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Personal Bankruptcy and the Level of Entrepreneurial Activity

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Abstract

The U.S. personal bankruptcy system functions as a bankruptcy system for small businesses as well as for consumers. When firms are non-corporate, debts of the firm are personal liabilities of the entrepreneur/owner. If the firm fails, the entrepreneur has an incentive to file for bankruptcy under Chapter 7, since both business debts and the entrepreneur's personal debts will be discharged. The entrepreneur must give up assets above a fixed bankruptcy exemption level for repayment to creditors, but future earnings are entirely exempt. Exemption levels are set by the states and they vary widely.

We show that higher bankruptcy exemption levels benefit potential entrepreneurs by providing partial wealth insurance. The predicted relationship between the probability of owning a business and the exemption level is positive at low exemption levels, but may be either positive or negative at high exemption levels, depending on whether higher bankruptcy costs outweigh the gain from additional insurance. We test this prediction and find that the probability of families who are homeowners being self-employed is 35% higher if families live in states with unlimited exemptions rather than low exemptions. We also find evidence that families who are homeowners are more likely to start businesses and to organize their businesses as non-corporate rather than corporate if they live in states with high or unlimited, rather than low, bankruptcy exemptions.

JEL categories: E6, K2, M13, L5

Personal Bankruptcy and the Level of Entrepreneurial Activity[1]

Wei Fan and Michelle J. White

The U.S. personal bankruptcy system is primarily intended as a bankruptcy procedure for consumers, but also is the de facto bankruptcy procedure for small firms. When firms are non-corporate, debts of the firm are personal liabilities of the entrepreneur/owner. If the firm fails, entrepreneurs have an incentive to file for personal bankruptcy under Chapter 7, because both their business and personal debts will be discharged. Entrepreneurs must give up all of their assets above an exemption level to repay creditors, but all of their future earnings are exempt from the obligation to repay (this is the "fresh start" in bankruptcy). Bankruptcy exemption levels are set by the states and they vary widely. The higher the exemption level, the more attractive it is for potential entrepreneurs to go into business, because more of their assets are sheltered from creditors if the firm fails.

In this paper we examine whether individuals are more likely to become entrepreneurs if they live in states with higher bankruptcy exemptions. There is a large literature explaining whether workers choose self-employment versus working for others and, in this paper, we test whether the bankruptcy system is a important part of the decision. The U.S. provides a good setting for studying this question because, while bankruptcy law is uniform across the U.S., bankruptcy exemption levels vary by state. We first develop a model of how variations in exemption levels affect incentives to own, start and end small businesses. We show that higher exemption levels provide partial

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wealth insurance, which makes potential entrepreneurs who are risk averse more likely to choose self-employment. We test the model empirically and find that families are more likely to own and start businesses if they live in states with higher bankruptcy exemption levels.

Section 1 of the paper reviews prior literature, section 2 presents our model and, in section 3, we discuss our data and empirical results. Section 4 concludes and discusses policy implications.

1. Prior Literature

There is a fairly large literature, both theoretical and empirical, on individuals' choice whether to work for others or to become entrepreneurs. On the theoretical side, the two themes are risk aversion and credit constraints. In Kihlstrom and Laffont (1979), individuals have varying degrees of risk aversion, so that more risk-averse individuals become workers and less risk-averse individuals start firms. In Evans and Jovanovich (1989), individuals are risk neutral, but they vary by both entrepreneurial ability and wealth. Individuals choose to become entrepreneurs if they have high entrepreneurial ability and choose to become workers otherwise. But because of credit constraints, the return to being an entrepreneur depends on individuals' initial wealth. Those who have high entrepreneurial ability but low wealth may be constrained in their ability to borrow, which reduces their return as entrepreneurs.[2]

The empirical research on entrepreneurial behavior includes a number of studies that test for the importance of credit constraints. Evans and Jovanovic (1989) find that

initial wealth is an important determinant of entrepreneurial success, supporting the hypothesis that entrepreneurs whose initial wealth is low are constrained in their ability to borrow. Holtz-Eakin, Joulfaian, and Rosen (1994) test for the importance of credit constraints by examining a sample of individuals who received inheritances. They find that entrepreneurs who receive inheritances are both more likely to remain in business, and, contingent on remaining in business, their revenues increase substantially. They interpret their results as providing evidence that entrepreneurs are credit constrained, and that receiving an inheritance loosens the credit constraint. Other empirical research examines the roles of racial/ethnic/immigrant status and work history in determining whether individuals become entrepreneurs. Fairlie and Meyer (1994) find that there are very large differences across ethnic groups in the probability of being self-employed. Evans and Leighton (1989) find that workers are more likely to shift to self-employment if their wages are low, if they have changed jobs frequently or been unemployed, and if they have more assets. Dunn and Holtz-Eakin (1996) and Fairlie (1999) show that family characteristics such as whether parents are self-employed also affect whether children choose self-employment. Borjas (1986) examines the self-employment experience of immigrants. Hamilton (2000) examines earnings of self-employed versus employed persons and finds that self-employed persons earn less and their earnings grow at a slower rate. He argues that this points to self-employment providing non-pecuniary benefits.

There is also a literature on credit rationing by lenders, which examines the conditions under which small firms are able to borrow. Petersen and Rajan (1994) show

[2] Baumol (1990) discusses the importance of the policy environment, as opposed to cultural factors, in determining the supply of entrepreneurs.

that the length and strength of the relationship between small firms and their lenders are important in determining whether small firms obtain loans. Cavaluzzo, Cavaluzzo and Wolken (1999) show that small firms are more likely to be credit rationed when they are minority-owned. Berkowitz and White (1999) show that when small firms are located in states that have higher bankruptcy exemptions, they are more likely to be turned down for credit. Gropp, Scholz and White (1997) show that individual borrowers are also more likely to be turned down for credit when they live in states with high bankruptcy exemptions.[3]

2. Theory

Suppose an individual is considering becoming an entrepreneur/starting a firm. Assume that the firm would be non-corporate and, therefore, its debts would be legal obligations of the owner. (We consider incentives to start a corporate firm below.) Individuals that do not start firms are assumed to work for others. In this section we consider how variations in bankruptcy exemption levels affect individuals' incentives to be self-employed. We also consider how variations in exemption levels affect lenders' incentives to shut down existing firms. Because the model is intended for empirical testing, it is intentionally kept simple.[4]

2.1. The decision to become an entrepreneur

[3] There is also a large (and contentious) literature on whether small firms create a large fraction of new jobs in the U.S. economy. However this research has focussed on firms which have less versus more than 100 or 500 employees. There has been little or no work on the employment effects of small-scale self-employment. For a summary of the literature, see Acs, Carlsson, and Thurik (1994).

[4] We do not consider changes in bankruptcy law other than varying the exemption level. We also ignore moral hazard considerations. See Wang and White (2000) and Adler, Polak and Schwartz (1999) for normative analysis of alternate bankruptcy provisions that also consider moral hazard.

Suppose starting a firm requires investing in a project which has a cost of I in period 1 and an uncertain return of R in period 2. In period 1, the individual has a fixed amount of wealth W and a fixed amount of debt $B > 0$. The debt B is unsecured, has an interest rate of r, and is due in period 2. It may have been incurred in period 1 or earlier and it may be used either to finance the project or for consumption. If individuals decide to start firms, their wealth in period 2 will be $W - I + B + R$, which varies because R is uncertain. Suppose $\Omega = W - I + B + R$ and suppose the density of Ω is $f(\Omega)$.

In period 2, entrepreneurs may file for bankruptcy under Chapter 7.[5] Suppose the bankruptcy exemption in the entrepreneur's state of residence is X. In the U.S., bankruptcy exemptions range from zero to unlimited (for homestead equity). Suppose the out-of-pocket cost of filing for bankruptcy is C.[6] If entrepreneurs file for bankruptcy, then the debt of $B(1+r)$ will be discharged, but they must give up any wealth they own that exceeds the exemption level, or $max[\Omega - C - X, 0]$. These funds are used for repayment to lenders. Suppose $\overline{\Omega}$ denotes the level of period 2 wealth at which entrepreneurs are indifferent between filing versus not filing for bankruptcy. Entrepreneurs' wealth is $\Omega - B(1+r)$ if they do not file for bankruptcy and X if they do (assuming that they pay the cost of bankruptcy C before filing). Therefore they are

[5] There is also a second personal bankruptcy procedure, Chapter 13. Under it, debtors are not obliged to give up any of their assets, but they must propose a plan to repay part of their debts from future earnings. Most debtors have few non-exempt assets, so filing under Chapter 7 is more favorable and, in fact, about 70% of all bankruptcy filings occur under Chapter 7. Because creditors are entitled to receive under Chapter 13 only the amount they would receive in a Chapter 7 bankruptcy filing and because debtors have the right to choose between the two Chapters, debtors who file under Chapter 13 have an incentive to propose repayment plans under which they repay no more than the value of their non-exempt assets. We therefore model incentives to file for bankruptcy generally as a decision to file under Chapter 7.

[6] This ignores the cost of bankruptcy stigma/reduced access to credit in the future. For entrepreneurs, the cost of bankruptcy stigma is probably small, since it is expected that they will take risks and file for bankruptcy if their projects fail. Most owners of failed businesses have very large debts, so that the gain from having the debts discharged in bankruptcy is very high.

indifferent between filing versus not filing at the wealth level $\overline{\Omega} = X + B(1+r)$. They file for bankruptcy if $\Omega \leq \overline{\Omega}$ and do not file if $\Omega > \overline{\Omega}$. Their net wealth in period 2 after repaying the loan in full or filing for bankruptcy will be $\Omega - C$ if $\Omega \leq X + C$, X if $X + C < \Omega \leq \overline{\Omega}$ and $\Omega - B(1+r)$ if $\Omega > \overline{\Omega}$.[7]

The combination of borrowing and bankruptcy encourages potential entrepreneurs to go into business by providing partial wealth insurance. This effect can be seen in Figure 1, which compares entrepreneurs' net wealth in period 2 at varying levels of gross wealth Ω if they go into business and borrow versus if they go into business but do not borrow. Entrepreneurs who do not borrow always have net wealth of $W - I + R$ (shown as the dotted line); while entrepreneurs who borrow have net wealth of $\Omega - C$, X, or $\Omega - B(1+r)$, depending on the project's return (shown as the three part solid line). The combination of borrowing and bankruptcy lowers entrepreneurs' net wealth by the amount of interest payments rB if the project's return is high, but raises entrepreneurs' net wealth by the net amount of debt forgiven in bankruptcy B - C if the project's return is low. Overall this transfer reduces the riskiness of period 2 net wealth. If either the exemption level or the amount borrowed rises, then the size of the insurance effect increases and the incentive for risk averse individuals to become entrepreneurs also increases.[8]

Now consider lenders' behavior. Suppose there are many potential entrepreneurs who are identical as of period 1 and they all apply to borrow from business lenders. Business

[7] One question is whether potential entrepreneurs would be familiar with bankruptcy law and bankruptcy exemptions. We found that self-help manuals such as *Legal Guide to Starting & Running a Small Business, Vol. 1,* contain a clear explanation of bankruptcy. See Steingold (1999).

[8] Note that the insurance effect of bankruptcy for entrepreneurs is similar to that of taxes. Entrepreneurs pay taxes if their profit is high and deduct losses if their profits are negative, assuming that their households have other sources of taxable income.

lenders are assumed to be risk neutral. They are willing to lend if they expect to make zero profits. Lenders' zero profit condition is:

$$\int_{X+C}^{\overline{\Omega}} (\Omega - X - C) f(\Omega) d\Omega + \int_{\overline{\Omega}}^{\infty} B(1+r) f(\Omega) d\Omega = B(1+r_f) \qquad (1)$$

where r_f is lenders' fixed opportunity cost of funds. Lenders set the interest rate *r* so as to satisfy equation (1). If no interest rate satisfies (1), then they do not lend at all.

Changes in the exemption level affect both the interest rate and whether credit rationing occurs. In the literature, credit rationing is usually associated with models that assume heterogeneous borrowers and asymmetric information concerning borrowers' types.[9] However, credit rationing may also occur even when borrowers are homogeneous and all information is common knowledge. To illustrate, suppose $f(\Omega)$ is distributed normally with a mean of 2 and a standard deviation of .25. Also suppose $B = 1$, $C = 0$ and $r_f = 0.1$. Then the interest rate *r* that satisfies eq. (1) rises at an increasing rate as the exemption level increases. This is because borrowers are more likely to file for bankruptcy when *X* is higher and lenders respond by raising the interest rate. But from lenders' standpoint, raising the interest rate becomes less effective as *X* rises, because borrowers only repay more if they avoid bankruptcy and avoiding bankruptcy is increasingly less likely as *X* gets higher. When the exemption level is .9 or higher (90% or more of the loan amount), no interest rate is high enough to satisfy the zero profit constraint and lenders therefore cease lending. Credit rationing thus takes a simple form: lenders lend to all potential entrepreneurs if $X \leq .9$ and do not lend at all if $X > .9$.

[9] Stiglitz and Weiss (1981) is the original paper on credit rationing under asymmetric information. For a recent paper in this literature, see Bester (1994). See Longhofer (1997) for a model of credit rationing with common knowledge.

Now suppose individuals work for others rather than starting businesses. They may or may not borrow in period 1, but in either case we assume that they do not file for bankruptcy in period 2. Their period 2 wealth is assumed to be the certain amount W.

Individuals' utility is assumed to depend on their net wealth and they are assumed to be risk averse. They choose to become entrepreneurs if their expected utility in period 2 when they become entrepreneurs exceeds their utility in period 2 when they work for others, or if:

$$\int_{-\infty}^{X+C} U(\Omega - C) f(\Omega) d\Omega + \int_{X+C}^{\overline{\Omega}} U(X) f(\Omega) d\Omega + \int_{\overline{\Omega}}^{\infty} U(\Omega - B(1+r)) f(\Omega) d\Omega \geq U(W) \quad (2)$$

Now consider how changes in the exemption level affect entrepreneurs' expected utility. Solving for *dr/dX* from (1) and for *dEU/dX* from the left hand side of (2) and substituting, we get:

$$\frac{dEU}{dX} = U'(X) \int_{X+C}^{\overline{\Omega}} f(\Omega) d\Omega - \int_{\overline{\Omega}}^{\infty} U'(\Omega - B(1+r)) f(\Omega) d\Omega \frac{\int_{X+C}^{\overline{\Omega}} f(\Omega) d\Omega + Cf(\overline{\Omega})}{\int_{\overline{\Omega}}^{\infty} f(\Omega) d\Omega - Cf(\overline{\Omega})} \quad (3)$$

Consider the special case of (3) when the interest rate is fixed, so that *dr/dX* = 0. This might be the case, for example, if entrepreneurs borrow from relatives to finance their businesses or if they receive pre-approved credit card offers in the mail which specify lines of credit at fixed interest rates, and they use this credit to finance their businesses.[10] Since *dr/dX* is the fraction in the second term of (3), the value of *dEU/dX* in this case

[10] Other types of loans in which the interest rate is fixed include borrowing that occurred independently of the investment project and business borrowing that is involuntary on the lender's part (such as unpaid rent or wages or tort judgments against the firm).

becomes the first term in (3), or $[U'(X) \cdot \int_{X+C}^{\overline{\Omega}} f(\Omega) d\Omega]$, which must be positive. Thus when interest rates are fixed and credit is available, increases in the exemption level unambiguously raise the attractiveness of owning a business. Also, individuals' fixed utility level from working for others, $U(W)$, does not depend on *X*. Therefore when loans are available at fixed interest rates, an increase in the exemption level always increases the attractiveness of going into business relative to working for others.

Now consider a second special case when the interest rate is endogenous, but the cost of bankruptcy *C* is zero. Then the sign of *dEU/dX* in (3) becomes the sign of:

$$U'(X) - \frac{\int_{\overline{\Omega}}^{\infty} U'(\Omega - B(1+r)) f(\Omega) d\Omega}{\int_{\overline{\Omega}}^{\infty} f(\Omega) d\Omega} \qquad (4)$$

This expression equals entrepreneurs' marginal utility of wealth when they file for bankruptcy and keep *X* minus their average marginal utility of wealth when they avoid bankruptcy and keep $\Omega - B(1+r)$. For risk averse entrepreneurs, expression (4) must be positive, since their wealth when they file for bankruptcy is lower than their wealth when they avoid bankruptcy, so their marginal utility of wealth must be higher when they file for bankruptcy. Thus when $C = 0$, increases in the exemption level unambiguously raise risk averse individuals' expected utility from becoming entrepreneurs, as long as credit is available. This is because entrepreneurs pay a fair price via the interest rate for the partial wealth insurance that bankruptcy provides. Because risk averse individuals always wish to purchase additional insurance if it is sold at a fair price, having a higher exemption level must make them better off.

Finally, suppose *C* is positive, but not too large. In this case the sign of expression (3) is ambiguous, since the second term in (3) becomes more negative as *C* rises. Thus at any given exemption level, *dEU/dX* must be positive if *C=0*, but it gets smaller and may become negative as *C* rises. The reason is that, when *C* is positive, entrepreneurs pay for additional bankruptcy insurance as *X* rises both via higher interest rates and via higher expected bankruptcy costs. Because the cost of insurance exceeds its fair price, only risk averse entrepreneurs demand it and demand increases as entrepreneurs' degree of risk aversion rises. There is likely to be an internal optimal exemption level which depends positively on entrepreneurs' level of risk aversion.

As an illustration, suppose the utility function is $U = (\text{Net Wealth})^{\alpha}$. Some entrepreneurs have high risk tolerance/low risk aversion ($\alpha = .8$) and others have low risk tolerance/high risk aversion ($\alpha = .2$). Assume that the parameters of the previous simulation remain the same, except that bankruptcy costs can be either zero or .1. Figure 2 illustrates how expected utility varies with the exemption level for both types, at the two different levels of bankruptcy cost. When bankruptcy is costless, the expected utility level of both types of individuals rises monotonically as *X* increases, as long as loans are available. Thus the optimal level of *X* is the highest level at which lenders are willing to lend. But when bankruptcy is costly, entrepreneurs with high risk tolerance have an optimal exemption level of zero, while individuals with low risk tolerance have an optimal exemption level of $X = .35$. Thus the gain from having some wealth insurance rather than none more than offsets bankruptcy costs for risk averse individuals. But if bankruptcy costs are high, they eventually more than offset the gain from having additional wealth insurance.

2.2 The decision to shut down a business

Now consider how changes in the exemption level affect whether businesses in financial distress shut down. For most small businesses, the timing of shutdown is determined by when creditors foreclose on equipment that is essential to the firms' operations (see LoPucki, 1983, for discussion).

Assume that a failing firm's creditor has a choice between shutting the firm down in period 2 versus allowing it to continue to operate until period 3. Because of the firm's poor financial condition, we assume that the entrepreneur cannot obtain new loans from either new or old creditors. If the firm continues to operate for an additional period, then the entrepreneur's gross wealth in period 3 is denoted *Z*, which has the distribution $g(Z)$. The firm's debt at the end of period 2 is assumed to be *B'*, which exceeds *B* because of accrued interest and default charges. In period 3, the firm therefore owes *B'(1+r).* Because the loan is in default, the interest rate *r* is fixed. The creditor's expected return if the firm continues to operate until period 3 is:

$$\int_{X+C}^{\bar{Z}} (Z - C - X) g(Z) dZ + \int_{\bar{Z}}^{\infty} B'(1+r) g(Z) dZ \quad (5)$$

where $\bar{Z}$ denotes the level of gross wealth in period 3 at which the entrepreneur is indifferent between filing versus not filing for bankruptcy.

The effect of an increase in the exemption level on creditors' expected return in period 3 is:

$$-Cg(\bar{Z}) - \int_{X+C}^{\bar{Z}} g(Z) dZ \quad (6)$$

Since (6) must be negative, creditors' expected gain from allowing failing firms to continue operating is smaller in states with higher exemption levels.

Now consider creditors' gain from shutting the firm down in period 2. Because the firm is failing, we assume that entrepreneurs will file for bankruptcy when the firm shuts down. Either of two possible outcomes may occur. In the first, entrepreneurs' assets Z are less than $X+C$, so that creditors receive nothing. In this situation, creditors have a stronger incentive to shut failing firms down if firms are located in states with higher bankruptcy exemptions, because creditors' return from allowing firms to continue is negatively related to the exemption level while their return from shutting firms down is independent of the exemption level. In the second, the entrepreneur's assets are between $X+C$ and $\overline{Z}$, so that creditors receive $Z - X - C$ if the firm shuts down. In this latter case, creditors' incentive is ambiguous since, in states with higher exemptions, they receive less from allowing failing firms to continue and they also receive less from shutting failing firms down immediately. However the first case seems more likely to occur than the second, because owners of failing firms have an incentive to protect their assets from creditors by shifting them from non-exempt to exempt categories before the business shuts down.[11]

Therefore the model suggests that creditors are more likely to shut failing firms down immediately rather than allowing them to continue operating if firms are located in states with high exemption levels. We test this hypothesis in the empirical work below.[12]

2.3 Summary

[11] Z includes both personal and business assets of the entrepreneur. Entrepreneurs can protect assets from creditors by, for example, transferring business assets to exempt personal categories.

[12] In some cases entrepreneurs may prefer to shut their failing firms down immediately---even if creditors allow them to continue operating---because they can do better working for others.

We have shown the following: (1) The bankruptcy system makes going into business more attractive to potential entrepreneurs by providing them with partial wealth insurance. (2) If the interest rate on business loans is fixed or if the cost of filing for bankruptcy is zero, then entrepreneurs prefer that the exemption level be the highest level at which loans are available. If the interest rate on loans is endogenously determined and the cost of filing for bankruptcy is positive, then increases in the exemption level may raise the attractiveness of owning a business at low exemption levels, but lower the attractiveness of owning a business at higher exemption levels. (3) Existing firms are more likely to shut down if they are located in states with higher exemption levels.

3. Empirical Tests

Our empirical work explains whether families own, start or end businesses as a function of the bankruptcy exemption in the state where the family lives and other variables. We use family-level panel data from two different Survey of Income and Program Participation (SIPP) panels. The first panel consists of families who were interviewed in 1993, 1994, and 1995 and the second consists of families who were interviewed in 1996, 1997, and 1998. Each panel contains about 20,000 families. Our dataset combines the two panels, so that it covers the period 1993 through 1998. Because different questions about self-employment were asked in the two panels, we categorize families as self-employed in 1993-95 if anyone in the family owned a business and did

not work at a job, while we categorize families as self-employed during 1996-98l if any family member(s) owned one or more businesses. The sample size is about 98,000.[13]

Bankruptcy is a matter of Federal law. In 1978, Congress adopted a new Bankruptcy Code, which specified a nationally uniform bankruptcy exemption (the Federal exemption). However Congress also gave the states the right to opt out of the Federal exemption by adopting their own exemptions. All states did so by 1982, although about one-third of the states allowed their residents to choose between the state's exemption and the Federal exemption. Since 1982, the pattern has been that only a few states change their exemption levels each year, mainly to correct nominal exemption levels for inflation.[14] Because most states adopted their bankruptcy exemptions in response to the passage of the 1978 Federal Bankruptcy Code, we treat exemption levels as exogenous to families' self-employment decisions.

States have bankruptcy exemptions for various types of property, but the largest and most variable is the exemption for equity in owner-occupied housing---the "homestead" exemption.[15] Homestead exemptions range from zero (in Maryland) to unlimited (in Texas, Florida and several other states). High homestead exemptions reduce the risk of owning a business because, if the business fails, entrepreneurs are less likely to lose their homes or to lose their non-housing assets. Homestead exemptions also protect entrepreneurs' non-housing assets because non-housing assets can be converted into home equity by using the assets to pay down a mortgage, as long as entrepreneurs' home

[13] In each SIPP panel, families are questioned every four months, but we use only the 1st, 4th, and 7th waves. We include only families that responded to all three of the relevant waves. Variables that are reported at the household or individual level are converted to the family level. (The SIPP is available from www.bls.census.gov/sipp.)

[14] The Federal homestead exemption remained the same from 1978 to 1994, when it was doubled from $7,500 to $15,000. See Elias et al (1994 and other editions) for exemption levels by state.

equity is less than the homestead exemption. We therefore use the homestead exemption as our bankruptcy exemption variable.[16]

Some states allow married couples to take larger homestead exemptions if they file for bankruptcy jointly. We therefore adjust the exemption level if the family head is married and lives in a state that allows married couples to claim a larger exemption. In states that allow bankruptcy filers to choose between the state and the Federal exemptions, we use the Federal homestead exemption if it is larger. We divide the distribution of homestead exemptions into quartiles and use separate dummy variables to represent each quartile of the distribution except the lowest. We also use a separate dummy variable for states with unlimited homestead exemptions. States with unlimited homestead exemptions are coded as having the highest "limited" exemption level, so that the unlimited exemption coefficient captures the effect of the exemption being unlimited rather than high. Finally, renters who file for bankruptcy cannot make use of the homestead exemption and are therefore less protected against the risk of their businesses failing. To take account of this, we interact all of the exemption variables with whether families own or rent their homes. The lowest exemption quartile for renters is the omitted exemption category.

Now consider other variables. The SIPP asks separate questions concerning how much families earn from working for others versus from self-employment. Because families whose workers are partly or fully self-employed spend less time working for others, we first estimate an OLS model that explains the log of earnings for families that

[15] Most states also have exemptions for household belongings, equity in vehicles, retirement accounts, and a wildcard category that can be applied to any type of asset, but they are almost always small.
[16] See White (1998) for discussion of other strategies to convert assets from non-exempt to exempt.

do not have self-employment earnings. The explanatory variables are the head's education level, the head's age, and demographic variables. We use the results of this model to predict the log of earnings from working for others, for those families that have self-employment earnings. The predicted values are an estimate of the amount that families with self-employment would earn if all of their workers spent all of their time working for others, or the opportunity cost of becoming self-employed. The combined distribution of predicted log earnings for families with self-employment and actual log earnings for families without self-employment is divided into quartiles and we construct dummy variables for each quartile, omitting the lowest.[17]

We also have data on income from wealth, retirement income, and income from transfers. We divide the distribution of income from wealth into four categories, of which the lowest category consists of non-positive values and the three highest categories each contain the same number of families. We exclude the non-positive values and enter separate dummy variables for each category of positive values (the latter are referred to as quartiles of the income from wealth distribution). We follow the same procedure for retirement income and income from transfers.

We also enter a vector of demographic variables as additional controls: the number of earners in the family, the head's education level in years, the age of the head in decades (under thirty is the excluded category and each variable represents the marginal effect of being one decade older), and dummy variables for the number of persons in the family (one person families are excluded), for whether the head is married, whether the head is a single female, whether the head is African-American, Mexican, other Spanish, or Eastern

[17] We ignore the possibility of selection bias in predicting self-employed families' earnings from working for others. Selection bias will not be a problem if, for example, the same characteristics that make

European, and whether the family lives in a metropolitan area. Additional variables capture local macroeconomic conditions and other state policies that might affect the decision to be self-employed. These include the state unemployment rate, the fraction of the labor force that is employed in the non-farm sector, the rate of growth of output in the state over the past year, and the maximum state income tax rate. We enter the non-farm employment rate as a correction for the fraction of state economic activity that is due to farming, since different bankruptcy law provisions apply to farms. The maximum state tax rate is entered because self-employment presents greater opportunities for tax evasion and evasion is more valuable when the tax rate is higher.[18] Finally, we enter year effects and a dummy variable that differentiates between the two SIPP panels (results not reported).

Summary statistics are given in table A1. The probability of owning a business is .11. Note that the average business, however, is small: mean revenues during the previous year were about $2,400.

3.1 The decision to own a business. Our benchmark case is a random effects probit model that explains whether families own businesses. The results, in columns (1) and (2) of table 1, show that all of the exemption variables are positive and statistically significant for homeowners and the unlimited exemption variable is positive and statistically significant for renters. We also tested for whether the third and fourth quartile and unlimited exemption variables for homeowners are significantly different from the lowest quartile variable for homeowners and found that they are (*p* values are .0199, .0078, and .0000, respectively). Table 2, column (1), shows the predicted

individuals successful in working for others also make them successful as entrepreneurs.
[18] All calculations use weights that make the sample representative of U.S. families.

probabilities of owning a business at varying exemption levels.[19] For homeowners, the probability of owning a business increases from .10 when the homestead exemption is in the lowest two quartiles to .11 when the exemption is in the highest two quartiles and jumps to .135 when the exemption is unlimited. The relationship between the exemption level and homeowners' probability of owning businesses is monotonically increasing, rather than rising at low exemption levels and then falling. The increase in the probability of owning a business from the lowest exemption level to unlimited is about 35%. For renters, the probability of owning a business rises from .08 at the lowest exemption level to .107 when the exemption is unlimited, but the increase is not monotonic. These results imply that homeowners respond strongly to increases in the homestead exemption in making their decisions to become self-employed, while renters also respond, but less strongly. Presumably, many renters deciding whether to become entrepreneurs expect to be homeowners in the future.

The results for other variables imply that families are significantly more likely to be self-employed if they have more earners, live in non-metropolitan areas, have more educated heads, have heads in their 30's or older rather than in their 20's, have earnings from working for others that are in the middle two quartiles of the distribution, or have income from wealth in the highest quartile of the distribution. Families are less likely to be self-employed as they become larger, if they have retirement income in the highest quartile, if the head is over 70, if the head is a single female or is African-American, Mexican or from another Spanish-speaking country. The state unemployment rate is positive and significant, suggesting that families are more likely to be self-employed

[19] We predict the probability of being self-employed separately for each family, using the family's actual characteristics and the specified exemption level. We then take a weighted average of the predictions.

when fewer jobs are available. The maximum state income tax rate is also positive and significant, suggesting that families are more likely to be self-employed in states where the gain from evading taxes is higher. Our results concerning race and ethnic background are similar to those found by Fairlie and Meyers (1994) and Borjas (1986). The results concerning wealth support findings of Evans and Jovanovic (1989) and Holtz-Eakin, Joulfaian and Rosen (1994) that wealth constraints are important determinants of whether families are self-employed.[20]

3.2 The decision to own a "big" business. Because the average business in our dataset is small, we reran the benchmark case, but classified families as self-employed only if their business income was greater than $2,000 per month. The results are shown in table 1, columns (3) and (4). Only the unlimited exemption variable for owners is significantly different from the lowest quartile exemption variable for owners ($p < .0000$). The predictions are shown in table 2, column (2). The predicted probability of owning a business for homeowners rises from .047 in the lowest quartile of the exemption distribution to .060 when the exemption is unlimited, or by about 28%. For renters, the unlimited exemption variable is also positive and significant at the 10% level. The probability of renters owning big businesses rises from about .035 in the lowest quartile of the exemption distribution to .045 in states with unlimited exemptions.

3.3 Choice of organizational form. We also examined whether bankruptcy law affects families' decisions to organize their businesses in corporate versus non-corporate form. As discussed above, higher bankruptcy exemption levels make it more attractive to own a non-corporate business relative to working for others. This is because, while

[20] As additional robustness checks, we reran the benchmark model using random effects GLS rather than probit and separately reran the benchmark model omitting the earnings variables and the income from

business owners are personally liable for their business debts, they can file for bankruptcy if the business fails. The higher the exemption level, the more of their business and personal assets they can keep in bankruptcy. In contrast when businesses are corporate, owners' assets and debts are legally distinct from the assets and debts of their corporations, so that owners are not liable for the losses of their corporations. But when corporations make losses and file for corporate bankruptcy, owners cannot keep any of the corporation's assets. Strictly speaking, this means that whether the bankruptcy exemption level is high or low should have no effect on how favorable it is to own a corporate business relative to working for others. However, in practice business lenders often require that owners personally guarantee loans to their small corporate businesses and these guarantees muddy the distinction between corporate versus non-corporate businesses.[21] As a result, states with higher personal bankruptcy exemption levels may be more attractive environments for families to own both types of businesses.[22]

The SIPP asks families if their businesses are non-corporate or corporate. We ran a weighted multinomial logit model explaining whether families own incorporated businesses, non-corporate businesses, or no business.[23] The results (not shown) indicate that the exemption variables are strongly statistically significant in the decision by homeowners whether to own unincorporated businesses, but are less statistically significant in the decision by homeowners to own corporate businesses or the decision by renters to own either type of business. For non-corporate businesses of homeowners, the third and fourth quartile and unlimited exemption variables are all significantly different

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wealth, transfer and pension variables. The results (not shown) were very similar to the benchmark model.

[21] Berkowitz and White (1999) found that business lenders ignore organizational form when deciding whether to offer loans to small businesses.

from the lowest quartile exemption variable for homeowners (the *p* values are .011, < .0000, and < .0000, respectively). For corporate businesses of homeowners, the unlimited exemption category is significantly higher than the lowest quartile exemption variable for homeowners ($p = .0054$). The predicted probabilities of owning corporate and non-corporate businesses are shown in table 2, columns (3) and (4). For homeowners, the probability of owning a non-corporate business rises from about .08 in the lower half of the exemption distribution to .11 when the exemption level is unlimited, or by about 37%. Homeowners' probability of owning corporate businesses rises from about .026 in the lower half of the exemption distribution to .029 when the exemption is unlimited, or by about 15%. For renters, the probability of owning non-corporate businesses rises from about .054 in the lowest quartile of the exemption distribution to 083 when the exemption is unlimited, but the probability of renters owning corporate businesses is unrelated to exemption levels. Thus exemption levels have an important effect on whether both groups own non-corporate businesses, but they affect only homeowners' decisions to own corporate businesses.

3.4 The decision to start a business. Now turn to families' decisions to start businesses. Define a dummy variable for starting a business which equals one if a family did not own a business in 1993, 1994, 1996, or 1997, but owned a business in the following year. (Because different SIPP panels are used for 1995 versus 1996, we have no information on business starts between these two years.) The explanatory variables are the same as those used previously. Explanatory variables for each year are used to explain whether families started businesses between that year and the next. The sample

[22] Most small firms have a tax incentive to choose non-corporate status, since the firm's losses can then be deducted against other income of the entrepreneur or spouse. See Gordon and Mackie-Mason (1994).

consists of families in both SIPP panels that did not own businesses in the earlier year. Because we lose two years of data, the sample size falls to about 58,000.

In table 3, columns (1) and (2), we report the results of a random effects probit model explaining whether families start businesses. For homeowners, the third quartile, fourth quartile, and unlimited exemption variables all have positive signs, but only the unlimited exemption variable is significantly different from the lowest quartile exemption variable for homeowners (p = .08). Of the exemption variables for renters, only the 4th quartile variable is significantly greater than the lowest quartile value for renters. The predicted probabilities are shown in table 4, column (1). The probability of homeowners starting businesses rises from .023 in the lowest quartile of the exemption distribution to .028 in unlimited exemption states, or by about 22%. For renters, the probability of owning a business is .019 in the lowest quartile, falls slightly, and then rises to .027 in the highest quartile and .022 in unlimited exemption states.

Among the other variables, the only significantly positive factor in families' decisions to start businesses is the head having more years of education. Significantly negative factors include having a single female head, having a head who is over 60, having a Mexican or African-American head, or having higher earnings from working at a job. None of the state level macroeconomic variables or the maximum tax rate variable is statistically significant.

3.5 The decision to end a business. We used the analogous procedure to examine the probability of existing businesses shutting down. Define a dummy variable for ending a business which equals one if a family owned a business in 1993, 1994, 1996, or 1997 but did not own a business in 1994, 1995, 1997, or 1998, respectively. Again we have no

[23] If families own more than one business, we use the organizational type of the first business reported.

data for the decision to end businesses between 1995 and 1996, because of the change in the SIPP panel composition. Explanatory variables for earlier years are used to explain whether families end businesses between that year and the next. The sample includes only families that owned businesses in the earlier year, so that the sample size is only about 7,200. The specification otherwise remains the same.

The results are shown in table 3, columns (3) and (4). The exemption variables are consistently negative for owners, but none is significantly different from the lowest quartile value for owners. The predicted probabilities of businesses shutting down are shown in table 4, column (2). For homeowners, the probability of ending a business rises fairly monotonically from about .141 in the lowest exemption states to .167 in states with unlimited exemptions, or by about 18%. For renters, the probability of ending a business rises from .22 in the lowest exemption states to .244 in states with unlimited exemptions, although the increase is not monotonic. Thus the results suggest that businesses owned by both owners and renters are more likely to shut down when they are located in states with higher bankruptcy exemption levels, but the results are not statistically significant for either group.

Among the other variables, businesses owned by families with heads in their 60's are more likely to close than those owned by families with younger heads. Also families with transfer income above the lowest quartile are significantly more likely to close their businesses, while families with high income from wealth are significantly less likely to close their businesses. The latter result provides additional support for the hypothesis that wealth constraints are an important determinant of the success of small businesses. Finally, businesses owned by families with more earners are significantly more likely to

close, perhaps because multiple-earner families are less dependent on their business earnings.

4. Conclusion

In this paper, we test whether potential entrepreneurs are more likely to own, start and end small businesses if they live in states with higher personal bankruptcy exemptions. Entrepreneurs benefit from higher personal bankruptcy exemptions because exemptions provide partial wealth insurance, although at the cost of a reduction in credit availability as the exemption level rises. Exemption levels are set by the states and they vary widely. We find that families who are homeowners are about 35% more likely to own businesses if they live in states with high or unlimited rather than low homestead exemptions, and the difference is statistically significant. Renters are 22% more likely to own businesses if they live in high exemption states and this difference is also statistically significant. Families' decisions to own non-corporate businesses are more responsive to changes in exemption levels than their decisions to own corporate businesses. Bankruptcy exemptions also affect the decision to start a business: homeowners are 22% more likely to start businesses if they live in states with unlimited rather than low homestead exemptions, although the relationship is only significant at the 10% level. We did not find significant support for the hypothesis that entrepreneurs are more likely to end their businesses if they live in states with unlimited rather than low homestead exemptions.

During each of the past few years, Congress has passed legislation to reform personal bankruptcy law, which President Clinton has consistently threatened to veto. While the bills have varied, they all involve making it substantially more difficult for debtors to

qualify for discharge of debt in bankruptcy, either by requiring that debtors who have greater than the median earnings level repay part of their debt from future earnings or by capping the maximum homestead exemption, or both. These reforms are intended to reduce abuse of the bankruptcy system, particularly by relatively well-off debtors. However our analysis suggests that an unintended consequence of adopting these reforms would be a substantial reduction in the level of self-employment by U.S. households. To the extent that self-employment provides additional jobs, making personal bankruptcy procedures tougher could reduce the rate of growth in the U.S. economy.

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Table 1. Effects of Bankruptcy on Whether Families Own Businesses

	Probit with random effects		Big business	
	(1)	(2)	(5)	(6)
Explanatory Variables	Coef.	s.e.	Coef.	s.e.
1st quartile – owner	0.119	0.037	0.158	0.057
2nd quartile – renter	0.0229	0.039	0.0940	0.063
2nd quartile – owner	0.136	0.037	0.130	0.057
3rd quartile – renter	0.0753	0.043	0.0096	0.066
3rd quartile – owner	0.175	0.038	0.170	0.057
4th quartile – renter	0.0235	0.050	0.0133	0.069
4th quartile – owner	0.201	0.042	0.210	0.060
Unlimited – renter	0.155	0.051	0.131	0.075
Unlimited – owner	0.312	0.042	0.293	0.060
Number of earners	0.359	0.011	0.106	0.013
Metropolitan area	-0.0690	0.019	-0.0077	0.025
Education level	0.0101	0.002	0.0159	0.003
Single female head	-0.409	0.034	-0.583	0.047
Married head	-0.0302	0.038	-0.0382	0.052
2-person family	-0.0944	0.033	0.0462	0.051
3-person family	-0.203	0.038	-0.0989	0.056
4-person family	-0.222	0.042	-0.0167	0.060
5-person family	-0.253	0.047	0.0510	0.064
>=6 person family	-0.190	0.059	0.144	0.079
30<= age < 40	0.192	0.032	0.261	0.044
40<= age < 50	0.0796	0.020	0.0811	0.026
50<= age < 60	0.0091	0.021	0.0127	0.027
60<= age < 70	0.0512	0.025	-0.0361	0.038
age >= 70	-0.147	0.033	-0.245	0.056
2nd quartile earnings	0.362	0.022	0.511	0.037
3rd quartile earnings	0.256	0.023	0.516	0.036
4th quartile earnings	-0.0124	0.026	0.439	0.039
2nd quartile wealth income	-0.0171	0.013	-0.0237	0.022
3rd quartile wealth income	0.0115	0.015	0.0546	0.024
4th quartile wealth income	0.0905	0.016	0.199	0.026
2nd quartile transfer income	-0.0075	0.025	-0.153	0.037
3rd quartile transfer income	-0.0091	0.027	-0.169	0.046
4th quartile transfer income	-0.0896	0.030	-0.267	0.046
2nd quartile retirement inc.	-0.0842	0.037	-0.219	0.070
3rd quartile retirement inc.	-0.0303	0.037	-0.116	0.079
4th quartile retirement inc.	-0.0768	0.033	-0.193	0.074
Eastern Europe	0.0500	0.053	0.0774	0.056
Mexican	-0.230	0.062	-0.306	0.073
Other Spanish	-0.171	0.050	-0.165	0.061
African-American	-0.466	0.064	-0.582	0.097
Other ethnic groups	-0.0164	0.022	-0.0455	0.026
State GDP growth rate	-0.156	0.25	-0.322	0.44
State unemp rate	1.83	0.78	2.39	1.1
Non-farming employment	-0.391	0.19	-0.310	0.22
Max state income tax rate	0.924	0.33	0.644	0.40
Constant	-1.90	0.20	-2.75	0.24

Table 2:
Predicted Probabilities of Owning Businesses

Exemption Category	**Own business (r.e. probit)**	**Own "big" Business (r.e. probit)**	**Own Non-corp. business (mnlogit)**	**Own corp. business (mnlogit)**
	(1)	(2)	(3)	(4)
Owners				
1st quartile	.101	.0470	.0796	.0258
2nd quartile	.103	.0446	.0784	.0261
3rd quartile	.110*	.0481	.0872*	.0246
4th quartile	.114*	.0517	.101*	.0200*
Unlimited	.135*	.0600*	.110*	.0294*
Renters				
1st quartile	.083	.0347	.0534	.0188
2nd quartile	.086	.0417	.0706	.0218
3rd quartile	.094	.0354	.0710*	.0134
4th quartile	.086	.0356	.0734*	.0126*
Unlimited	.107*	.0447	.0834*	.0183

Asterisks indicate that the variable is significantly higher than the relevant 1st quartile level for homeowners or renters, whichever is relevant.

Table 3. Effect of Bankruptcy on Whether Families Start and End Businesses

Random-Effect Probit Model	Start businesses		End businesses	
Explanatory Variables	Coef.	s.e.	Coef.	s.e.
1st quartile – owner	0.0669	0.066	-0.313	0.13
2nd quartile – renter	-0.0916	0.075	-0.354	0.14
2nd quartile – owner	0.0117	0.065	-0.240	0.13
3rd quartile – renter	-0.0238	0.076	0.0624	0.14
3rd quartile – owner	0.0839	0.066	-0.265	0.13
4th quartile – renter	0.147	0.076	0.0074	0.15
4th quartile – owner	0.150	0.072	-0.226	0.13
Unlimited – renter	0.0589	0.080	0.0867	0.15
Unlimited – owner	0.158	0.068	-0.195	0.13
Number of earners	0.0174	0.023	0.106	0.052
Live in a metropolitan area	-0.0535	0.031	0.106	0.052
Education level	0.0137	0.0031	-0.0049	0.0060
Single female head	-0.245	0.047	0.236	0.087
Married head	0.0272	0.060	-0.0450	0.10
2-person family	0.0264	0.053	0.108	0.093
3-person family	0.0586	0.061	0.146	0.10
4-person family	0.0826	0.065	0.147	0.11
5-person family	0.0927	0.074	0.135	0.12
6 more person family	0.0727	0.090	0.149	0.14
30<= age < 40	0.0132	0.044	-0.348	0.086
40<= age < 50	-0.0382	0.035	-0.0869	0.054
50<= age < 60	-0.0499	0.042	-0.0516	0.062
60<= age < 70	-0.227	0.058	0.164	0.091
Age >= 70	-0.326	0.064	0.124	0.10
2nd quartile earnings	-0.0636	0.043	-0.0655	0.088
3rd quartile earnings	-0.117	0.047	-0.135	0.13
4th quartile earnings	-0.138	0.055	-0.112	0.18
2nd quartile wealth income	0.0293	0.036	-0.0660	0.57
3rd quartile wealth income	0.0075	0.039	-0.126	0.056
4th quartile wealth income	0.0574	0.041	-0.133	0.056
2nd quartile transfer income	-0.0697	0.055	0.414	0.088
3rd quartile transfer income	-0.0888	0.060	0.389	0.093
4th quartile transfer income	0.0121	0.059	0.244	0.10
2nd quartile retirement inc.	0.0814	0.072	0.237	0.12
3rd quartile retirement inc.	0.0098	0.081	0.183	0.12
4th quartile retirement inc.	-0.128	0.089	0.0479	0.12
Eastern Europe	0.0140	0.068	-0.0552	0.13
Mexican	-0.225	0.085	0.0627	0.14
Other Spanish	-0.116	0.064	-0.0677	0.11
African-American	-0.374	0.081	0.189	0.15
State unemployment rate	1.67	1.6	5.77	2.3
Non-farming employment	0.000	0.000	0.000	0.000
Max state income tax rate	0.279	0.469	1.01	0.73
Constant	-2.30	0.14	-0.817	0.25

Table 4:
Predicted Probabilities of Starting and Ending Businesses

Exemption Category	**Start business (random-effect probit model)**	**End business (random-effect probit model)**
	(1)	(2)
Owners		
1st quartile	.0226	.141
2nd quartile	.0198	.157
3rd quartile	.0234	.151
4th quartile	.0272	.160
Unlimited	.0277	.167
Renters		
1st quartile	.0193	.219
2nd quartile	.0155	.132
3rd quartile	.0183	.237
4th quartile	.0270	.217
Unlimited	.0221	.244

Table A1. Summary Statistics

	SIPP 1993-95 and 1996-98 panels	
	(1)	(2)
	Mean	s.d.
Own business	.110	.313
Start business	.0299	.170
End business	.0294	.169
Own incorporated bus.	.0330	.178
Exemption (000$)	62.8	71.8
Unlimited exemption	.182	.386
1st quartile – renter/owner	.064/.136	.245/.343
2nd quartile – renter/owner	.068/.152	.252/.359
3rd quartile – renter/owner	.065/.155	.247/.362
4th quartile – renter/owner	.060/.118	.237/.323
Unlimited – renter/owner	.054/.128	.226/.334
Business revenue (if own business)	$2,385	$4,368
Number of earners	1.15	.924
Metropolitan area	.772	.419
Own their home	.689	.463
Education level	9.33	9.00
Single female head	.286	.452
Married head	.551	.497
Family size	2.45	1.42
Head's age	49.8	16.8
Log earnings	7.87	.95
Wealth income (000$)	156	640
Transfer income (000$)	212	569
Retirement inc. (000$)	147	582
Eastern Europe	.0350	.184
Mexican	.0315	.175
Other Spanish	.0453	.208
African-American	.593	.236
Other ethnic groups	.355	.478
State GDP growth rate	.0273	.0149
State unemp. rate	.0554	.014
Non-farming employment share	.886	.061
Max. state income tax rate	.0556	.032
Own "big" business	.049	.216
Business revenue (big business only)	$5,727	6,104

Figure 1. The Insurance Effect of Bankruptcy

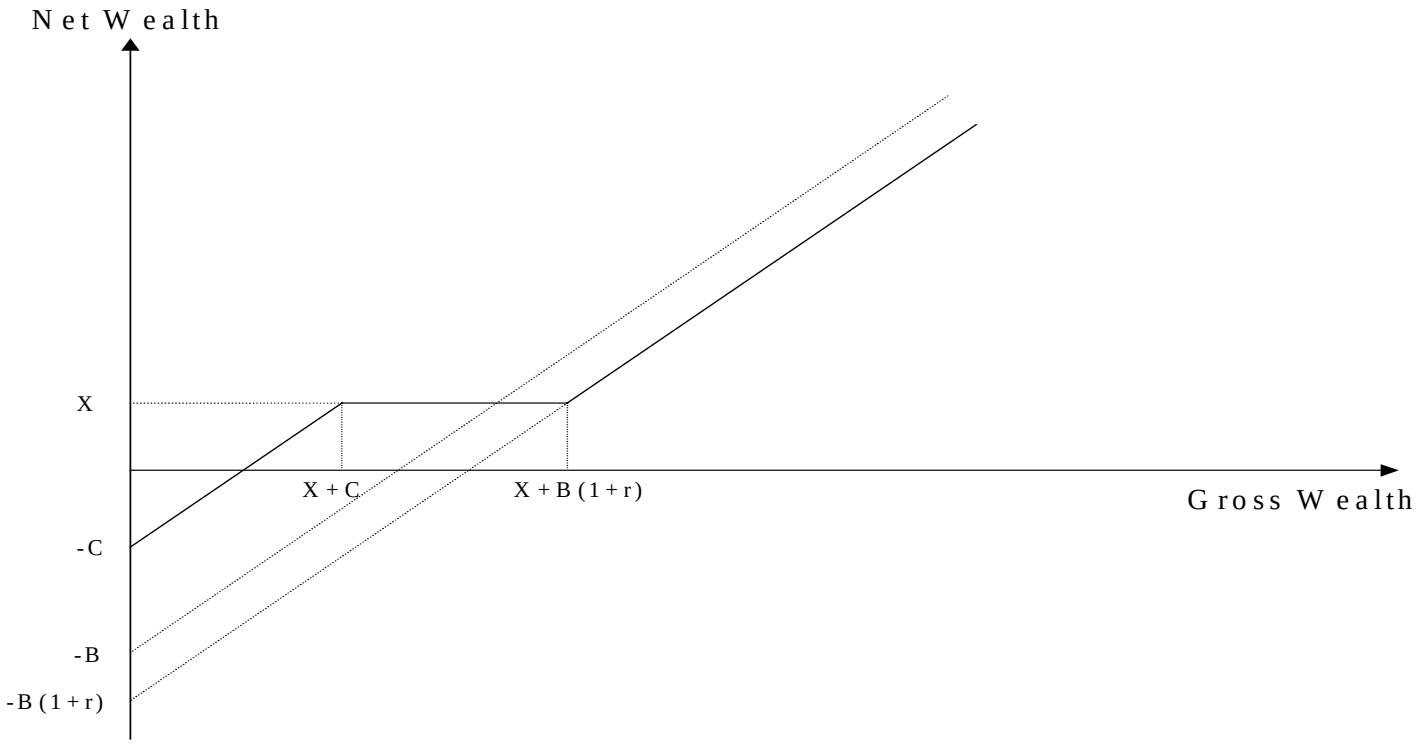

Figure 2. Effect of Bankruptcy Exemption on the Utility Levels of Risk Averse Individuals