
Minnesota	no		

Source: Westlaw (various) annotated state codes.

for each state. This paper has summed the exemption on the homestead to the exemption on other assets but it has excluded the exemption on 'tools of trade'. The 'tools of trade' exemption has been excluded since, for the most part, they do not give rise directly to consumption and thus directly enter the utility function. In any case, including the 'tools of trade' exemption does not substantially change any of the reported results. As already stated 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 dependents. 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.[13] In each case it is the overall household's exemption that has been calculated rather than the individuals in the household. This household exemption will depend on the marital status and age of the household head, on the number of dependents (both children and old people) and on whether the household head, or his spouse, is disabled. The exemption will also depend on the date at which the household is observed, since the exemptions evolve over time.

In calculating the level of exemptions a number of simplifications had to be made. The homestead exemption is that stated in the state legislation. In cases where the homestead exemption was unlimited, then a dummy was included in the regressions and the value of the continuous exemption was set at the value of the exemption on other items.[14] In cases

[13]In California, the household was assigned the larger of the two state exemptions.

[14]Note that in these cases there were acreage limits for the property which placed limits on how much

where no specific monetary limit was put on a particularly category of goods (for instance some states had an allowance for "all necessary wearing apparel") a value was assigned to the exemption of the good. This paper adopted the following values: 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.

The final issue is to consider what happens when either the state or the federal exemption changes, due to local or national legislation. Most states changed the level of exemptions at least once (if preferred to the federal exemption), and the federal exemptions also changed in this period. While most states only made one or two changes during the period, Minnesota changed the exemption a remarkable seven times. 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 (the year always is) then all observations for that year have been removed.[15]

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

could be claimed.

[15]In Ohio, since I have not been able to date the legislation, 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.

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.

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.*

As an example of how much the legislation can differ, it is instructive to compare the most, and one of the least generous jurisdictions. 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. In contrasts Texas, the most generous state, allows the home to be exempt from seizure, no matter what the value of the house, as well as allowing individuals to keep $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 level of exemptions that may be claimed as exempt in bankruptcy. It is precisely this heterogeneity that will be exploited in this paper. States also differ in rules concerning garnishment: court orders that take a proportion of wage income directly from employers to lenders. However, since bankruptcy overrides garnishment, filing for bankruptcy tends to be higher in states which allow garnishment, but may not reflect differences in default (less than a quarter of defaults result in a filing for bankruptcy). Usury limits also differ across states, but by 1988 these rules had mostly been repealed. Other possible differences are differences in stigma and in welfare rules. A clear assumption is that omitted state heterogeneity is orthogonal to the state bankruptcy exemptions.[16]

4 Data Description:

The data used is the Consumer Expenditure Survey in which 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.

[16] A further problem arises if debtors can move state to take advantage of the more generous exemptions within the new state. In practise the courts were reluctant to allow people who had recently moved to take advantage of the new rules, and indeed some states specified a qualifying period before movers were entitled to the new exemptions.

Data is available for the years 1980-1996. In this survey, income, debt, and saving data is recorded for the 2nd and 5th interview, while spending is additionally recorded in the 3rd and 4th interview together with a large number of household characteristics, including state of residence. However, for confidentiality reasons, information on state of residence has been suppressed for some states in some years (and some states have always been suppressed).[17]

From 1988 the survey has also included additional information on the household debts in the 2nd and 5th interview. This paper constructs the total unsecured debts held by the household, including 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. Excluded from the total are mortgage, and other secured debts. This contrasts with the approach taken by Gropp *et. al.* (1997). Hynes and Berkowitz (1998) argue that the impact of bankruptcy exemptions on secured and unsecured debt ought to be very different, and in their study they consider mortgage debt. While mortgage (and other secured) debt is also likely to be important for the household, the creditor has an additional claim to such assets in the event of bankruptcy and can always claim the house (or other security) if the debtor

[17]Furthermore, this paper excludes farming households, since these households are covered by separate bankruptcy legislation. Self-employed households have been excluded because the emphasis of this paper is on personal loans, and not business loans. Also excluded are large households with eight or more members, and households in which the respondent answers that they have received no education.

defaults. The housing, or other 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. All income, debt and exemption values have been deflated by the CEX price index so that they are in real terms. The households were also assigned to cohorts, based on the year-of-birth of the household head.

Table 5: Summary statistics for different exemption quartiles.

	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

Table 5 gives a brief summary of the data, and compares the different exemption quartiles of the state exemptions. It shows that the level of debt changes from quartile 1 (in which the lowest level of assets may be kept) to quartile 4. The average level of debt held is around $2,100 (the median is $385, while the 75th percentile is $2,250) but there is no strong 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 percent of people hold debt. However, looking at the interest rate suggests laxer rules imply 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 rather than the marginal interest rate, which is

what motivates 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 percent level) if a one-sided rank-order test is done. The rate of default, calculated from aggregate data as the ratio of the number of bankruptcy filings, divided by the number of households (rather than individuals) resident in the state, is much higher for the first quartile for which the highest exemptions, but otherwise there does not seem to be a clear pattern to the defaults. As might be expected, the pattern for defaults and the interest rate is similar, but does 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. By comparing the level of debt that individuals hold across states, the impact of the state exemptions can be assessed. Since debts are bounded at zero, a simple tobit model, in which the level of debt is regressed on a set of household characteristics, and the bankruptcy exemption to which the household is eligible, can be used. The key assumptions here are that household characteristics, and the size of the exemption are 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 6 the results of the tobit are displayed. They show that increasing the exemptions reduces the amount of debt that is held by households. The regressions 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 variables will partly account for preferences, and partly account for income. The regression includes age and cohort effects, which means that time is excluded (age, cohort and time are collinear). This implicitly assumes all changes over time in the population is due to individual cohorts aging, and new cohorts replacing old cohorts. If year effects are important, then this will show up in the age and cohort coefficients. However, the paper does not attempt to interpret these coefficients. The interest rate that is included is the municipal bond rate deflated by the inflation rate. The regression has 10,418 observations: the small number is due to the fact that only the second interview for those households with full state information are included. Furthermore, households who are very close to a *change* in their exemption level are also excluded (within three months if the month is known and in the same year if it is not). The reason for

excluding these households, is it is not clear whether one should use the existing exemption, or the exemption that may rationally anticipated shortly in the future.

When the level of the exemption is included, (and also dummy for unlimited homestead exemption,) we find that the coefficients are not significant level. A joint test of the level and including a dummy for the unlimited homestead exemption is also not significant. Although the negative coefficient 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 (which may partly reflect the greater chance they have of being turned down, see Hajivassiliou (2002) for instance). Better educated people also hold higher levels of debt as well.

Table 7 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. Thus it measures the effect of changes over time. When these dummies are included, the control variables do not change substantially. However, the effect on the exemption coefficient is substantial: the results are now highly significant, as shown by the F-test. This time increasing the level of the exemption from the 25th centile to the 75th centile entails a reduction in about \$1,500. This is large figure, but not implausible, recall table 5 showed the average level of debt is around \$2,100 dollars.[18] The true effect is likely to be under-

[18]The distribution of observed debt may have fatter tails than would be implied by the normality assumption used in the tobit regression, which may affect the results. A second problem is measurement error in the coefficients, which may again have affected the results.

estimated. The correct regression 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, if 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 from the table will under-estimate the true effect. It would have been nice to have included time dummies, to exploit purely the cross-sectional variance, but this is not possible since the regression already includes age and cohort effects. Clearly age, cohort, and time effects are not all separately identifiable.[19]

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

[19]Another possibility would be to first difference the data, and regress the change in the exemptions on the change in the level of debt. However, the exemptions change relatively rarely, and hence the results would be identified by a comparatively small number of observations. Furthermore, these changes take time to be legislated, and, at least over the period of two or three months, can be anticipated by lenders. This would cause the level of debt to already reflect the new exemptions immediately before the change (something that in the reported regressions motivated the exclusion of such observations).

component is high, then the effects would be a little more ambiguous. Suppose individual i's income, denoted y, follows the following process:

$$y_{it} = \theta x_{it} + v_i + \varepsilon_{it} \tag{10}$$

where x is a set of other explanatory factors (that evolve over the lifetime), v_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.

The effect of the exemptions on the interest rate that is charged is reported in tables 8 and 9. 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 9 neither the level of the exemptions nor the level of income enter significantly into the results. This is disappointing given table 5, 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 8 it can not explain the sign (measurement error in the left-hand side does not bias the point estimates). Table 9 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.[20]

Consumption:

So far these equations have been couched in terms of the level of debt that is held by the household. It is also interesting to think more directly about consumption. For instance, consider the standard Euler equation for consumption growth that has been estimated in the literature:[21]

$$\Delta \ln c_{it} = \gamma^{-1} (r - \delta) + \beta X_{it} + u_{it} \tag{11}$$

This framework implies an iso-elastic utility function with relative risk aversion parameter γ, δ is the discount rate, while X_{it} represents observed taste shifters, such as family size. According to the theory, nothing else should enter the regression. However, the literature

[20]Charles (2000) also reports results for a probit on whether any debt is held and on the probability of default, although only the first of these was significant.

[21]See, for instance, Deaton (1992)

has consistently rejected this: current and future income both seem to enter significantly.[22] Two of the most popular explanations for this can be interpreted as having implications for the error term u_{it}. Writing

$$u_{it} = \frac{\gamma}{2} var\left(c_{it}\right) + \phi ln\left(1 + \psi_{t-1}\right) + \varepsilon_{it}$$

then if the relative risk aversion parameter γ is non-zero, there is a precautionary motive to saving[23], and the variance of permanent income c_{it} will enter the equation. Alternatively, if some consumers are credit-constrained, the kuhn-tucker condition has an associated multiplier ψ, which will be positive when credit constraints are binding. The rejection of equation 11 can be thought of as an omitted variable problem, as is well known in the literature. However, bankruptcy constraints can account for part of this error term. Suppose the bankruptcy exemptions were included in equation 11 as an additional explanatory variable, then if the bankruptcy exemptions are providing insurance, this will reduce the variance of consumption, and thus the parameter on the bankruptcy rules will be negative. If instead bankruptcy rules created credit constraints, then the estimated coefficient in equation 11 should be positive.

[22]See for instance, Hall and Mishkin (1982), or Flavin (1981). Of course one explanation for the rejection of the Euler equation framework is the failure to properly take account of changing tastes over the life-cycle, see for instance, Attanasio and Weber (1992). Including taste-shifters X_{it} should alleviate this issue.

[23]More generally, there is a precautionary motive for saving if agents are risk-averse and prudent, in the sense of Zeldes (1989). Given the utility function here, the parameter that controls risk aversion also controls prudence.

A second and additional approach is due to Deaton and Paxson (1994) and will again help to test whether bankruptcy rules provide insurance. Consider a consumer who faces both temporary and permanent shocks to his (log-)income (here v_{it} denotes the permanent shock while ε_{it} denotes the temporary shock).

$$y_{it} = y_{it-1} + v_{it} + \varepsilon_{it} - \varepsilon_{it}$$

Suppose he can smooth some proportion $1-\phi_j$ of each shock. Then there will be the following relationship between (log-)income and (log-)consumption (assuming the interest rate equals the discount rate, log-utility, and ignoring preference shocks).

$$c_{it} = c_{it-1} + \phi_1 v_{it} + \phi_2 \varepsilon_{it}$$

Full insurance implies $\phi_1 = \phi_2 = 0$, while the permanent income hypothesis argues $\phi_1 = 1$, $\phi_2 = \frac{r}{1+r} \approx 0$ (that is, all temporary shocks are fully insured, but permanent shocks are uninsured). More generally, one may believe both types of shocks are partly insured. An implication of the model is that the cross-sectional variance of consumption should be growing over time, and that the variance of the change in consumption is related in a very simple way to the level of insurance.[24]

$$var\left(c_{it} - c_{it-1}\right) = \phi_1^2 var\left(v_{it}\right) + 2\phi_2^2 var\left(\varepsilon_{it}\right)$$

[24]One could equally use the change in the variance in consumption, although, anticipating table 12, the results, while similar, were not as clear cut.

If the variance of the income shocks is identical across all states, but bankruptcy rules generate insurance, then this should cause the variance of the change (or the change in the variance) in consumption to be negatively correlated with these bankruptcy rules: insurance means that the variance of the change in consumption is lower. In either case the sign of the effect can be identified, but the size of the coefficient will not be.

Results:

The regressions relating to equation 11 augmented by the state exemptions are on state-quarter averages, and are displayed in tables 10 and 11. The first shows that the level of exemptions seems to be of negligible importance when considering consumption growth. Including state specific effects increases the size of the estimated effect dramatically. Although the $F-$test continues to reject the significance of the results, the results are negative, and close to being significant: the point estimate suggests that the bankruptcy exemptions provide some insurance. These results seem to contrast the earlier results on debt holding, where increasing the level of exemptions reduced the level of debt. These results might suggest that bankruptcy is making it easier to smooth consumption over relatively short time intervals, but cause problems in smoothing consumption over lower frequency events. Recall that the earlier regressions investigated level effects while the regressions in this section investigate the effect of changes in the levels.

The results for the variance of the change in consumption are displayed in table 12.In

these regressions, the dependent variable was constructed as the difference in the variance of c_{it} (or the variance of the difference) where the variance was constructed for each state-year cell. At time t household heads were aged between 30 and 55 while in time $t+1$ household heads were aged between 31 and 56. The fact that the constant is both positive and significant in both panels rules out complete insurance. The coefficient on the level of the exemption is always significant. By contrast, the coefficient on the dummy for an unlimited housing exemption is not significant (even at the 10 percent level). The F-test, which jointly tests the exemption level and the unlimited homestead exemption is significant at the 10 percent level in the top panel, and at the 1 percent level in the bottom panel. These coefficients change little if year, or state and year dummies are included, although for the latter, the variance increases substantially. The results from this section suggest that exempting assets in bankruptcy does provide substantial insurance.

6 Conclusion:

The results show that as the level of the exemptions increases, households hold less debt. Including state specific dummies dramatically increases the estimated effect. 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, although a much more realistic model would fully interact the two effects. The argument for credit constraints seems to be an incomplete argument, not least because casual observation shows that a great many people default in the United States. The fact that default is observed 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.

In contrast to the regressions on the level of debt held, the consumption growth equations show evidence that the bankruptcy laws were providing insurance to consumers. One way to reconcile these results with the levels results is to argue that bankruptcy rules help consumers to smooth relatively high frequency income shocks, but at the cost of making it more difficult to smooth income over the lifecycle. The regressions of the variance of the growth of consumption seems to suggest that bankruptcy rules reduces variance of consumption, which supports the idea that the rules do providing insurance.

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.* (1997) 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 6: Results of a tobit regression on household debt (probability in parentheses).

parameter	(1)	(2)	(3)
age	1990.10	1947.56	1882.81
	(0.548)	(0.555)	(0.566)
age-squared	-208.41	-200.26	-220.73
	(0.776)	(0.784)	(0.761)
age-cubed	-2.05	-2.62	1.09
	(0.968)	(0.958)	(0.983)
completed high school	367.81	370.18	205.27
	(0.025)	(0.026)	(0.173)
some college	1014.52	1012.12	771.22
	(0.000)	(0.000)	(0.001)
college graduate	1302.04	1302.98	936.59
	(0.000)	(0.000)	(0.001)
Black	-171.54	-160.91	-64.40
	(0.457)	(0.489)	(0.789)
Asian	-480.67	-483.46	-354.46
	(0.020)	(0.023)	(0.063)
Native American	-468.75	-473.45	-450.52
	(0.061)	(0.059)	(0.071)
female household head	-482.36	-483.23	-391.28
	(0.008)	(0.008)	(0.031)
not married	-198.38	-195.24	-7.86
	(0.447)	(0.453)	(0.977)
family-size	205.62	203.91	157.15
	(0.137)	(0.143)	(0.249)
family-size squared	59.81	59.34	83.14
	(0.255)	(0.258)	(0.104)
interest rate	307.02	302.18	316.56
	(0.203)	(0.210)	(0.189)
exemption $\times$ 1000	-	-1.31	-1.58
		(0.739)	(0.695)
unlimited homestead exemption	-	-65.35	-115.24
		(0.746)	(0.585)
income $\times$ 1000	-	-	45.05
			(0.000)
F-test*	-	0.07	0.16
		(0.93)	(0.85)
no. of observations	10,418	10,418	10,418

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

Table 7: Results of a tobit regression on household debt, including state dummies (probability in parentheses).

parameter	(4)	(5)	(6)
age	1675.67	1831.95	1755.01
	(0.682)	(0.654)	(0.667)
age-squared	-141.50	-170.82	-188.57
	(0.877)	(0.851)	(0.836)
age-cubed	-6.42	-4.21	-0.89
	(0.921)	(0.948)	(0.989)
completed high school	385.49	375.21	223.41
	(0.036)	(0.041)	(0.230)
some college	981.67	965.02	746.13
	(0.000)	(0.000)	(0.000)
college graduate	1287.783	1269.22	935.79
	(0.000)	(0.000)	(0.000)
Black	-166.87	-167.94	-72.74
	(0.376)	(0.373)	(0.701)
Asian	-532.52	-518.78	-408.66
	(0.532)	(0.543)	(0.631)
Native American	-760.27	-765.27	-706.52
	(0.023)	(0.022)	(0.035)
female household head	-494.83	-479.83	-396.79
	(0.001)	(0.001)	(0.006)
not married	-189.88	-281.31	-88.79
	(0.291)	(0.124)	(0.634)
family-size	228.53	250.07	202.40
	(0.004)	(0.002)	(0.011)
family-size squared	56.74	47.66	70.95
	(0.349)	(0.432)	(0.243)
interest rate	232.12	260.24	263.49
	(0.474)	(0.423)	(0.417)
exemption $\times$ 1000	-	-26.39	-21.47
		(0.004)	(0.018)
unlimited homestead exemption	-	-5013.23	-4266.27
		(0.002)	(0.010)
income $\times$ 1000	-	-	42.18
			(0.000)
F-test*	-	4.75	3.33
		(0.008)	(0.035)
no. of observations	10,418	10,418	10,418

*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 8: 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 × 1000	-	-2.99e-04	-1.95e-04
		(0.331)	(0.330)
unlimited homestead exemption	-	-0.020	-0.021
		(0.157)	(0.123)
income × 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 9: 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 × 1000	-	-0.001	-0.001
		(0.271)	(0.231)
unlimited homestead exemption	-	-0.093	-0.103
		(0.418)	(0.370)
income × 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 10: Results of a linear regression of the growth rate of consumption (probability in parentheses).

parameter	(1)	(2)	(3)	(4)
age/10	0.013	0.017	0.018	-0.007
	(0.641)	(0.540)	(0.524)	(0.760)
age-squared/100	-0.031	-0.272	-0.023	-0.019
	(0.160)	(0.220)	(0.293)	(0.318)
age-cubed/1000	-0.008	-0.007	-0.003	-0.017
	(0.742)	(0.774)	(0.882)	(0.428)
completed high school	0.036	0.056	0.016	0.226
	(0.674)	(0.533)	(0.861)	(0.004)
some college	0.093	0.124	0.070	0.316
	(0.285)	(0.168)	(0.450)	(0.000)
college graduate	0.103	0.140	0.050	0.329
	(0.200)	(0.099)	(0.594)	(0.000)
Non-white	0.019	0.009	-0.004	0.067
	(0.578)	(0.301)	(0.906)	(0.048)
female head	-0.072	-0.071	-0.063	-0.084
	(0.244)	(0.249)	(0.306)	(0.114)
not married	-0.111	-0.109	-0.049	0.181
	(0.183)	(0.194)	(0.577)	(0.013)
family-size	0.597	0.683	0.066	0.025
	(0.135)	(0.093)	(0.102)	(0.476)
family-size squared	0.001	0.006	0.006	-0.018
	(0.949)	(0.839)	(0.825)	(0.464)
real interest rate	-0.006	-0.006	-0.006	-0.016
	(0.322)	(0.322)	(0.290)	(0.004)
exemption × 1000	-	-0.0002	-0.0002	-0.0001
		(0.213)	(0.158)	(0.388)
unlimited homestead exemption	-	-0.002	-0.008	-0.022
		(0.840)	(0.572)	(0.081)
income × 1000	-	-	-0.078	-
			(0.034)	
income growth × 1000	-	-	-	0.352
				(0.000)
F-test*	-	1.01	1.60	1.57
		(0.365)	(0.203)	(0.208)

*The regressions are on the state average in each quarter for the variables (and only includes those cells with at least 50 observations). The F-test is a joint test for the exemption and the dummy for unlimited homestead exemption. All regressions include a constant and seasonal dummies.

Table 11: Results of a linear regression of the growth rate of consumption when state effects are included (probability in parentheses).

parameter	(1)	(2)	(3)	(3)
age/10	0.013	0.017	0.016	0.007
	(0.641)	(0.578)	(0.602)	(0.765)
age-squared/100	-0.031	-0.031	-0.014	-0.029
	(0.160)	(0.202)	(0.556)	(0.136)
age-cubed/1000	-0.008	-0.011	-0.005	-0.018
	(0.742)	(0.685)	(0.842)	(0.416)
completed high school	0.036	0.057	0.041	0.040
	(0.674)	(0.532)	(0.724)	(0.673)
some college	0.093	0.071	0.018	-0.008
	(0.285)	(0.581)	(0.885)	(0.935)
college graduate	0.103	0.166	0.096	0.0.065
	(0.200)	(0.165)	(0.418)	(0.496)
Non-white	0.019	0.104	0.156	0.025
	(0.578)	(0.315)	(0.132)	(0.761)
female head	-0.072	-0.072	-0.030	-0.042
	(0.244)	(0.384)	(0.709)	(0.529)
not married	-0.111	-0.172	-0.049	0.291
	(0.183)	(0.098)	(0.363)	(0.001)
family-size	0.597	0.642	0.044	0.033
	(0.135)	(0.162)	(0.328)	(0.363)
family-size squared	0.001	0.004	0.001	0.008
	(0.949)	(0.894)	(0.966)	(0.754)
real interest rate	-0.006	-0.007	-0.007	-0.018
	(0.322)	(0.264)	(0.239)	(0.001)
exemption $\times$ 1000	-	-0.002	-0.002	-0.002
		(0.056)	(0.070)	(0.025)
unlimited homestead exemption	-	-0.337	-0.315	-0.334
		(0.086)	(0.104)	(0.033)
income $\times$ 1000	-	-	-0.173	-
			(0.000)	
income growth $\times$ 1000	-	-	-	0.494
				(0.000)
F-test*	-	2.07	1.84	2.57
		(0.127)	(0.157)	(0.077)

*The regressions are on the state average in each quarter for the variables (and only includes those cells with at least 50 observations). The F-test is a joint test for the exemption and the dummy for unlimited homestead exemption. All regressions include a constant and seasonal dummies.

Table 12: Regressing the variance against the bankruptcy exemptions.

		coeff.	s.d.(robust)	prob.
$\Delta s.d.\,(c_{it})$				
	exemption ($\times$ 1000)	-3.285	1.415	0.022
	unlimited housing exemption	0.005	0.006	0.397
	constant	0.022	0.010	0.031
F-test		2.82		0.063
$s.d.\,(\Delta c_{it})$				
	exemption ($\times$ 1000)	-28.78	10.09	0.009
	unlimited housing exemption	-0.043	0.028	0.130
	constant	0.688	0.076	0.000
F-test		5.54		0.004

The minimum cell size was 75. The F-test is a joint test for the exemption and the dummy for unlimited homestead exemption.