

EUROPEAN UNIVERSITY INSTITUTE
DEPARTMENT OF ECONOMICS

EUI Working Paper ECO No. 2003/19

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US Consumer Bankruptcy Exemptions**

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Published in Italy in October 2003
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Italy

EVIDENCE ON THE EFFECT OF US CONSUMER BANKRUPTCY EXEMPTIONS¹

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Key Words: Consumption, Bankruptcy Law, Debt, Insurance,
JEL codes: D14, G33, K19

August 2003

¹I would like to thank Gabriella Berloff, Nick Bloom, Vassilis Hajivassiliou, Mario Padula, Luigi Pistaferri, Ian Preston, Nick Souleles, and many other seminar participants for their comments have improved this work. Any remaining errors remain my own. e-mail for correspondence: charles.grant@iue.it

Abstract

Bankruptcy (defaulting on one's debts) acts as insurance if it allows default in cases of negative income shocks. However, if debts are not fully recoverable, lenders may instead react by limiting the amount that they allow households to borrow. This upper borrowing limit will increase as the punishment for defaulting increases. The US provides a natural test for these effects since rules about which assets may be kept by the debtor (the exemptions) when filing for bankruptcy differ dramatically across the different states. While increasing the level of these exemptions causes less debt to be held by consumers, empirical results also show that consumption becomes much smoother, suggesting that these bankruptcy exemptions help households insure themselves against adverse shocks.

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 and over the whole lifecycle. 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]. Bankruptcy legislation can interact with these mechanisms: the fact that the enforcement of debt contracts is incomplete can generate credit-constraints, but it can also provide insurance if agents do not have access to alternative risk-sharing arrangements. This motivation for bankruptcy rules has been particularly emphasized among lawyers, see Jackson [1986]. When risk-averse agents face uncertainty about the future, any mean preserving action that reduces uncertainty will be welfare improving. Bankruptcy legislation can reduce uncertainty if the consumer can default on his debt when his income is low. If this is not true then very different effects can occur.

In the early literature on credit constraints, such as Stiglitz and Weiss [1981], credit constraints arise as agent's types are imperfectly observed, and different types have different propensities to default; but the default decision is not modeled. More recently, a theoretical literature on credit constraints has attempted to explain the fact that consumers can not fully insure all their idiosyncratic risk. Several 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: default entails a punishment for the household such as losing a

portion of its current assets; being denied credit for some period after default; losing (or having garnished) some of its future income; and/or being socially stigmatized. Borrowers have an incentive to default if the cost of the punishment is lower than the cost of repaying their debts. Thus lenders rationally limit how much credit they extend and households are credit constrained. Because nobody defaults in equilibrium in these models, an implication is that increasing the punishment for default is welfare improving. This will not necessarily be true if some agents default.

Section 2 shows the substantial differences in the punishment for default across US states as different states allow differing levels of assets to be kept by the debtor when he defaults. Borrowers are assumed to be otherwise identical, and lenders face no constraints as to which state they operate in. The theory is tested by comparing the level of debt held by households in the different US states, and by examining consumption smoothing. The level of debt should be systematically related to the level of assets that may be kept in bankruptcy. This part 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, so that state specific effects can be controlled for. A second difference is that this paper restricts attention to unsecured debt: the debt for which the bankruptcy exemptions is applicable. The paper also reports results for consumption growth, and for the change in the variance of consumption, which is a direct test for the

extra insurance induced by the bankruptcy rules. That consumption is smoother as more assets can be retained in bankruptcy will be a major result of the paper. This suggests that even if the average level of borrowing is lower (something that might reduce welfare), there is a welfare gain from smoothing. One interpretation is that agents are less able to smooth temporary shocks (through borrowing against their future income) but find it easier to smooth their permanent shocks although no attempt is made to quantify this tradeoff.

The paper is organized so that section 1 expounds the theory stated above. In section 2 a brief account of the rules in personal bankruptcy as they pertain to the United States is given. Section 3 contains a description of the data. In section 4 there is a description the regression results, and the paper concludes in section 5.

1 Motivation

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. These ideas are illustrated in the following discussion.

Consider a consumer who lives for two periods and maximises utility over a durable good 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 . Period 1 income y_1 is observed but second period income is uncertain and drawn from some distribution $y_2 \in \Gamma$ (where the moments of y_2 are bounded, and the utility function is continuously differentiable, strictly increasing, and strictly concave in all its arguments). Uncertainty about future income causes the consumer to reduce consumption in period 1. First period consumption is increasing in y_1 , and in the expected value of y_2 , but falling in the variance of y_2 .¹ The first period consumption bundle (c_1, d_1) defines the level of debt B_2 at the beginning of period 2:

$$(1) \quad B_2 = (1 + r)(c_1 + p d_1 - y_1)$$

where r is the interest rate. 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 bank's zero profit condition is:

$$(2) \quad \int_{\text{default}} q(y_2, B_2) dy_2 + \int_{\text{no-default}} \frac{1+r}{1+r^f} B_2 dy_2 = B_2$$

Here r^f is the risk free rate and $q(\cdot)$ is the 'punishment' for default: the amount that the

¹Consumption of both the durable and the non-durable good in the first period will also depend on the punishment for default. Moreover, the limited enforcement of debt in the second period will place restrictions on the set of debt contracts that banks will offer.

bank can make the consumer pay in bankruptcy.² 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 the same as an insurance premium. If at least some debt will be held, so that $B_2 > 0$, then second period wealth, allowing for default, can be defined as:

$$(3) \quad W_2 = \begin{cases} y_2 + p \alpha d_1 - q & \text{default} \\ y_2 + p \alpha d_1 - \frac{1+r}{1+r^f} B_2 & \text{no default} \end{cases}$$

Define \hat{y}_2 in the following way:

$$(4) \quad \hat{y}_2 = \begin{cases} y_2 + p \alpha d_1 - q + B_2 & \text{default} \\ y_2 + p \alpha d_1 - \frac{r-r^f}{1+r^f} B_2 & \text{no default} \end{cases}$$

Clearly $q(\cdot) \in [0, y_2 + p \alpha d_1]$, while it is optimal for the consumer to default if and only if $q < B_2$. In this case the consumer would be indifferent between receiving y_2 with default allowed, or receiving \hat{y}_2 with default not allowed. When default occurs $\hat{y}_2 > y_2$, while $\hat{y}_2 < y_2$ when the consumer does not default. If default happens when income is low then $\text{var}(\hat{y}_2) < \text{var}(y_2)$ thus allowing default is equivalent to y_2 being drawn from a more compressed distribution.³

This increases both period 1 consumption and the level of debt. In period two, consumption is higher when default occurs, and lower when it does not. Hence there are two immediate implications for consumption growth. Consumption is higher in the first period so average consumption growth will be lower, while since the variance of consumption is lower in the

²This implicitly imposes that the bank is risk neutral. For simplicity there is no deadweight loss so the bank receives what the consumer pays.

³The banks no-profit condition ensures that $E(\hat{y}_2) = E(y_2)$. Implicit in this statement is that income is exogenous, and that there are no moral hazard issues.

second period, the variance of consumption growth is also lower. Overall, allowing default is unambiguously welfare improving since expected lifetime utility has increased. Moreover, applying Leibniz's rule to the bank's zero profit condition shows that allowing default will raise the interest rate above the risk-free rate.

Allowing default provides insurance since in low income states the consumer does not repay his debts. Instead the bank bears the risk of low income realisations. Crucial to this argument is that default occurs when income is low as for insurance, default must be negatively correlated with income. If this is not true then any bankruptcy rule will not provide insurance. It is essentially trivial to devise a rule where the agent gets insurance (e.g. suppose default was punished by the agent losing his second period income, but he could keep his durable good from the first period, and his debts are forgiven). It is also simple to devise a rule where this is untrue. One example would be if default was punished by having the durable good, in excess of some exempt level E , seized by the bank, e.g.

$$(5) \quad q = \min [B_2, \max(\alpha p d_1 - E, 0)]$$

In which case the consumer will default if $B_2 > \alpha p d_1 - E$. That is, the consumer will default whenever second period debt exceeds the level of assets that can be seized, and the debt 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 will always default whenever he holds any debt. Since default is independent

of income, bankruptcy can not insure consumers against low income draws. Clearly as the exemption increases, default becomes more attractive.

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 so much that $\alpha p d_1 - E$. Further, for any level of assets below the default level, repayment is certain regardless of income, and there is no interest rate premium. Even if there is no uncertainty about second period income in the example above, the consumer will still be denied credit despite the fact that second period income will cover his debt; the exemption will have created a credit constraint. Since period 1 consumption is lower, consumption growth will be higher compared to a model in which debts are fully enforced, and there will be no effect on the variability of consumption growth. Thus the limited enforceability of debts has, in this case, unambiguously reduced welfare, in contrast to the case in which debts are fully enforceable. The implications of this example that the punishment for default is optimally very high (indeed arbitrarily large).

Table I summarises the main implications of this section. It shows what we would expect to observe if limited bankruptcy caused either credit constraints, or allowed households to smooth idiosyncratic income risk. It highlights the possible effects on borrowing, the level

of default, the interest rate, consumption growth and what level of punishment might be optimal. In section 4 these ideas are tested, and allows us to draw inference from the empirical results. The analysis will particularly concentrate on the level of debt held, and on consumption growth. There will also be some brief results on the interest rate, but neither defaults nor welfare are tested.

2 Personal Bankruptcy in the United States:

The United States contains some of the most generous bankruptcy regulations for default on consumer 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.⁴ The aim of the act was to allow those genuinely unable to repay their debts the chance to have a fresh start. Under chapter 7 of 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 II.⁵ Under Chapter 13, the debtor agreed a repayment

⁴In 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.

⁵Case law has created an obligation for these exemptions to be ‘liberally construed’ by the courts. These

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.

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.

2.1 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.⁶ It also allowed each state to refuse to allow the federal exemptions. 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 exempt assets would only be surrendered if a valid lien had been created for them. 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 although this does not imply that re-mortgaging was not allowed.

⁶The source for all the legislation, and legal comments, is derived from the Annotated State Codes published by Westlaw.

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 two dimensions; differences across the different states at a point in time, and changes over time.

Table III shows which states have opted out of the federally set bankruptcy exemptions. 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.⁷ Roughly 18 percent of people are better off claiming the federal exemption rather than the state exemption.

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 manoeuvre in fully exploiting all the exemptions available: in most cases they have allowed the debtor to re-

⁷In 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.

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 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. Including the ‘tools of trade’ exemption does not substantially change the reported results. The calculated exemption value differs not only between states and across time, but also differs 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.⁸

In calculating the level of exemptions a number of simplifications had to be made. In cases where the homestead exemption was unlimited, 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.⁹ In cases where no specific monetary limit was put on a category of goods (for instance some

⁸In California, the household was assigned the larger of the two state exemptions.

⁹Note that in cases where the value of the homestead had no upper limit, legislation typically placed an acreage limits on the size of the property which could be claimed.

states allowed "all necessary wearing apparel") a value was assigned to the exemption of the good.¹⁰ 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.¹¹

Table IV 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

¹⁰Gropp, Scholz and White [1997] did not do this. Implicitly they assigned a zero value when the law specified no particular amount, which seems unreasonable. The values chosen in this paper very roughly correspond to the average values across the states that did set a maximum value.

¹¹In Ohio, since I have not been able to date the legislation, only observations from 1991 are included, as there has been no change in the level of the exemption after this date.

(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 to compare the most, and one of the least generous jurisdictions. In Maryland a bankrupt has a 'tools of trade' exemption of up to \$2,500 which excludes any car used to get to work (before July 1989 there had been no limit specified for 'tools of trade'). The state exemption also allowed up to \$5,500 of other assets to be kept. This last amount had actually been decreased from \$7,500 in July 1983. Furthermore, Maryland did not allow households to apply the federal exemptions. In contrast, Texas, the most generous state, allows the home to be exempt from seizure no matter what the value of the house (but subject to an acreage limit), as well as allowing individuals to keep \$15,000 of other assets (which could include two cars) and other types of households to keep \$30,000. In May 1991, these limits were doubled.

Both table IV and the comparison between Texas and Maryland 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 gar-

nishment, 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, and can be controlled for by including fixed state effects.¹²

3 Data Description:

The data used is the Consumer Expenditure Survey for the years 1980-1999. Households are interviewed five times at 3-month intervals. The survey is constructed as a rotating panel in which, each quarter, one fifth of the households leave the survey and are replaced. Income and saving, as well as a large number of household characteristics, including state of residence, are recorded for the 2nd and 5th interview, while spending is additionally recorded in the 3rd and 4th interview.¹³

¹²A further problem arises if debtors can move state to take advantage of more generous exemptions within a 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 their exemptions.

¹³However, for confidentiality reasons, information on state of residence is sometimes suppressed in the publicly available data, and these households are excluded from the analysis. Farming households are excluded, 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

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, hence the debts analysed differ from those in Gropp *et. al.* [1997]. Hynes and Berkowitz [1998], when they consider mortgage debt, argue that the impact of bankruptcy exemptions on secured and unsecured debt ought to be very different. While mortgage (and other secured) debt is also likely to be important for the household, the creditor has an additional claim to such assets and can always recover the house (or other security) if the debtor 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. Income, debt and exemption values have been deflated by a consumer price index and are in real terms. The median level of debt in the survey is \$2,151 (the median is \$331, while the 75th percentile is \$2,211) while around 60 percent of people hold at least some unsecured debt.

excluded are large households with eight or more members, and households in which the respondent answers that they have received no education. Cohorts are defined by their year of birth.

4 Regression Results:

According to theory, 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.

4.1 The effect on the level of debt:

The results of the Tobit regression are displayed table V. All the regressions include a set of controls which account both for preferences and for permanent income. The regression includes age and cohort effects, but exclude time effects (age, cohort and time are collinear). This implicitly assumes all changes over time in the population is due to cohorts growing older, and new cohorts replacing old cohorts. If year effects are important, then this will show up in the age and cohort coefficients. Only one observation per household is included in the regression, and moreover 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): if changes in the exemption level are anticipated, then the current borrowing and lending behaviour will be influenced by the new exemption level before it is implemented.

Column (1) only includes the control variables, and shows that the education dummies, race, sex, and marital status are all significant: being poorly educated, black, having a female head of household, or being unmarried all reduce the level of debt held. This may partly reflect the greater chance of these households being turned down for credit, see Hajivassiliou and Ioannides [2002] for instance. The interest rate (constructed as the municipal bond rate minus the inflation rate) is also significant at the 10 percent level. In column (2), income, income-squared, and a dummy for whether the household own their own house (including those with an outstanding mortgage) are included. All three coefficients are highly significant: income has a quadratic shape, while being a homeowner increases the level of debt. It would be interesting to investigate other wealth variables, but unfortunately the CEX survey does not report very detailed information on wealth. Nevertheless, this is consistent with Gropp *et. al.* [1997] who report that wealth increases the level of debt.

Column (3) assesses the effect of the exemptions: it includes both the exemption level, and a dummy for unlimited homestead exemption. The exemption is positive, but not significant, while the unlimited homestead exemption significantly increases the amount of debt held. These results are surprising, and seem to contradict the idea that the exemption creating credit constraints. However, when state dummies are included, as in column (4), the effect is now both negative and highly significant. Indeed, a joint test for both the

exemption level and the unlimited homestead exemption both being negative is significant at the 1 percent level. Moreover, the estimated effect of the control variables changes very little. In column (5), income, debt and the exemption are all in logs. Both the exemption level and the dummy for the homestead being fully exempt remain negative, but this time only the exemption level is significant.

For column (4), increasing the level of the exemption from the 25th centile to the 75th centile entails a reduction in the amount of debt held of about \$910. This is large, but not implausible; recall that the average level of debt is around \$2,150 dollars. The true effect is likely to be under-estimated as in the presence of credit constraints debt will be truncated at zero and at the point where the credit constraints bite. However, this second point is not observed, and it is not even sure if any given consumer is constrained. The level of debt that the consumer will hold will only change as the exemption level increases if the consumer is credit constrained for the higher exemption level and he is able to borrow more money at the lower level (where the punishment for default is bigger). For households that are constrained at neither level, there will be no change their level of debt.¹⁴

¹⁴Another possibility would be to regress the change in the exemptions on the change in the level of debt. However, the exemptions change relatively rarely, and 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).

Columns (6) and (7) distinguish between households by whether they own their house. The results in column (6) suggests that the effect on homeowners is very different from the effect on renters. The effect of the exemption level on renters is highly negative, and larger than the effect when renters and homeowners were pooled together in column (4). The coefficient on the exemption level when interacted with being a homeowner is positive (the overall effect on this group is the sum of the exemption effect and the exemption effect interacted with being a homeowner). That is, while the overall effect remains negative, the effect is significantly smaller than for renters. The effect of the unlimited homestead exemption dummy is also negative and highly significant. Again, homeowners have a much smaller reduction in the amount lent to them than renters (the effect is positive when interacted with home-ownership), but the overall effect (the sum of the two coefficients) remains negative and significant.

So far the regressions assume that households can re-arrange their assets prior to default. In column (7), it is assumed that only households that own their own home can claim the homestead exemption, but that all other exemptions can be claimed by all households. This second assumption is imposed since households do not report their assets in sufficient detail to more accurately assign an allowance. However, it is not unreasonable since transaction costs are much lower for other assets, and households can much more easily re-arrange their other assets, than for housing, prior to default. The effect of the exemption level is larger than that estimated in column (6), and moreover, while homeowners are significantly different

from renters, they do not appear to be negatively affected by the exemption level (overall effect for this group is positive). The homestead dummy has a weakly positive effect on the debt that homeowners hold, but this effect is not significant at the 5 percent level.

4.2 The effect on the reported interest rate:

One curious fact is that the rate of default (calculated from aggregate data as the ratio of the number of bankruptcy filings, divided by the number of households resident in the state) decreases with the level of the exemptions. This suggests a similar pattern should be observed for the interest rate, and is something that can be tested: the effect of the exemptions is reported in table VI. The interest rate is the ratio of self reported charges to the principal, and is calculated from the fifth interview (the only interview in which charges are reported). Except in column (2), the regression is limited to those households with at least \$1,000 of debt outstanding who report paying at least some charges; the mean reported rate is 15.47 percent. However there was considerable variability in the rates reported, and moreover, charges will include more than just the interest rate. A further issue is in selecting only those households holding debts and paying interest; this is likely to downward bias the estimated coefficients. While these caveats suggest a cautious attitude to the results, they are still of interest.

Column (1) reports results for the controls only, and the shows that only age has a significant affect on the reported interest rate. In column (2), all the households who have

debts are included in the regression, and the effect of the exemptions, while negative, are not significant. Restricting the sample to those households paying interest, and who have outstanding debts of at least \$1,000 is more interesting: column (3) shows that the exemption is now both negative and significant at the 1 percent level. The dummy for unlimited homestead exemption is also significant at the 5 percent level. Including state effects in the regression, column (4), causes the size of the coefficient to become much larger, but the large increase in the standard errors mean that the estimated coefficients are marginally not significant at the 10 percent level. Column (5) allows for differences in between homeowners and renters. The exemption reduces the interest rate for renters by less than for homeowners, but the difference is not significant. The homestead fully exempt dummy continues to be significant for renters, but only at the 10 percent level. In column (6), only homeowners were allowed to claim the homestead exemption, and this time, none of the results are significant at the 10 percent level.

4.3 The effect on consumption smoothing:

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 smoothing, by considering the standard Euler equation for consumption growth (where c_{it} is log consumption for individual i at time t), based on the iso-elastic utility function with relative risk

aversion parameter γ , and discount rate δ .

$$(6) \quad \Delta c_{it} = \gamma^{-1} (r - \delta) + \Delta y_{it} + \beta X_{it} + u_{it}$$

Here y represents log-income, X_{it} observed taste shifters, such as family size and u_{it} is an error term. In the standard approach, only unexpected changes in income should enter equation 6. However, the literature has consistently rejected this: current and future income both seem to enter significantly.¹⁵ More recently, Mace [1991] argued that with full insurance, even predictable changes in the idiosyncratic component of income should not enter the consumption decision, and again rejected this implication of the theory. Two of the most popular explanations for these failures can be interpreted as having implications for the error term u_{it} . Decomposing the error term as:

$$(7) \quad u_{it} = \frac{\gamma}{2} \text{var}(c_{it}) + \phi \ln(1 + \psi_{t-1}) + \varepsilon_{it}$$

then if the relative risk aversion parameter γ is non-zero, there is a precautionary motive to saving, and the variance of consumption 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 and the parameter ϕ will enter the equation. Here ε_{it} is a residual. The rejection of equation 6 can be thought of as an omitted variable problem, as is well known in the literature, and bankruptcy constraints can

¹⁵See for instance, Hall and Mishkin [1982], or Flavin [1981]. Note that taste-shifters are included in the estimating equation, see Attanasio and Weber [1992] for an explanation.

account for part of this error term. Suppose the bankruptcy exemptions were included as an additional explanatory variable; 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 6 should be positive.

A second and additional approach is due to Deaton and Paxson [1994] and can be used to test whether bankruptcy rules provide insurance. As with Mace [1991], they noted that full insurance implies that households will not react to the idiosyncratic component of changes in their income. An implication of this (ignoring taste shifters) is that each household's consumption will grow at the same rate and thus the cross sectional variance of consumption for any fixed membership group will not change over time. They rejected this implication as the variance of consumption of US cohorts is increasing over time. Nevertheless, a useful corollary of their theory is that anything that helps households insure at least part of their income risk will reduce the growth rate of the cross-sectional variance of consumption.

4.4 Results for consumption smoothing:

The regressions relating to equation 6 augmented by the state exemptions are on the state averages in each half year, and the results are displayed in table VII. Averages were constructed for the 18 largest US states, and for households whose head was born between 1924 and 1955. Moreover, the data now refers to 1980-1999 since consumption is available

back to this earlier date. Column (1) shows the simplest regression, in which the equation is estimated by OLS. It shows that education and income enter significantly into the equation for consumption growth. More interestingly, the exemption level and the dummy for an unlimited homestead exemption both enter negatively in the regression, the first is significant at the 5 percent level while the second is significant at the 10 percent level. This strongly supports the idea that the bankruptcy exemptions are helping agents smooth their income, and is providing insurance against unexpected adverse shocks. In column (2) the bankruptcy exemptions are instrumented by their first and second lag, producing almost exactly the same results.

The first two regressions are similar to the Mace (1991) framework, but the more traditional approach in which current income growth is instrumented by itself lagged twice and lagged three times is estimated in column (3). Estimation uses 3-stage Hayashi-Sims, which for problems with a large number of time periods is asymptotically more efficient than conventional GMM, see Hayashi and Sims [1983]. In this regression, income is marginally not significant, but enters negatively. The exemptions also enter negatively, and both variables are significant at the 10 percent level. The table also reports the Sargan statistic, as is traditional for the excess sensitivity test, and shows that the regression passes this test.

Columns (4)-(6) repeat the regressions of columns (1)-(3), but this time the housing exemption is only given to those households that own their own house. The results are similar to those in columns (1)-(3). In the OLS regression, the exemptions have a negative effect but

the results are not significant. When the bankruptcy exemptions are instrumented by their first and second lag, the result for the exemption level, and the homestead dummy are now significant at the 5 percent level. Finally, in column (6), the exemptions are again negative, but not significant. However, income is significant, and as before, the regression passes the Sargan test on the over-identifying instruments. Overall, the effect of the bankruptcy exemptions is consistently estimated as having a negative coefficient, and in some regressions this is significant.

The results for the variance of consumption are displayed in table VIII. The selection criteria is the same as for consumption growth, except that now, since the variance is taken over all households in their fifth interview, less the variance in their second interview, the cells are now defined by year and state, and all regressions include state specific effects. Column (2) reports the OLS regression where both the exemption level and the dummy for an unlimited homestead exemption are significant at the 10 percent level. Moreover, family size enters significantly into the regression. Column (3) reports results for the IV regression (where the exemption is instrumented by its first and second lag). Now the results are much more highly significant, the exemption level has a p-value of 1.5 percent while the homestead dummy is significant at the 1 percent level. Columns (4)-(6) repeat the analysis but under the assumption that only homeowners can claim the homestead exemption. The estimated effect is smaller. The OLS result in column (5) significant at the 10 percent level, while for the IV regression in column (6), only the exemption level is significant, and only at the 10

percent level. Overall, this subsection offers strong evidence that the exemptions are helping agents smooth consumption, especially in those regressions in which it is assumed that all households can claim the homestead exemptions.

5 Conclusion:

The results from the Tobit regression showed that increasing the exemption level (reducing the punishment for default) reduced the average level of debt held. Moreover, the effect was large (over \$900 reduction in debt held when moving from the 25th to the 75th percentile of the exemptions). This is consistent with the argument that the exemption level induces credit constraints as lenders react by reducing the amount of credit they extend. If the exemptions reduced uncertainty, the opposite effect would be expected: agents would react to the reduced uncertainty by increasing current consumption since there is a lower precautionary saving motive. Unlike previous studies, the regressions reported here allow for state fixed effects, and thus other fixed differences across states are controlled for, as the data covered several years. Allowing for fixed effects actually made the results much stronger. When house-owners are compared to renters, the reduction in observed borrowing is larger for renters than for homeowners. This effect remains even when it is assumed that only homeowners can receive the homestead exemption.

The regressions for consumption growth and for the growth in the variance of consump-

tion, in contrast, showed strong support for the suggestion that the bankruptcy exemptions provide insurance. The results showed that consumption growth was lower in states with higher exemptions, suggesting the reduction in uncertainty was helping agents smooth consumption. The reduction in the growth rate of the variance of consumption showed that the cross-sectional variance of consumption was lower in states with larger exemptions, and thus that those states were better able to transfer resources from high income to low income households. A puzzle with the results was the effect on the reported interest rates, although these households were highly selected: those reporting that they have high borrowings, and are paying charges on their debt, are unlikely to be uncorrelated with the exemption levels, and hence inference should be cautious. A second issue is that the charges refer to the total charges, and not to the marginal cost of an extra dollar of debt. Moreover, these charges are unlikely to be very accurately measured.

Overall, the results suggest that despite the fact that borrowing is lower in high exemption states, the bankruptcy exemptions are helping agents smooth consumption; the purported aim of the policy. One way to reconcile the consumption smoothing and the borrowing results is to note, as discussed by Deaton [1991], that agents can smooth temporary shocks through saving and borrowing relatively easily, but they can not self insure in this way against permanent shocks. Bankruptcy is designed to help agents with precisely these adverse permanent shocks (typically default happens after such things as divorce, losing work, or bad health). If permanent income shocks are becoming relatively more important than temporary

shocks, and agents do not have access to other risk-sharing mechanisms, then it may well be optimal to have large exemptions, and for these exemptions to have shown the large increases they have over the last 50 years.

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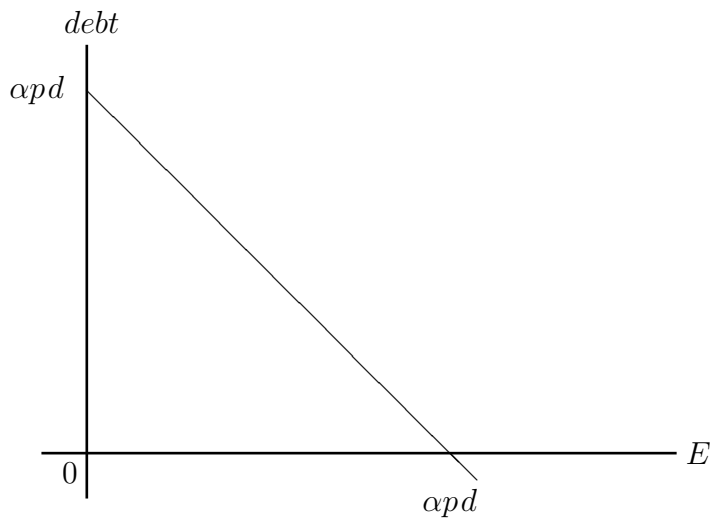


Figure 1: The feasible region for debt holdings when the utility function has the form $u(c_1, d_1, c_2, d_2) = \ln c_1 + \ln d_1 + \beta \ln c_2 + \beta \ln d_2$ where $\beta \in (0, 1)$ is the discount rate. Default is assured above the line.

Table I: Expected Effect Of Increasing The Punishment For Default.

	Credit Constraints	Insurance
Borrowing	increases	falls
Defaults	no default	positive
Interest rate	no change	uncertain
Consumption Growth	increases	falls and becomes less variable
Optimal Punishment	very high	very low

Table II: Federal Exemptions For Chapter 7 Bankruptcy.

Description	Amount \$	Comments
<i>Current exemptions:</i>		
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.
<i>Prior to 1994:</i>		
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	
<i>Prior to 1984:</i>		
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.

Table III: Whether, And In Which Year, Each State Disallowed The Federal Exemptions.

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. Ohio passed its legislation before 1991 while Washington passed its legislation before 1988.

Table IV: The Level Of Exemptions Under Chapter 7 Bankruptcy.

Year	mean	Centile		
		25%	50%	75%
homestead*:				
1988	22,576	7,500	15,000	30,000
1993	31,262	7,500	15,000	40,000
1999	42,588	10,000	30,000	75,000
other assets				
1988	9,521	5,400	7,400	12,700
1993	11,424	5,400	7,400	12,700
1999	15,873	6,500	12,200	19,400
'tools of trade':				
1988	2,225	0	750	3,000
1993	2,438	0	750	3,000
1999	3,128	0	2,000	5,000

*In calculating the mean for the homestead exemptions, the unlimited homestead exemptions have been omitted. Values are in current dollars.

Table V: The Effect Of Bankruptcy Exemptions On Unsecured Debt.

parameter	(1)	(2)	(3)	(4)	(5)	(6)	(7)
age / 10	-1,978 (3,184)	-3,137 (3,185)	-3,110 (3,185)	-2,872 (3,183)	-3.12 (1.75)	-2,174 (3,180)	-2,017 (3,174)
age-squared / 100	810 (739)	827 (740)	818 (740)	772 (739)	0.62 (0.40)	644 (739)	594 (737)
age-cubed / 1000	-93 (55)	-81 (55)	-80 (55)	-76 (55)	-0.05 (0.03)	-69 (55)	-65 (54)
family-size	37 (200)	-168 (201)	-170 (201)	-140 (201)	-0.19 (0.11)	-102 (201)	-104 (201)
family-size squared	-833 (713)	-530 (712)	-538 (713)	-601 (714)	-0.21 (0.39)	-619 (713)	-729 (712)
full high school	2,231 (200)	1,702 (202)	1,714 (202)	1,691 (203)	1.38 (0.11)	1,736 (201)	1,736 (202)
some college	3,748 (205)	2,973 (210)	2,977 (210)	2,892 (211)	2.06 (0.11)	2,938 (210)	2,956 (210)
college graduate	3,766 (205)	2,522 (218)	2,529 (218)	2,462 (219)	1.19 (0.12)	2,516 (219)	2,530 (219)
non-white	-1,399 (167)	-1,030 (168)	-1,014 (168)	-1,102 (174)	-0.89 (0.09)	-1,204 (173)	-1,187 (173)
female head	-589 (147)	-390 (147)	-389 (147)	-354 (148)	-0.16 (0.08)	-376 (148)	-380 (147)
unmarried	-1,191 (166)	-414 (171)	-408 (171)	-521 (176)	-0.20 (0.10)	-610 (175)	-519 (172)
interest rate	14.75 (8.64)	14.28 (8.62)	14.04 (8.63)	15.75 (8.62)	2.36 (4.78)	16.44 (8.62)	15.33 (8.61)
income	-	63.28 (5.22)	63.58 (5.22)	62.73 (5.27)	2.11 (0.37)	66.40 (5.22)	67.57 (5.19)
income - squared	-	-0.26 (0.03)	-0.26 (0.03)	-0.26 (0.03)	-0.50 (0.01)	-0.27 (0.03)	-0.27 (0.03)
homeowner	-	1,503 (149)	1,510 (149)	1,489 (151)	1.26 (0.83)	-	-
exemption	-	-	1.47 (2.39)	-29.93 (9.43)	-0.34 (0.16)	-42.23 (9.61)	-47.77 (15.96)
× homeowner	-	-	-	-	-	23.84 (8.34)	58.62 (13.27)
homestead fully exempt	-	-	226 (0.160)	-4,464 (1,568)	-1.06 (0.63)	-4,660 (1,600)	-
× homeowner	-	-	-	-	-	1,478 (190)	728 (421)
State Dummy	no	no	no	yes	yes	yes	yes

Standard errors are in parentheses. All regressions include a constant, cohort dummies, and month dummies, while “state dummy” denotes whether state dummies were included in the regression. Income and the exemptions are measured in thousands, while family-size is in logs. All columns are estimated in levels except column (5) where debt, income, and the exemptions are in log-levels. In column (7) only homeowners had the homestead exemption included in their total exemption. There were 29,126 observations.

Table VI: The Effect Of Bankruptcy Exemptions On The Interest Rate.

parameter	(1)	(2)	(3)	(4)	(5)	(6)
age / 10	30.98 (17.20)	-16.62 (119)	30.33 (17.19)	28.75 (17.16)	30.34 (17.16)	30.46 (17.15)
age-squared / 100	-7.30 (3.98)	-1.97 (27.48)	-7.08 (3.98)	-6.69 (3.97)	-7.08 (3.97)	-7.11 (3.97)
age-cubed / 1000	0.54 (0.29)	0.42 (2.03)	0.52 (0.29)	0.49 (0.29)	0.52 (0.29)	0.52 (0.29)
family-size	-1.22 (1.02)	-5.99 (7.29)	-1.16 (1.02)	-1.15 (1.02)	-1.15 (1.02)	-1.16 (1.02)
family-size squared	-0.76 (3.50)	-7.46 (25.34)	-0.58 (3.50)	-0.05 (3.50)	-0.66 (3.50)	-0.49 (3.50)
full high school	-0.46 (1.15)	-20.43 (7.76)	-0.19 (1.15)	0.07 (1.16)	-0.19 (1.15)	-0.24 (1.15)
some college	0.55 (1.17)	13.10 (7.94)	0.54 (1.17)	0.74 (1.17)	0.54 (1.17)	0.51 (1.16)
college graduate	-1.52 (1.19)	-20.83 (8.16)	-1.60 (1.19)	-1.36 (1.19)	-1.60 (1.19)	-1.64 (1.19)
non-white	0.71 (0.90)	4.93 (6.41)	0.45 (0.90)	0.51 (0.93)	0.45 (0.90)	0.44 (0.90)
female head	0.66 (0.76)	1.14 (5.43)	0.67 (0.75)	0.63 (0.76)	0.65 (0.75)	0.61 (0.75)
unmarried	-0.50 (0.90)	6.30 (6.41)	-0.62 (0.90)	-0.80 (0.93)	-0.63 (0.90)	-0.62 (0.90)
income	-0.019 (0.015)	-0.226 (0.110)	-0.020 (0.015)	-0.018 (0.015)	-0.020 (0.015)	-0.019 (0.015)
homeowner	-0.32 (0.77)	2.47 (5.54)	-0.47 (0.77)	-0.66 (0.78)	-	-
exemption	-	-0.082 (0.086)	-0.035 (0.012)	-0.066 (0.049)	-0.016 (0.018)	-0.079 (0.149)
× homeowner	-	-	-	-	-0.024 (0.019)	0.039 (0.047)
homestead fully exempt	-	4.45 (5.74)	-1.71 (0.80)	-10.94 (7.92)	-2.66 (1.56)	-
× homeowner	-	-	-	-	1.24 (1.74)	-1.38 (0.89)

Standard errors are in parentheses. Only households who paid at least some interest, and had debts of over \$1,000 were included, except in column (2) which included all debtors. All regressions include a constant, cohort dummies, and month dummies while column (4) also includes state dummies in the regression. Income and the exemptions are measured in thousands and is in logs, as is family-size. In column (7) only homeowners had the homestead exemption included in their total exemption. Except in column (2), there were 8,825 observations.

Table VII: The Effect Of Bankruptcy Exemptions On Consumption Growth.

parameter	(1)	(2)	(3)	(4)	(5)	(6)
age/10	1.134 (1.062)	0.553 (0.578)	1.057 (0.973)	1.139 (1.064)	0.595 (1.060)	0.915 (1.088)
age-squared/100	-0.231 (0.229)	-0.105 (0.227)	-0.220 (0.204)	-0.232 (0.230)	-0.115 (0.228)	-0.174 (0.227)
age-cubed/1000	0.015 (0.015)	0.007 (0.015)	0.014 (0.013)	0.015 (0.015)	0.007 (0.015)	0.011 (0.015)
\ln family-size	0.192 (0.209)	0.207 (0.205)	0.113 (0.192)	0.192 (0.210)	0.206 (0.205)	0.205 (0.206)
\ln family-size squared	0.058 (0.109)	0.042 (0.107)	0.038 (0.101)	0.055 (0.109)	0.047 (0.107)	-0.020 (0.107)
completed high school	-0.024 (0.095)	-0.045 (0.092)	-0.140 (0.072)	-0.019 (0.109)	-0.043 (0.091)	-0.152 (0.080)
some college	0.146 (0.092)	0.156 (0.090)	0.063 (0.073)	0.143 (0.092)	0.162 (0.090)	0.028 (0.079)
college graduate	0.286 (0.084)	0.253 (0.082)	0.038 (0.062)	0.286 (0.084)	0.256 (0.082)	0.025 (0.070)
Non-white	-0.102 (0.070)	-0.123 (0.068)	-0.133 (0.049)	-0.088 (0.070)	-0.137 (0.068)	-0.121 (0.055)
female head	-0.085 (0.058)	-0.083 (0.057)	-0.007 (0.040)	-0.087 (0.058)	-0.085 (0.136)	-0.013 (0.046)
not married	0.003 (0.091)	-0.016 (0.088)	-0.075 (0.080)	0.012 (0.090)	-0.010 (0.088)	-0.099 (0.088)
house-owner	-0.007 (0.009)	-0.002 (0.009)	-0.008 (0.009)	-0.007 (0.010)	-0.001 (0.009)	-0.008 (0.010)
real interest rate \times 100	0.167 (0.128)	0.199 (0.127)	0.200 (0.408)	0.167 (0.128)	0.197 (0.127)	0.215 (0.466)
$\Delta \ln$ income	0.181 (0.019)	0.187 (0.019)	0.279 (0.186)	0.181 (0.019)	0.187 (0.019)	0.470 (0.144)
exemption \times 1000	-0.015 (0.007)	-0.014 (0.007)	-0.008 (0.005)	-0.014 (0.115)	-0.021 (0.009)	-0.007 (0.006)
homestead fully exempt	-0.049 (0.029)	-0.048 (0.028)	-0.036 (0.018)	-0.048 (0.035)	-0.068 (0.035)	-0.032 (0.026)
Sargan Test (<i>p-value</i>)	-	-	6.28 (0.178)	-	-	4.88 (0.299)

Standard errors are in parentheses. The regressions are on the state average in each half year for the variables for the 18 largest states, for households where the head was born between 1924 and 1955. All regressions include a constant and seasonal dummies. Columns (1) and (4) are OLS regressions; in columns (2) and (5) the exemptions were instrumented by their lags; while columns (3) and (6) are estimated by 3SHS where income is instrumented by its lags. In columns (4)-(6) only homeowners got the homestead exemption.

Table VIII: The Effect Of Exemptions On Changes In Consumption Inequality.

parameter	(1)	(2)	(3)	(4)	(5)	(6)
age/10	-0.078 (0.812)	-0.062 (0.354)	-0.247 (0.233)	-0.010 (0.232)	0.095 (0.241)	-0.254 (0.247)
age-squared/100	0.016 (0.816)	0.012 (0.076)	0.054 (0.050)	0.001 (0.050)	-0.020 (0.052)	0.052 (0.052)
age-cubed/1000	-0.001 (0.004)	0.001 (0.005)	-0.003 (0.003)	-0.000 (0.003)	0.001 (0.003)	-0.003 (0.003)
\ln family-size	-0.231 (0.075)	-0.211 (0.081)	0.070 (0.053)	0.010 (0.052)	0.006 (0.055)	0.005 (0.048)
\ln family-size squared	0.123 (0.038)	0.115 (0.043)	-0.043 (0.028)	0.001 (0.026)	0.003 (0.029)	-0.006 (0.024)
completed high school	-0.013 (0.029)	0.013 (0.043)	-0.020 (0.027)	0.007 (0.020)	0.035 (0.028)	0.009 (0.020)
some college	-0.035 (0.028)	-0.021 (0.040)	-0.003 (0.026)	0.000 (0.020)	0.036 (0.027)	0.000 (0.019)
college graduate	-0.000 (0.026)	0.030 (0.039)	-0.007 (0.025)	-0.006 (0.018)	0.005 (0.027)	0.016 (0.084)
Non-white	-0.005 (0.016)	0.015 (0.039)	-0.035 (0.024)	-0.027 (0.011)	-0.042 (0.026)	-0.005 (0.014)
female head	0.034 (0.018)	0.044 (0.021)	0.014 (0.014)	0.002 (0.012)	-0.006 (0.015)	-0.012 (0.012)
not married	0.035 (0.018)	0.047 (0.037)	0.015 (0.023)	0.030 (0.023)	0.033 (0.025)	0.018 (0.021)
house-owner	-0.001 (0.002)	-0.003 (0.002)	-0.000 (0.000)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)
$\Delta \ln$ income	0.181 (0.007)	0.008 (0.007)	0.009 (0.005)	0.001 (0.005)	0.001 (0.005)	0.006 (0.005)
exemption \times 1000	-	-0.015 (0.007)	-0.016 (0.006)	-	-0.008 (0.005)	-0.003 (0.001)
homestead fully exempt	-	-0.079 (0.041)	-0.095 (0.036)	-	-0.051 (0.028)	-0.010 (0.006)

Standard errors are in parentheses. The regressions are on the state average in each year for the the 18 largest states, for households where the head was born between 1924 and 1955. All regressions include a constant. In columns (3) and (6) the exemptions were instrumented by their lags. In columns (4)-(6) only homeowners got the homestead exemption.