THE IMPACT OF STATE EXEMPTIONS ON PERSONAL BANKRUPTCY FILINGS

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Thesis to be submitted to the Faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

In

Economics

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May 30, 2000

Falls Church, Virginia

Keywords: Bankruptcy, Economics

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(Abstract)

Although the Federal Government is granted authority over bankruptcy law through the U.S. Constitution (Article 1, section 8), the Federal Government has historically left bankruptcy law for state governments to enact. In 1978, the U.S Congress tried to create a national bankruptcy law, but a last minute compromise allowed states to override federal law in key areas such as Chapter 7 exemption types and amounts. Since the 1978 law was enacted, all states have overridden the law to some extent. Although the original 1978 law has undergone several revisions, the basic structure of the law with state control over certain provisions remains the same. Because the Chapter 7 exemptions affect the cost of bankruptcy for the debtor, this paper develops a state level probability model to determine whether the different state exemption amounts affect the probability of filing for bankruptcy. The paper shows that states with more lenient exemption laws will incur a higher bankruptcy rate after controlling for socioeconomic and economic conditions that may create higher bankruptcy frequencies.

Acknowledgments

I would like to thank the thesis committee of Dr. Tom Lutton, Dr. Roger Waud, and Dr Nancy Wentzler for all of their patience, time, and advice. I am also grateful to Anniene Porter who so beautifully guided and encouraged me through the thesis process. Finally, many thanks go to my new wife, Jill Marsteller, for her comments and support.

GRAPHS

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CHAPTER 1: INTRODUCTION

Personal bankruptcy includes both Chapter 7 and Chapter 13 plans under US bankruptcy code. Chapter 7 is the “straight” bankruptcy plan in which all debts are forgiven and Chapter 13 is the “wage earner plan” in which the filer agrees to a negotiated re-payment plan over 3-5 years. Prior to discussing the economic issues around state bankruptcy exemptions, it is important to understand the legal environment around bankruptcies. The rest of this section will provide a brief background on the history and form of bankruptcy law today.[1]

According to Article 1, section 8 of the US Constitution grants Congress the authority to establish "uniform laws on the subject of bankruptcies". This proved difficult to do, however, as the several attempts Congress made to establish national laws were almost always repealed within years of their enactment. As a result, states established their own code for bankruptcy filings.

In 1978, Congress crafted a uniform national bankruptcy bill called the Bankruptcy Reform Act (BRA78). The bill set forth two different options for personal bankruptcy, which were already in use by some states. The first option was an asset-based bankruptcy approach called Chapter 7 or straight bankruptcy. In this Chapter, a filer could discharge most debts (taxes, child support, and student loans were not dischargeable) by selling off all assets in excess of a given exemption amount, while all future income was protected. The bill was thought to be generous to debtors because it provided relatively large federal exemptions that allowed the debtor to keep $4,000 of personal property and $7,500 of home equity. For most states just prior to the law's enactment, the exemption levels were considered much lower than the federal limits[2]. Overall, these exemptions allowed debtors suffering from temporary financial setbacks,

[1] See Shepard (1984) and Sullivan, Warren, and Westbrook (1988) for excellent histories on bankruptcy law.
[2] See White (1987).

such as an illness or job loss, to discharge their debts and get a fresh start with some level of personal property in tact.

The other path, called Chapter 13, allowed debtors to keep their assets, but used future income to pay off their debts over three years. Judges rather than creditors approved the payment plan, and allowed for token payments that did not meet the debtor's full obligations. In some cases, judges even approved zero payment plans due to ambiguities in the law. I should note, however, that in an attempt to make Chapter 13 a more attractive option, some debts were dischargeable under the Chapter 13 code, but not the Chapter 7 code. This included student loans and loans obtained through fraud.

Some other features of the bill were also part of BRA78 and are still in effect today. For example, creditors with secured debt were able to maintain their liens over the subject property. Also, debtors were allowed to switch between Chapter 7 and Chapter 13 at any time after they petitioned for bankruptcy. This allowed debtors to take the most optimal course throughout the bankruptcy process. It is quite common, for example, for debtors to use the Chapter 7 filing as leverage while negotiating a Chapter 13 repayment plan with the creditor. This is one reason why debtors can frequently obtain lenient Chapter 13 payment plans with creditors. Finally, just prior to passage of the 1978 bill, an amendment was added that allowed states to "opt out" of the federal exemption limits set in Chapter 7. In the few years following the law, thirty-six states actually opted out of the federal exemption limits. Figures from 1981 show that 23 of the 50 states opted out for lower exemptions[3]. By 1993, all 50 states had opted out of the federal exemptions in some way. This made the study of bankruptcy law more difficult as state law needed to be taken into account.

[3] See White (1987), table A1.

In 1984, a new bankruptcy code (BRA84) was passed to tighten up BRA78 in three primary ways. First, Chapter 13 filers now had to apply all "disposable income" towards debt repayment. This made the zero payment option plan more difficult because it required zero disposable income. It also gave a little more clarity in defining token payment plans. Second, the code stated that courts could dismiss Chapter 7 filings that displayed a "substantial abuse" of the law. Finally, the federal exemption limits were lowered slightly, which made chapter 7 filings less attractive in the non-opt out states.

The next major change in the law came in 1994 (BRA94). This law basically was an update to the 1984 law. It raised the Chapter 7 exemptions to $15,000 for home equity, $2,400 for a car, and $8,000 in personal property. This new ceiling, of course, only affects states that did not opt out of the federal plan. It also raised the cap on debt eligible for a Chapter 13 filing, which was made in hope of attracting more debtors to entering a repayment plan rather than the Chapter 7 bankruptcy.[4] The previous caps were $100,000 for unsecured debts and $350,000 for secured debts. The new caps are $250,000 for unsecured and $750,000 for secured debts. The law also created a bankruptcy commission to study whether overhaul of the original system created in 1978 was needed.

Most of the laws above were written to protect unlucky individuals who faced an unexpected financial event that caused either an income shock or a liability shock. The belief was that bankruptcy is an undesirable act that individuals would prefer to avoid. In cases of an unexpected illness, injury, job loss, or other liability that was beyond the control of the individual, the law would grant some sort of relief in the form of a "fresh start".

[4] See Zandi (June 1996).

The public policy question debated under current bankruptcy reform legislation before the U.S. Congress revolves how to structure bankruptcy laws that can distinguish between debtors who are unlucky and debtors who use bankruptcy write off debt that they could otherwise afford to repay. Specifically, the public policy concern is whether people with stable incomes who can pay at least a portion of their debt should be allowed to write off their total debt under Chapter 7. Many policy makers believe that these individuals should file under Chapter 13 or not file at all. To distinguish these individuals with a steady income and an ability to pay off some debt, several proposals, such as a means test for Chapter 7, have been debated as a way to further restrict Chapter 7 filings. Meanwhile, other policy makers stress that bankruptcy is not usually an option for financially distressed debtors. Instead, these are forced into bankruptcy by unforeseen circumstances. As a result, these policy makers believe that tightening bankruptcy law only imposes more burdens on these unlucky debtors. Although this paper does not directly answer these public policy questions or directly address the impact of a means test, it does look at the economic issue under debate. Namely, can bankruptcy regulation affect bankruptcy-filing rates or is the pool of financially distressed debtors unmoved by differences in bankruptcy legislation? In particular, this paper looks at whether the Chapter 7 exemption amounts have an effect on state filing rates.

CHAPTER 2: LITERATURE REVIEW

Until about 1998, when the Congressionally chartered National Bankruptcy Review Commission focused greater attention on the subject, academic research on personal bankruptcy was sketchy at best. Most of the original bankruptcy research in academic journals took place in the mid 1980's when data became available to study the effects of BRA78. At the time of BRA78, the country was in a recession so the research focused on how much of the increased filing levels were due to BRA78 and how much were due to economic and demographic factors.

Lawrence Shepard (1984) modeled bankruptcy filings as a function of economic and legal factors using national-level time series data from 1948 – 1979. With this model, Shepard found that the recession could not fully explain the increase in bankruptcies after 1978. He then postulated that BRA78 increased bankruptcies. Although his analysis did not fully explain why BRA78 might have caused the increase, he did suggest that state and federal exemption levels were not the cause of the increase since states with lower exemptions had nearly the same bankruptcy rate as states with the higher federal exemptions. Unfortunately the design of his national time series model did not include the testing of exemption levels.

Michelle White (1987) reached a different conclusion about Chapter 7 bankruptcy exemptions. She used 1981 county level data in a model that separated Chapter 7 bankruptcies and Chapter 13 bankruptcies. She found that while high Chapter 7 exemption levels were positively associated with Chapter 7 filings, these same exemptions were negatively associated with Chapter 13 filings. In her theory, the negative relationship between Chapter 7 exemption levels and Chapter 13 filings makes sense. If Chapter 7 is more attractive with higher exemptions, Chapter 13 is then less attractive. White’s model also

included demographic and social factors such as divorce rate, income, farmland percentage, minority populations and elderly population.

Although White's decision to treat Chapter 7 and Chapter 13 separately yielded interesting results about the factors influencing the different filing plans, it is still useful to consider the combination of both plans, which was not included in White's paper. A model that combines both Chapter 7 and Chapter 13 filings is useful because the two plans are inextricably linked. As mentioned earlier, debtors can switch filing plans during the bankruptcy process. This means that debtors can use Chapter 7 as leverage when negotiating repayment plans or "wage earner plans" with their lenders. The higher the state raises the Chapter 7 exemption level, the more leverage the state gives to the debtor. Thus, debtors can arrange plans that pay little of the original liability, while also retaining the assets associated with the debt. Later, this paper will examine how higher Chapter 7 exemption limits make bankruptcy more attractive.

Following Shepard's lead, Peterson and Aoki (1994) also sought to determine whether legislative changes or economic conditions affect bankruptcy filings. They looked at state level data for a quarter just prior to the enactment of BRA78 and a quarter in 1980 after enactment of BRA78. They also found that state exemption laws had little impact on relative filing rates before and after 1978, but their model did not control for socioeconomic factors such as debt burden or divorce, which White found significant. In the end, they concluded that there were some factors behind the increased filings between 1978 and 1980 that remained unexplained. They cited some possibilities such as lawyer advertising, which was finally allowed under a 1977 Supreme Court ruling. They also were the first to introduce evidence that state laws that restrict or prohibit wage garnishment had a negative correlation with bankruptcy filings. The idea was that wage garnishment puts more pressure on the debtor to file for bankruptcy.

In spite of a drastically increasing bankruptcy rate in the early 1990's, the academic literature did not focus on bankruptcy again until 1998 and 1999. At this time, three new papers that discussed bankruptcy exemptions emerged. These papers included Hynes and Berkowitz (1998), White (1999) and Nelson (1999).

Hynes and Berkowitz (1998) developed a model that showed bankruptcy exemptions as having little effect on the supply of credit in the mortgage market. Previously, Michelle White (1987) had postulated that lenient states with higher bankruptcy exemptions would suffer from a reduced supply of credit. Hynes and Berkowitz did not dispute that lenient bankruptcy exemptions would encourage more debtors to file and more lenders to restrict credit; however, they noted a difference between secured loans and unsecured loans. Secured loans, such as mortgage loans, still maintain a lien on the pledged asset even if bankruptcy is declared. The debtor still has to pay off the loan or risk losing the home, with or without bankruptcy. As a result, Hynes and Berkowitz theorized that the homestead exemption on a person's principal residence would not greatly impact the bankruptcy decision since most mortgage debt is secured.

The main empirical model for Hynes and Berkowitz is an accept/reject logit model that uses 1990-1995 Home Mortgage Disclosure Act (HMDA) data of accepted and rejected mortgage applicants. The model tests whether state bankruptcy exemptions are associated with the acceptance or rejection outcome of an applicant. If the homestead exemption was an important part of the bankruptcy decision, then Hynes and Berkowitz theorized that lenders would restrict credit in states with high homestead exemptions. This would mean that high homestead exemption states would have lower acceptance rates or probabilities, holding other factors constant. The results, however, show that high state homestead exemptions are actually associated with higher

acceptance probabilities in the data. This result is consistent with the theory that homestead exemptions do not reduce the supply of mortgage credit and are not important in the bankruptcy decision. Hynes and Berkowitz also developed a model to show that interest rates decline with higher homestead exemption levels, so lenders also do not tighten credit supply in high exemption states through pricing either.

Later, Michelle White (1998) published another paper that examined both the societal benefits and costs of a bankruptcy system. Bankruptcy benefits society because it provides insurance to risk averse borrowers in the event of an unexpected loss of income or wealth. This risk sharing agreement among all borrowers and lenders allows for an expanded debt market as default risk is diversified and spread more efficiently across the interested parties. As the system increases the consumer's insurance benefits through higher exemptions, however, societal costs start to rise more quickly than societal benefits. More debtors take advantage of the system to eliminate the debt and even acquire wealth through these exemptions, even when they have an ability to repay the debt. There also is a moral hazard that allows for more risky behavior than otherwise would occur without this form of insurance. These behaviors all impose greater costs to the debt market (i.e., lenders and borrowers) that at some level will outweigh the benefits provided.

Because of these behaviors by some debtors that increase societal costs, it is important to examine the incentives provided by the bankruptcy system. Michelle White (1998) particularly focuses on the incentives around Chapter 7 exemptions. Using data from the 1992 Survey of Consumer Finances (SCF), she calculates what percentages of debtors are financially better off by filing for bankruptcy. To account for different bankruptcy exemptions, she adjusts her calculations to meet the bankruptcy law of 11 different states and the entire U.S. Her calculations show that the more generous the state exemption, the more

households that benefit from bankruptcy. Specifically, she found that anywhere from 10% to 32% of the SCF participants would benefit financially depending on which state exemption rules she used. White also goes on to test three different strategies for bankruptcy planning by shifting certain non-exempt assets to exempt assets. These strategies naturally increase the percentages of those credit worthy households who would benefit from filing. By employing all three strategies, White found that 19% to 61% of the SCF population would increase net worth through bankruptcy, depending on which state laws were used.

Finally, Nelson (1999) developed a chapter choice model using state level panel data from 1989-1996. The model estimated the ratio of chapter 13 filings to total filings as a function of sociological, economic and legal variables. Specifically, his explanatory variables fell under six categories: income, assets, bankruptcy cost, legal factors like state exemptions, legal climate in the different courts, time dummies. He estimated various models including a fixed effect model with state and court dummies to account for differences "that are difficult to explain by other than historical precedent or legal culture".

As White (1987) did in her earlier paper, Nelson found that the Chapter 7 homestead exemption had a negative relationship with Chapter 13 filings when controlling for these other factors. Both White and Nelson hypothesized that the higher Chapter 7 homestead exemption would make Chapter 7 a more favorable option than Chapter 13 for a given state. So as the homestead exemption went up, Chapter 13 filings would go down in favor of more Chapter 7 filings. Personal property exemptions, however, seemed less robust with signs changing with the different specifications. Lenient wage garnishment laws were positively related to Chapter 13 filings. Wage garnishment laws allow creditors to collect debts automatically through wages. Nelson thought that tougher wage garnishment laws would encourage more debtors to file under Chapter 7 in order to discharge as much debt as possible.

CHAPTER 3: THEORETICAL DISCUSSION

This is a study of how bankruptcy law affects the cost of bankruptcy for debtors. The specific area of the law in question is the Chapter 7 exemptions. Higher Chapter 7 exemptions should make bankruptcy a more desirable option to debtors, since they will have more of their assets protected. Higher Chapter 7 exemptions should make the Chapter 13 option less desirable, but still increase the total number of debtors who will benefit from filing under any chapter. This is because the higher Chapter 7 exemptions will not only shift Chapter 13 debtors to Chapter 7, but also attract new debtors previously uninterested in bankruptcy under an otherwise smaller exemption. As a result, the hypothesis is that higher Chapter 7 exemptions will lead to more bankruptcy filings.

To test this hypothesis, a state level model is proposed using legal, economic, and demographic data from 1993. Prior to describing the state level model, however, it is helpful to understand all the factors that influence bankruptcy-filing rates at the individual debtor level. Then, from an individual level model, we can obtain guidance of factors that may influence the aggregate state model.

The rest of section 3 goes on to describe these influences both at the individual level and the state level. Specifically, Section 3.1 describes a detailed microeconomic approach to explain the individual level incentive to declare bankruptcy; Section 3.2 proposes a bankruptcy decision model at the individual debtor level; and Section 3.3 proposes a bankruptcy frequency model at the state level. From this theoretical discussion, an empirical methodology for the state model is developed and tested in section 4.

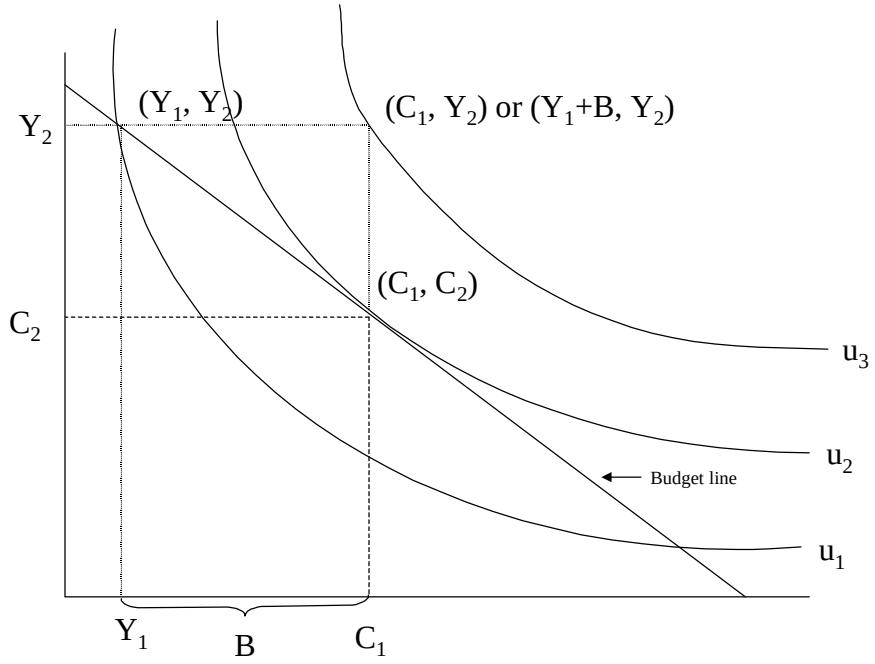
3.1 Microeconomic Theory of Individual Level Bankruptcy Decisions

As mentioned above, Michelle White (1987) developed an extensive theory behind the incentives of borrowers and lenders under the current bankruptcy regime. She examined which borrowers would choose a chapter 7 bankruptcy, which borrowers would choose a chapter 13 bankruptcy, and how lenders would react to the law. Her explanation is useful in considering how lenders and individuals act in the consumer credit market. Without bankruptcy costs imposed on debtors, her simple two period consumption model shows that borrowers have an incentive to declare bankruptcy, while lenders have no incentive to lend money. This section forms the basis for developing an individual model and for understanding how borrowers, lenders, and governmental regulation influence the bankruptcy decision.

White first discussed a model in which individuals could borrow or save to adjust consumption levels in period 1 and period 2. Without the borrowing or saving assumption, borrowers can only consume what they earn in a given period. In graph 1, this is the point (Y_1 , Y_2) on utility curve, u_1. As a result, consumption can vary only with income. With borrowing, however, an individual who desires a more consistent income stream or an individual who prefers present consumption over future consumption can elect to borrow at an interest rate, r. A person may also elect to save money at rate, r. In this simple model, it is assumed that bankruptcy is not an option and that a debtor can only borrow up to the known second period income minus interest costs. Thus, given consumption C_i, income Y_i, and loan B_i at interest rate r, a typical individual would face a two period budget line constraint of

$$(C_1 - Y_1)(1 + r) = Y_2 - C_2$$

Graph 1: Two Period Consumption Model



The borrower would then find their optimal consumption utility for C_1 and C_2 at the point where their highest utility or indifference curve is tangent to this budget line. This is point (C_1, C_2) in graph 1. Note that the slope of the budget line is -(1+r); so borrowing becomes more attractive as interest rate, r, decreases, causing the budget line to flatten out. Also, if income shifts up, while the interest rate, r, remains constant, then the budget line moves out and the demand for borrowing increases.

When bankruptcy in its simplest form of discharging debt without penalty is brought into the model, a borrower can increase their utility by borrowing the maximum amount in period 1 and then defaulting just prior to period 2. This is point (C_1, Y_2) on graph 1. In this case, the borrower would consume just as much as the "no-bankruptcy" model in period 1, but would consume more than the "no bankruptcy" model in period 2. Specifically, the period 2 consumption

would be Y_2 instead of $Y_2 - B_1(1+r)$. This would push the borrower out to a new, higher utility curve that is beyond the budget constraint line. Thus, under a costless and limitless bankruptcy model, individuals have an incentive to borrow as much as possible and then declare bankruptcy.

If borrowers declare bankruptcy with a probability of 1 (since there are benefits without costs), however, then lenders will not lend. This is not realistic in practice, so the model needs some adjustment to account for costs imposed on bankruptcy filers, which act as a deterrence to declaring bankruptcy. In actual life, both lenders and government regulation impose bankruptcy-filing costs on debtors.

Lenders have several avenues to impose costs on debtors seeking bankruptcy that aren't available in the simple two period consumption model. For example, unlike the model, debtors actually face multiple consumption periods with a desire to maintain their future borrowing ability. Lenders can use this debtor preference for a future borrowing option as an incentive to pay back current debt. Also, because debtors acquire and hold wealth besides current period income, lenders can ask debtors to use this wealth as collateral on the loan. This is a way for the lender to share the risk with the debtor.

As mentioned above, the model does allow lenders to pass bankruptcy costs to all debtors by raising interest rates. Stiglitz and Weiss (1981) point out that interest rate pricing has a sorting effect on the borrower pool, which in some situations may limit a lender's ability to raise rates. This is because as you raise interest rates, low risk borrowers tend to drop out of the borrower pool, while high-risk borrowers remain. High-risk borrowers don't mind the higher rates because they are less inclined to repay the loan anyway. As a result of the higher risk pool of borrowers, higher interest rates will raise the bankruptcy costs of the pool, holding all other lending policies constant. This will then raise

lending costs above the costs covered by the higher interest rates. This only occurs to the extent that lenders fail to identify low-risk and high-risk borrowers through their other screening devices and contract terms. If the borrowers can be identified through other means besides the interest rate mechanism, then lenders should be able to price them more accurately. In the end, however, there is always some asymmetrical information between borrowers and lenders, as high-risk borrowers will try to look like low-risk borrowers to the lender. As long as this occurs, lenders need to exercise caution when raising interest rates or otherwise raising lending costs to borrowers.[5]

While lenders use the risk sharing and screening strategies described above to deter debtors from filing for bankruptcy, the bankruptcy filing process itself also imposes debtor filing costs through court fees and other legal fees. In addition, Federal and state governments impose debtor filing costs through various regulations around the debtor's assets or future income. Specifically, Federal and state bankruptcy code provides two avenues for debtors in Chapter 7 and Chapter 13, each of which impose a different cost structure on the debtor. This means that debtors have to consider their own individual situation before deciding which chapter has the lowest cost. In the Chapter 7 code, for example, the debtor would lose any assets greater in value than the exemption level, E. If the debtor held A assets before bankruptcy, then they would only keep all of these assets if A <= E. They would forfeit A-E assets if A > E. If a borrower holds A<E assets, then chapter 7 is clearly a desirable option, even if the assets, A, could be used to pay off any unsecured liabilities, L. This is because the borrower would get to keep the assets while discharging the unsecured liabilities. However, if the assets are much greater than the exemption level (A>>E), then the borrower has an incentive to file under Chapter 13.

[5] In some cases, lenders may react to bankruptcy (or default) by accepting a partial or full loss of the debt with no cost to the debtor. This will happen when the lender sees that it is more expensive to collect the full amount of debt than it is to just accept a lesser amount. An example might include a "workout" agreement where a lender offers to provide a lower rate loan or even forgives a few payments on the current loan. Lenders usually have restrictive policies, however, so as not to encourage and reward non-payment in the debtor pool. These programs are not meant to influence debtor behavior, rather they are meant to

To further complicate matters, some assets, such as cars and houses, have secured liens attached to them. These liens are not discharged in bankruptcy as the lender has priority over the property used to secure the loan.

In general, this analysis would postulate that Chapter 7 filers have assets less than or near the applicable exemption limit and large unsecured liabilities. Chapter 7 filers may also not have a steady income that could hold up to a Chapter 13 repayment plan. Meanwhile, Chapter 13 borrowers are more likely to consist of wealthier debtors with steady income and larger asset holdings especially unsecured asset holdings that the debtor needs to protect under the law. Chapter 13 filers may also have large liabilities in areas that are dischargeable under Chapter 13, but not Chapter 7. Student loans are one example of this specialized type of liability.

In summary, all of these potential costs can make bankruptcy less profitable to the debtor. In the two period model, if the costs imposed on the debtor are greater than or equal to the period 2 value of the amount borrowed, B(1+r), then there is no incentive to declare bankruptcy. Much of the public policy debate around recent bankruptcy legislation centers on just this issue. Namely, what is the proper cost to impose on those debtors who still have income and wealth after they declare bankruptcy?

3.2 Proposed Individual Debtor Level Bankruptcy Model

The individual debtor bankruptcy choice model can provide guidance to how a state level bankruptcy frequency model could be constructed. Based on the discussion in the previous section, an individual debtor model of bankruptcy would measure the probability to declare bankruptcy based on debtor, lender,

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cut costs. While “workouts” may affect the bankruptcy decision when available, this paper assumes that they only exist on a

and legal factors. There also are a set of macroeconomic factors that affect both debtors and lenders. Given these factors, the probability P that the individual debtor declares bankruptcy might look like the following

P(debtor x declares bankruptcy) = F(*Debtor Factors, Lender Factors, Macroeconomic Factors, Legal Factors, Error Term*)

Debtor factors: These factors include the debtor debt level relative to income and wealth, debtor employment stability such as type and length of employment, and debtor credit history. These factors cover both the relative level of outstanding debt and the probability of an income shock that might leave the debtor without ability to payoff the debt. Note that debtors with income shocks such as job loss, divorce, or catastrophic illness do not always declare bankruptcy since they may use their assets to pay off debt. Higher levels of debt in combination with income shocks should increase the probability that a borrower will declare bankruptcy. Self-employment and time on the job are good indicators of the stability of one's employment and the likelihood of an income shock. The "social cost" to a debtor who declares bankruptcy, often referred to as "bankruptcy stigma", is difficult to measure. One way to proxy it is through an individual's past credit history, such as number of late payments in the last two years. This measures "bankruptcy stigma" since it reveals past behavior about a borrower's willingness to repay debt.

Lender Factors: These factors are measured by relative interest rates and collateral policy for the borrower. As discussed in the previous section, lenders use interest rates to pass bankruptcy and other costs onto borrowers. They also use collateral policies to share bankruptcy risk with the borrower.
This kind of measure might look at the interest rate and down payment for the borrower's home mortgage, for example. These factors reflect on the debtor

small scale and do not greatly impact the bankruptcy statistics at the aggregate level.

since they show a lender's perception of the debtor's risk level at the time a loan was made

Macroeconomic Factors: These factors reflect on both debtors and lenders. They are measured by employment growth, inflation, and income growth. They are typically leading indicators of bankruptcy statistics, so they need to be lagged in the model. Employment is meant to capture the likelihood of income shocks. Income growth can measure wealth and ability to repay past debt. If income declines relative to past expectations, then a debtor may have difficulty paying of loans. Inflation is meant to measure the real value of the loan liability and the value of a debtor's assets, including collateral that is pledged against a secured loan. For example, high inflation may make the value of a house outstrip the value of the loan put up against the house.

Legal factors: These factors measure the regulatory cost of bankruptcy to individual debtors. This would include the Chapter 7 bankruptcy exemptions that are the focus of this paper. If also includes wage garnishment laws. Tough wage garnishment laws may encourage debtors to declare bankruptcy in order to remove debt that is getting paid through the wage garnishment.

3.3 Proposed State-Level Bankruptcy Model

As mentioned above, this paper proposes a state level model to study the legal impact of bankruptcy. The individual model discussed earlier provides guidance for developing factors that affect state level filing rates. With the state model, however, the cohorts are no longer homogeneous entities making individual decisions to declare or not to declare bankruptcy. Instead, a cohort represents a pool of these entities, which collectively are described by a distribution of bankruptcy decisions. Instead of a yes/no decision on bankruptcy, the pooled cohort contains a portion of "yes" decisions and a portion of "no"

decisions within one grouped observation. In developing an aggregated state level model, it is important to understand the individual processes taking place within the grouped cohort. This is why the previous discussion focused on bankruptcy at the debtor level. While individual level information is lost in the state model, the model can still test the effect of regulatory decisions on the rate of bankruptcy filings. More specifically, a state level aggregate model is useful because each state has different exemption levels to test.

The theoretical state-level model estimates the proportion of bankruptcies as a function of characteristics that influence debtor and lender behavior. The model is similar to the individual model above with measures for the debtor population, the lender population, macroeconomic effects, and legal effects. The main difference is that aggregate proxies are used to measure collective behavior in the debtor and lender populations, rather than individual debtor measures. The macroeconomic and legal effect measures may still remain the same, however, since they are measured at state levels anyway. The general idea is to use the individual model as guidance for selecting characteristics that affect the aggregate level of bankruptcy filings. Thus, instead of measuring an individual's debt level, the model looks for characteristics that describe debt behavior in a pool of debtors, such as the mean debt-to-income ratio in the pool.

Below is a discussion of the specific measures selected for debtor, lender, macroeconomic, and legal effects in the state model. A summary of these measures and their expected association with bankruptcy is provided at the end of the section in Table 2. The empirical test of this model is presented in section 4.

3.3.1 Debtor Effects in the State Model

As with the individual model, debtor population effects are sought to measure both the levels of debt and the likelihood of an income interruption that could prevent repayment of that debt. Debtors are assumed to borrow money on the assumption that they can and will repay the debt. In order to do this, the debtor must make an assumption about future income. When future income is unexpectedly interrupted or reduced, then the debtor must reevaluate their ability to repay the loan. These unexpected income interruptions are trigger events that could, but not always, lead to bankruptcy. Debtors can handle these interruptions in several ways. They may opt to borrow less to ensure a reasonable cushion during a trigger event or they may be resourceful enough to juggle assets and debts to get through difficult periods. If these two strategies fail, then a debtor may opt for bankruptcy.

Three specific measures are proposed for debtor behavior. First, the percentage of population in the 25-44 age bracket, which was first proposed by a Visa study in 1996 is suggested. Second, the divorce rate, which has been used by White (1998) and Nelson (1999) in previous studies, is suggested. Finally, the percentage of non-farm households with self-employment income from 1990 census data is suggested.

The 25-44 age group population was selected as a measure for debtor behavior. This is a period of life when more people are thought to go into debt to get married, have children, buy larger houses, etc. It is thought that these individuals are more vulnerable to trigger events that could slide them into bankruptcy. States with large percentages of this age group population should have higher probability for bankruptcy. This measure appears as PCT2544 in the empirical models discussed below and is available from 1993 data in the US Statistical Abstract.

bankruptcy. Divorce can be expensive in terms of legal fees and increased consu -earner couples, non earning spouses are especially vulnerable to these expenses as they try to re-

should show an increased probability for bankruptcy. This measure appears as

US Statistical Abstract.

Finally, the percentage of non farm households with self- income from 1990 census data is suggested as a measure of income stability -employed individuals often fair well, but as

leverage, wider variation in income and higher failure rates than larger more

income often face more risk and income variation than individuals in other professions. This makes this population more susceptible to income ions and bankruptcy. States with higher percentages of self- should have higher bankruptcy filing rates. This measure appears as SEINC in the empirical models below. 1990 Census data is available, but more recent able. This should not greatly impact the model, as there is a lag between self employment status and bankruptcy filing that accounts for much of this time difference.

3.3.2 Lender Effects in the State Model

As discussed previously, lenders attempt to limit bankruptcy through a

screening tools. These tools all have an affect on the supply of credit and who

can get credit. On an aggregate level, the use of these tools is often dictated by macroeconomic variables that describe the state of the economy. Lenders may tighten credit policies and credit supply in a declining economy, but relax these policies in a growing economy. Aside from macro-economic variables, Zaandi has suggested using the mortgage loan-to-value ratio (LTV) as a proxy for lender collateral or underwriting policies[6]. In the aggregate state level model, this factor is specified as median LTV for a state.

The LTV variable shows the equity stake that a lender supplies for any given mortgage. One minus LTV shows the equity stake or collateral put up by the debtor. The greater the equity stake of the lender, the more risk the lender assumes. It follows from this that states with lower LTVs have tighter credit standards for borrowers than states with higher LTVs (since borrowers have to put up more collateral for the loan). Lower LTVs would indicate a lower probability to file for bankruptcy, all other factors held constant. Data for median LTV by state was obtained from Freddie Mac. Higher values of median LTV are expected to have a positive relationship with state bankruptcy filings. This measure appears in the empirical models as LTVMED.

Other measures below that describe the state of the economy may also reflect the credit supply. These measures are described in the next section.

3.3.3 Macroeconomic Effects in the State Model

The state of the economy at any given time impacts both debtors and lenders. In an accelerating economic environment with low unemployment and increasing income growth, debtors have more ability to pay off current debt and more confidence to pay off future debt. Likewise, a declining economy with increasing unemployment and a greater probability of income interruptions could

[6] See Zaandi (1996)

cause a greater portion of the debtor population to default on their debt. While many individual debtors could get through temporary income interruptions, a portion will not make it.

When lenders are confident that borrowers will pay off loans, they are more likely to expand the credit supply and make loans; conversely in an economic downturn, making matters even worse as some debtors will lose access to credit at the time they may need it most. In this way, economic factors are related to both credit supply and individual borrower effects.

Two macroeconomic measures are proposed for the model. These measures are employment growth and income growth as measured from the 1992 to 1993 time period (1993 U.S. Statistical Abstract).[7] Employment growth was suggested over unemployment by a private VISA study on bankruptcy[8]. Although employment growth and the unemployment rate are related, employment growth gets closer to an individual debtor's ability to find new work in the event of an income interruption like a divorce or health issue. Meanwhile, unemployment mainly speaks to the probability that an income interruption will occur due to a loss of employment. Furthermore, at the household level, when one spouse faces an income interruption for health or other non-economic reasons, then the other spouse may elect to enter the work force if they are not already employed. In this case, employment growth is a better measure to address the other spouse's ability to find new work. In the model, employment growth should show a negative sign, as an increase in employment growth should correspond to a decrease in bankruptcy filings.

[7] Inflation was thought to be collinear with other macroeconomic variables and was dropped. Inflation was tested, however, using 1993 state house price inflation from the Weighted Repeat Sales Index (WRSI) series produced by the Federal Home Loan Mortgage Corporation. The results showed that inflation was insignificant. Other tests suggested that there was strong multicolinarity among the macroeconomic variables. When the inflation variable was estimated as a function of other regressors, the suspected multicolinarity was confirmed as LTV median and employment growth were significant and explained almost 40% of the variance in inflation.

[8] See Visa (1996). In this paper, both employment growth and unemployment rate were tested together, but the unemployment rate was statistically insignificant.

Likewise, income growth is used to measure a borrower's increasing ability and confidence to repay debt. As income grows, debtors are better able to withstand minor expense shocks related to health, auto, and other uninsured personal property matters. Lenders are also more willing to lend, which provides more liquidity to debtors. The income growth variable should have a negative sign. Employment growth appears as EMPGR93 and income growth appears as INCGR93 in the empirical models discussed below[9].

3.3.4 Legal Effects on State Bankruptcy Filings

Two types of legal effects are measured, wage garnishment laws and Chapter 7 exemption limits. Both Peterson and Aoki (1994) and SMR Research Corporation (1996) have proposed the wage garnishment effect in bankruptcy models. Generally, Federal law establishes the amount of garnishment allowed on wages, however, states are allowed to override the Federal law only if they plan to make the law more favorable to the debtor. Two states, Texas and Pennsylvania, actually ban wage garnishment, except in child support cases. Other things equal, states that make it easy for creditors to attach liens to a debtor's wages will find higher bankruptcy filings. This is because wage garnishment is so intrusive that debtors have more incentive to use bankruptcy as a shield against creditor claims on their current and future income. A wage garnishment variable dummy variable (EASYGARN) was created from data supplied by SMR Corporation (1996). The variable identifies states with easy wage garnishment laws. The variable EASYGARN equals 1 if a state has no or has less restrictive wage garnishment laws, and it equals 0 if a state has the most restrictive Federal standard. Easy wage garnishment states are expected to have a negative relationship with bankruptcy.

[9] Both employment growth and income growth are measured from the end of 1992 to the end of 1993. The bankruptcy frequency statistics used by the model cover the same period. Similar employment and income growth variables lagged one year from the end of 1991 to the end of 1992 were tested and produced weaker model results.

The other legal effect included here is the Chapter 7 exemption limits, which are the main focus of this paper. Data on 1993 exemptions was obtained from a recent paper compiled by Michelle White (1999). Measuring and quantifying these exemptions is extremely difficult as there are many types of exemptions and legal nuances that can alter the precise value of an exemption. For example, Arkansas has an unlimited homestead exemption for urban lots under a quarter acre and rural lots less than 160 acres. Otherwise, urban lots that are larger than a quarter acre and rural lots that are larger than 160 acres face an exemption is $2,500. Developing a precise value of this exemption is difficult to do. Furthermore, some states allow debtors to use either the state exemptions or the federal exemptions. In spite of these problems, the White data does provide ways to measure the exemption limits. Specifically, White breaks up the exemptions into six categories for each state. The categories are

- Homestead exemptions
- General exemptions for any type of personal property
- Major category exemptions for household furnishings, clothing and other major categories of personal property
- Retirement and pension account exemptions
- Motor vehicle exemptions
- Wildcards that exempt any type of property

The exemption amounts can range from $0 to unlimited. Typically, unlimited exemptions are used for the homestead, retirement account and major category exemption types. One state has an unlimited motor vehicle exemption. Other exemptions are generally in smaller ranges between 0 and $5,000.

For this paper, exemptions are grouped into three categories: homestead, retirement and personal property. Personal property is just the combination of White's general, major category, motor vehicle and wildcard exemptions, which

all apply to personal property. The personal property exemptions are usually created with the idea that a debtor will need some "tools of the trade" to remain economically viable after bankruptcy. Autos and clothes are typical tools of the trade that allow people to function in the current working environment.

For each of these groupings, a dummy variable was created to represent whether the state had an unlimited exemption in that grouping. A few states had an unlimited exemptions in all three groupings, most had unlimited exemptions in one or two groupings. Two states had no unlimited exemptions. A list of the three exemption dummies for the empirical models is presented in Table 1.[10]

Table 1. Exemption Variables

Name	Description	States with Exemption	Expected Relationship with State Bankruptcy Filings
PPYUNLM	Equals 1 if Unlimited Personal Property Exemptions, Equals 0 otherwise.	AL, CA, KS, LA, ME, OH, OK,	Positive
RETUNLM	Equals 1 if Unlimited Retirement Exemptions, Equals 0 otherwise.	All but AL, DE, MN, NC, ND, NH, NV, SD,	Positive
HOMEUNLM	Equals 1 if Unlimited Homestead Exemptions, Equals 0 otherwise.	FL, IA, KS, MN, OK, SD, TX	Neutral

A summary of all of the independent variables and their expected signs, sources, and variable names follows in table 2.

[10] Besides the dummy variables above, several different exemption specifications were tested. Most specifications provided similar results, however, so the unlimited exemption dummy variables were used because they were easy to explain and provided among the best model fits.

Table 2. Summary of Independent Variables

Lender Population Effect	LTVMED	1993 State Median Loan-to-Value for mortgages	Positive	Freddie Mac
Macroeconomic Effect	EMPGR93	(1993 Non-Farm Jobs – 1992 Non-Farm Jobs)/1992 Non-Farm Jobs	Negative	BLS www.bls.gov
Macroeconomic Effect	INCGR93	(1993 Avg Income – 1992 Avg Income)/1992 Avg Income	Negative	1993 US Statistical Abstract
Individual Population Effect	PCT2544	Percent of Population in the 25-44 Age Group	Positive	1993 US Statistical Abstract
Individual Population Effect	DIVRT93	Divorce Rate in 1993	Positive	1993 US Statistical Abstract
Individual Population Effect	SEINC	1990 Percentage of Households with Self-Employment Income	Positive	1990 US Census
Legal Effect	EASYGARN	States with Easy Garnishment Laws	Negative	SMR Research Corporation
Legal Effect	PPYUNLM	Equals 1 if Unlimited Personal Property Exemptions, Equals 0 otherwise.	Positive	Michelle White (1999)
Legal Effect	RETUNLM	Equals 1 if Unlimited Retirement Exemptions, Equals 0 otherwise.	Positive	Michelle White (1999)
Legal Effect	HOMEUNLM	Equals 1 if Unlimited Homestead Exemptions, Equals 0 otherwise.	Nuetral	Michelle White (1999)

$$w_i = [n_i \, BR_i \, (1\text{-}BR_i)]^{1/2}$$

Using this method, two models specifications are presented in Table 3 and explained in the rest of section 4. Section 4.1 discusses multcolinearity issues in the models. Section 4.2 discusses heteroskedasticity issues in the models. Section 4.3 discusses goodness-of-fit measures for the models. Section 4.4 discusses model results.

Table 3 Model Results for Two State Level Bankruptcy Frequency Models

#	Variable	Full model	Model without ltvmed, lncgr93, easygarn	Comments
1	Intercept	-7.4844** (-3.29)	-8.5989** (-8.43)	
2	LTVMED	-.0116 (-.46)		Insignificant
3	EMPGR93	6.3093* (1.74)	6.0376* (1.84)	Wrong Sign! Perhaps promotes more risky behavior
4	INCGR93	-6.1244 (-1.09)		Insignificant, but right sign
5	PCT2544	7.4494** (2.23)	7.9681** (2.53)	Significant with correct sign
6	DIVRT93	.1863** (3.09)	.1568** (3.21)	Significant with correct sign
7	SEINC	-.0691** (-2.13)	-.0574** (-2.03)	Significant with wrong sign. SE less risky in good economy
8	EASYGARN 1=easy law	-.0302 (-.22)		Insignificant with correct sign

#	Variable	Full model	Model without ltvmed, lncgr93, easygarn	Comments
9	PPYUNLM 1=unlimited exem	.2887* (1.75)	.3406** (2.36)	Significant with correct sign
10	RETUNLM 1=unlimited exem	.0324 (.20)	.0536 (.36)	Insignificant. BK debtors less likely to save for retirement
11	HOMEUNLM 1=unlimited exem	-.1332 (-.76)	-.1710 (-1.20)	Insignificant as expected.
12	Model Fit	F = 2.88** P-value = .0084 R^2 = .38	F = 4.07** P-value = .0017 R^2 = .32	Joint contribution of all independent variables is statistically significant
13	Joint contribution of PYUNLM, HOMEUNLM, and RETUNLM	F=1.60 P-value = .2030	F=3.70** P-value = .0184	Marginal contribution of all exemption variables not significant in full model, but significant in modified model
14	Contribution of PPYUNLM only	F=4.37** P-value = .0427	F=8.62** P-value=.0053	Marginal contribution of personal property variable is significant in both models
15	Degrees of Freedom	40	43	
16	Observations	51	51	

Table 3 Footnotes:

"Variable" Column: describes the content of each row. For rows 1-11, each row provides information about the independent variables in the model. For rows 12-14, each row provides information about model fit.

"Full Model" and "Model without ltvmed, lncgr93, easygarn" Columns: list relevant statistical information for each of the two respective models. For rows 1-11, the top number in each cell is the model coefficient and the bottom number in parenthesis is the t-statistic. One or two asterisks are placed after the top number to show statistical significant where

** indicates significance at .05 level

* indicates significance at .10 level

Row 12 shows overall model fit using F statistic, the significance level (p-value) of the F statistic and R^2. Rows 13 and 14 show the marginal contribution of the indicated exemption variables using the F statistic and the significance level (p-value) of the F statistic.

Table 3 Notes (continued):

Note that the F-statistic tests the null hypothesis that the coefficients multiple independent variables are jointly zero (see Gujarati, 1995, pp. 245-254). For row 12, all independent variables are tested using the F-statistic. For rows 13-14, only specific exemption variables are tested as being jointly equal to zero. P-values show the statistical significance or confidence that we can reject the null hypothesis for the F-test. A p-value below .05 provides a 95% level of statistical confidence that the null hypothesis can be rejected. The R^2 statistic, or coefficient of determination, measures the proportion of the total variation in bankruptcy frequency explained by the independent variables (see Gujarati, 1995, p. 201).

4.1 Multicolinearity in the Models

Multicolinearity is defined here as exact or near exact linear relationships among some or all of the independent variables. The presence of multicolinearity can cause larger standard errors in the coefficients and make the estimated coefficients less precise. The coefficients will still remain unbiased, however, if and only if the expected value of the error term, given the independent variables of the model, is zero.

Gujarati (1995, p. 337) suggested one way to detect multicolinearity is to estimate auxiliary regressions of one independent variable against the other independent variables. Specifically, if X is a vector of n independent variables in the primary equation

$$y = b_0 + b_1x_1 + b_2x_2 + \ldots\ldots + b_nx_n + u$$

then, the following auxiliary equations are estimated as a test for multicolinearity

$x_1 = f(x_2, \ldots, x_{n,} v_1)$

$x_2 = f(x_1, x_3, x_4, \ldots, x_{n,} v_2)$

…

$x_n = f(x1, \ldots, x_{n-1,} v_n)$

Gujarati (1995, p. 337) suggests a test called "Klien's rule of thumb" to check for the existence of multicolinearity from the auxiliary equations. According to Klien's rule, multicolinearity might exist if the R^2 from the auxiliary equations is greater than the R^2 from the original regression of Y on the X vector.

To estimate the auxiliary equation, ordinary least squares is used. The results show that equations for three variables have R^2 above .38, which is the R^2 of the full model equation in Table 3. Specifically, the auxiliary equation for LTVMED (1993 state median LTV) had an R^2 of .45; for EMPGR93 (1993 state employment growth) had an R^2 of .48; and for DIVRT93 (1993 state divorce rate) had an R^2 of .48. The results for these auxiliary models are shown in Appendix B.

When these three variables are pulled from the full model, however, the results are poor. Without LTVMED, EMPGR93, and DIVRT93, the R^2 drops from .38 to .19. Of the remaining seven variables in the model, the standard errors for three of the variables actually increase (results not shown). Also, one of the dropped variables, DIVRT93, had an extremely high T-statistic in the full model and was found significant in previously published papers.[11] Although the multicolinearity problem is resolved, it appears that too much information is lost when these variables are removed from the models.

[11] See White (1987) or Visa (1996)

Since some multicolinearity is suspected, another model, which drops the three insignificant variables in the full model, is estimated. The insignificant variables include LTVMED, INCGR93 (1993 state income growth), and EASYGARN (where states with easy garnishment laws equal 1). LTVMED was already identified as a potential source for multicolinearity through Klien's rule above. The other two insignificant variables are closely associated with the other variables identified by Klien's test above. Specifically, the auxiliary equations found that INCGR93 was positively associated with the DIVRT93 and EASYGARN was negatively associated with EMPGR93 (see Appendix C).

The results of removing the insignificant variables from the full bankruptcy model (see Table 3) show that when these variables are dropped, the standard errors for all variables except SEINC are reduced. This may imply a reduction of multicolinearity in the modified model. Note specifically that the T-statistic for PPYUNLM variable (a dummy variable where unlimited personal property equals 1, otherwise the variable is zero) goes from a .10 level of significance to a .05 level of significance. The statistical significance levels of the other variables show little change.

The modified model without LTVMED, INCGR93, and EASYGARN appears to lesson the multicolinearity problems, but does not eliminate them altogether. Using Klien's rule of thumb on auxiliary equations for the modified bankruptcy model now only shows EMPGR93 as a possible source of multicolinearity. Tests show that EMPGR93 is a strong predictor in the model, however, so it is kept. Both the full model and the model without LTVMED, INCGR93, and EASYGARN are shown in Table 3.

4.2 Heteroskedasticity in the Models

Heteroskedasticity is present when the variance of the error term, u, is not constant. One assumption of the least squares model is that the variance is

constant across observations. When this assumption is violated, Kmenta (1987, pp. 249-267) showed that the coefficients are still unbiased, but that the standard errors are larger.

There are many potential causes for heteroskedasticity, including improper model specification, data collection from different sources, and real life processes that actually do generate data at different variances. In the model presented in this study, all of these causes are possibilities.

As mentioned above, Maddala suggested that applying the weight, w_i or $[n_i\ BR_i\ (1\text{-}BR_i)]^{1/2}$ to a weighted least squares equation, should take care of the heteroskedasticity implied by the group size and bankruptcy proportion amounts in the aggregated data. Without applying this weight to the equation, the model variance becomes a function of state population and the state bankruptcy-filing rate, which change across observations.

4.3 Goodness of Fit Measures for the Models

To test the goodness of fit of the models, two statistical measures are used which are shown on line 13 of Table 3. First, an F-test, which tests the null hypothesis that all the coefficients on the independent variables are jointly equal to zero, is employed (Gujarati, 1995, pp. 245-254). The results for both models show that the F-statistic for both models has a p-value or significance value of less than .05. This means that for both models, there is a greater than 95% confidence level that all of the variables are not zero.

Second, an R^2 or coefficient of determination statistic is calculated to show how much of the variation in the state bankruptcy frequency is explained by the model. For the full model, the R^2 is .38 and for the model without LTVMED, INCGR93, and EASYGARN the R^2 is .32. This shows that the

independent variables explain 38% and 32% respectively of the variation in bankruptcy frequency.

4.4 Review of Bankruptcy Exemption Variables

The models were built to test the hypothesis that higher Chapter 7 exemptions will increase bankruptcy filings. The hypothesis suggests that states with unlimited personal property and retirement exemptions would have higher bankruptcy-filings. The Hynes and Berkowitz study, however, suggested that states with unlimited homestead exemptions may not have higher bankruptcy filings because homesteads are typically purchased through secured loans which, which retain the lien regardless of a bankruptcy filing.

The model results in Table 3 suggest that unlimited personal property exemptions (PPYUNLM dummy variable equal to 1; row 9) are associated with higher bankruptcy filings rates, while unlimited retirement (RETUNLM dummy variable equal to 1; row 10) and unlimited homestead exemptions (HOMEUNLM dummy variable equal to 1; row 11) are not. While RETUNLM has the correct sign in the model, the insignificant t-test is unexpected. This makes me hesitant to draw a conclusion about retirement exemptions. It is possible that retirement exemptions are not a factor in bankruptcy filing rates for several reasons. First, bankruptcy filers may come from a younger age distribution that has lower retirement savings amounts and more time to make up retirement losses. It could also be because the more conservative fiscal habits that are associated with building retirement accounts are also associated with lower risk individuals who are less likely to find bankruptcy appealing. Meanwhile, the HOMEUNLM variable was statistically insignificant which was expected based on the Hynes and Berkowitz study.

To test the contribution of these variables of the models, two different F-tests are computed for each of the models. In one F-test, the contribution of all three exemption variables is checked for significance. In the other test, the contribution of only the PPYUNLM is checked for significance. The results are shown in Table 3, rows 13 and 14 respectively. They show that the contribution of all three exemption variables together is statistically significant for the modified model without LTVMED, INCGR93 and EASYGARN, but not statistically significant in the full model.[12] The contribution of PPYUNLM by itself is statistically significant in both models. The conclusion is that only the personal property exemption, as defined by PPYUNLM, seems to have any association with bankruptcy filing rates.

4.5 Review of Other Explanatory Variables

The big surprise of the other explanatory variables is that 1993 employment growth or EMPGR93 was significant in all models and had a positive coefficient (Table 3, row 3). Employment growth was thought to have a negative association with bankruptcy rates according to the Visa (1996, p. 25) study. The Visa study was an individual level study, however, that had an inflation factor that also picked up macroeconomic effects. In this study, employment growth might indicate that consumer and lender confidence is pushing consumers into greater debt and greater risk of bankruptcy. Note that both 1992 employment growth and 1992 income growth were tested in the model for possible lagged effects, but both variables were insignificant.

The other surprise was the negative sign on the coefficient for SEINC, the percentage of households with self-employment income (see Table 3, row 7). The model used somewhat outdated data from the 1990 census, but the variable

[12] Statistical significance is measured using a 95% confidence level with p-value < .05

was statistically significant in all models. The hypothesis was that this sign would be positive because self-employment is associated with a higher risk for income interruption. It may be that more of a time series is needed to pick up these high-risk individuals in both good and bad economic cycles. In good cycles, the self-employed may fair better than the rest of the working population, while in bad times they fair worse. Using data from the 1991 recession might have shown a different result.

Meanwhile, the other variables behaved as expected. The two variables linked to debt and trigger events, PCT2544 (Table 3, row 5; represents the 1993 percentage of state population between the ages of 25-44) and DIVRT93 (Table 3, row 6; represents the 1993 state divorce rate per 1000 people), were positively associated with bankruptcy filings. Meanwhile, the variable proxy for tighter credit, LTVMED (Table 3, row 2; represents the median LTV of each state in 1993), and growing income, INCGR93 (Table 3, row 4; represents the income growth from 1992 to 1993 by state), were negatively associated with bankruptcy filings, although they sometimes appeared insignificant.

CHAPTER 5: CONCLUSION

The models show that the Chapter 7 state personal property exemption limits do appear to have an association with bankruptcy filing rates. Debtors in states with higher Chapter 7 exemption limits have greater incentive to file for bankruptcy because they can protect more assets with the higher exemption limits or negotiate a better Chapter 13 reorganization through increased leverage from the threat of filing through Chapter 7. A more favorable Chapter 7 regulation will make Chapter 7 a more favorable option over Chapter 13.

Retirement exemptions and Homestead exemptions appear to matter little to the bankruptcy filing decision. This is a somewhat surprising result for the retirement exemption, but is expected for the homestead exemption. Homesteads often have mortgage liens attached to them that are not exempted from bankruptcy. A possible reason that retirement exemptions are not associated positively with bankruptcy filings is that individuals close to declaring bankruptcy may not have assets in retirement funds that are worthy of concern. The debtor retirement funds may have already been exhausted or just not part of the typical bankruptcy filer's portfolio.

APPENDIX A

Data Sources

Variable Name	Source Data Description	Source
BKTOT	1993 Total Bankruptcy Filings by State	American Bankruptcy Institute www.abi.org
BK7	1993 Total Chapter 7 Bankruptcy Filings by State	American Bankruptcy Institute www.abi.org
BK13	1993 Total Chapter 13 Bankruptcy Filings by State	American Bankruptcy Institute www.abi.org
POP93	1993 Total US Population by State	1994 US Statistical Abstract, table No. 26.
PCT2544	1993 Percentage of Population between ages of 25 and 44	1994 US Statistical Abstract, table No. 33.
LTVMED	Median Loan To Value (LTV) percentage for comforming single family mortgages	Freddie Mac
SEINC	1990 Percentage of Nonfarm Households with Self-employment Income	1990 U.S. Census
DIVRT93	Divorce Rate per 1,000 in 1993	SMR Research Corporation or IS Statistical Abstract
INCGR93	Personal Income Per Capita Growth from 1992 to 1993	1994 US Statistical Abstract, table No. 699.
EMPGR93	Employment Growth from 1992 to 1993	Bureau of Labor and Statistics (BLS) www.bls.gov
EASYGARN	Garnishment easy on defendants or none?	SMR Research Corporation
PPYUNLM	Dummy Variable for whether state has unlimited personal property Ch 7 exemption	Michelle White (1999)
RETUNLM	Dummy variable for whether state has unlimited retirement account Ch 7 exemption	Michelle White (1999)
HOMEUNLM	Dummy variable for whether state has unlimited homestead Ch 7 exemption	Michelle White (1999)

APPENDIX B

Multicolinarity Tests on the Bankruptcy Exemption Variables: Run OLS of Bankruptcy variable as a function of other independent variables in state model and an error term.

#	Variable	LTVMED	EMPGR93	DIVRT93
1	Intercept	**78.3070****	-.0294	-4.7294
		(10.37)	(-.35)	(-.976)
2	Empgr93	23.1036		9.2465
		(.873)		(1.03)
3	Incgr93	-40.4371	-.1319	**33.0838****
		(-1.00)	(-.55)	**(2.55)**
4	Pct2544	-12.6156	-.1069	-8.1012
		(-.575)	(-.84)	(-1.09)
5	Divrt93	**1.1753****	.0027	
		(2.80)	(1.03)	
6	Seinc	**-.4432****	**.0022***	.1043
		(-2.35)	**(1.96)**	(1.57)
7	Easygarn	-.6617	**-.0118****	-.2487
		(-.68)	**(-2.19)**	(-.75)
8	Ltvmed		.0008	.1366
			(.87)	(2.80)
9	Ppyunlm	-.2292	**-.0288****	.5901
		(-.17)	**(-4.58)**	(1.34)
10	Retunlm	-1.4221	-.0071	.2060
		(-1.27)	(-1.08)	(.53)
11	Homeunlm	**3.0045****	-.0014	-.1790
		(2.45)	(-.18)	(-.40)
12	R^2	.45	.48	.43
13	F test value	3.738	4.136	3.410
14	Pr > F	.0017	.0008	.0033

Note: The columns labeled LTVMED, EMPGR93, DIVRT93 show the three variables thought to bring multicolinarity in the main bankruptcy logit models of

table 3. These three variables were tested for multicolinearity by estimating them as a function of the other independent variables in the bankruptcy logit model. Tests of other variables were also performed, but not shown here since multicolinarity was not demonstrated. The table above shows the models results for these tests. Rows 1-11 show the other independent variables used to estimate LTVMED, EMPGR93 and DIVRT93 in three separate tests. For each row, the coefficient for that variable is placed at the top of the cell wih the T-statistic placed underneath in parentheses. If the T-statistic is significant at the 95% level, then two asterisks mark the coefficients (**). If the T-statistic is significant at the 90% level, then one asterisk mark the coefficients (*). Row 12 shows the R^2 or coefficient of determination for each model. Row 13 shows the F-statistic, which tests the null hypothesis that the independent variables in each test are all zero. Row 14 shows the statistical significance of the F test. If the significance values are less than .05, then the null hypothesis can be rejected with 95% statistical confidence.

APPENDIX C

Data used in estimation

State	BKRATE	LTVMED (%)	EMPGR93	INCGR93	PCT2544	DIVRT93	SEINC	EASY GARN	PPY UNLM	RET UNLM	HOME UNLM
AK	.001255	75	.0522	.0085	.37563	5.3	18.7	0	0	1	0
AL	.005556	75	.0158	.0160	.30499	6.5	9.2	0	1	0	0
AR	.002703	76	.0219	.0057	.28672	6.9	11.3	0	0	1	0
AZ	.004043	75	.0250	.0144	.31275	6.2	11.7	0	0	1	0
CA	.004562	69	-.0039	-.0044	.34315	4.7	14.7	0	1	1	0
CO	.003577	74	.0525	.0164	.34997	5.4	15.0	0	0	1	0
CT	.002644	69	-.0048	.0085	.32682	3.1	12.3	1	1	1	0
DC	.001979	70	-.0096	.0274	.36159	3.4	10.4	0	0	1	0
DE	.001890	74	.0234	.0097	.32571	4.5	9.8	1	0	0	0
FL	.002917	75	.0293	.0307	.29512	6.1	10.8	1	0	1	1
GA	.005621	75	.0469	.0124	.33483	5.5	11.0	0	0	1	0
HI	.001111	58	.0062	.0247	.33532	4.2	14.4	1	0	1	0
IA	.001749	75	.0394	-.0238	.29282	3.9	13.4	1	0	1	1
ID	.002956	74	.0328	.0324	.29481	6.3	15.5	0	0	1	0
IL	.003208	72	.0003	.0102	.32025	3.7	10.6	1	0	1	0
IN	.003857	75	.0502	.0185	.31122	4.7	10.8	0	0	1	0
KS	.002914	76	.0012	.0119	.30739	4.8	13.2	0	1	1	1
KY	.003070	74	.0276	.0121	.31064	5.8	10.8	0	0	1	0
LA	.002747	76	-.0172	.0191	.30990	4.7	9.8	0	1	1	0
MA	.002217	72	.0242	.0106	.33483	2.7	11.9	0	0	1	0
MD	.002863	71	.0030	.0066	.34582	3.4	11.8	0	0	1	0
ME	.001264	70	-.0360	.0134	.31877	4.3	15.4	1	1	1	0
MI	.002356	73	.0303	.0171	.31631	4.1	9.8	0	0	1	0
MN	.002805	75	.0261	.0007	.32455	3.7	13.6	1	0	0	1
MO	.002727	75	-.0105	-.0007	.30512	5.1	11.4	0	0	1	0
MS	.003781	75	.0407	.0302	.28869	5.0	9.8	0	0	1	0
MT	.002002	72	.0196	.0398	.30036	5.1	16.0	0	0	1	0

State	BKRATE	LTVMED (%)	EMPGR93	INCGR93	PCT2544	DIVRT93	SEINC	EASY GARN	PPY UNLM	RET UNLM	HOME UNLM
NC	.001741	75	.0139	.0198	.32023	5.0	10.9	0	0	0	0
ND	.001472	75	.0261	-.0008	.30236	3.5	14.9	0	0	0	0
NE	.002151	75	.0277	.0127	.30118	3.9	13.6	0	0	1	0
NH	.003077	73	.0192	.0063	.34044	4.5	14.6	0	0	0	0
NJ	.002805	74	.0001	.0067	.32606	3.1	10.5	0	0	1	0
NM	.002136	75	.0132	.0269	.31126	6.2	12.9	0	0	1	0
NV	.005338	75	.0346	.0227	.34629	4.7	10.5	0	0	0	0
NY	.002499	71	.0078	-.0046	.32313	3.1	10.8	0	0	1	0
OH	.002997	73	.0071	.0072	.30989	4.5	10.0	0	1	1	0
OK	.003843	79	.0016	.0097	.29991	7.1	12.6	0	1	1	1
OR	.003952	72	.0353	.0179	.31860	5.3	14.5	0	0	1	0
PA	.001583	72	.0057	.0075	.30428	3.3	10.0	0	0	1	0
RI	.006453	70	-.0055	.0134	.31700	3.4	10.8	0	0	1	0
SC	.001696	75	.0025	.0167	.31622	4.1	9.8	0	0	1	0
SD	.001681	75	.0193	.0005	.28671	4.0	14.9	0	0	0	1
TN	.006998	75	.0257	.0159	.31477	6.5	11.0	0	0	1	0
TX	.002225	80	.0235	.0138	.32960	5.5	12.7	0	0	1	1
UT	.003516	73	.0710	.0120	.28817	4.8	14.4	0	0	1	0
VA	.003608	74	.0084	.0091	.34109	4.5	11.2	0	0	1	0
VT	.001188	67	.0319	.0090	.32813	4.8	16.5	0	0	1	0
WA	.003021	70	.0200	.0015	.33606	5.2	13.3	0	0	1	0
WI	.001926	70	.0238	.0136	.31302	3.5	11.1	0	0	1	0
WV	.001821	75	.0238	.0122	.29176	5.3	8.3	0	0	1	0
WY	.002317	75	.0129	.0215	.31915	6.5	14.3	0	0	1	0
Mean	.002910	73.29	.0184	.0125	.31803	4.7	12.3	.31	.16	.84	.14
Stdev	.001325	3.3	.0197	.0107	.01972	1.1	2.2	.47	.37	.37	.35
Min	.001111	58	-.0360	-.0238	.28671	2.7	8.3	0	0	0	0
Max	.006998	80	.0710	.0398	.37563	7.1	18.7	1	1	1	1

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