Economics of Corporate and Personal Bankruptcy Law

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Introduction

Bankruptcy is the legal process by which the debts of firms, individuals, corporations and some local governments in financial distress are resolved. Debtors file for bankruptcy because they cannot pay debts as they come due and/or because their total liabilities exceed their assets. However, countries vary in whether they have bankruptcy procedures at all and which types of debtors are allowed to use them.

Bankruptcy law always includes several components. First, it provides a collective framework for simultaneously resolving all the debts of the bankrupt, regardless of whether they are due immediately or in the future and regardless of whether they are contingent or not. Part of the bankruptcy process involves creating a list of debts. Another part of the bankruptcy process involves finding and valuing the bankrupt's assets and determining which assets must be used to repay debt. Here, bankruptcy law differs depending on whether bankrupts are corporations, individuals or governments: corporations in bankruptcy may be required to use all of their assets to repay, but individuals and governments in bankruptcy are always allowed to keep some of their assets. Bankrupts may also be required to use some of their future earnings to repay and bankruptcy law provides rules for determining how much and for how long. These rules determine the size of the repayment pie in bankruptcy. Bankruptcy law also provides rules for dividing the pie among creditors—called priority rules. Thus bankruptcy law provides rules that determine both the size and division of the pie.

Second, bankruptcy law provides rules for protecting the collective debt resolution procedure and maximizing the value of assets that go into it. When debtors are in financial distress, individual creditors have an incentive to grab assets in order to keep them outside of the collective bankruptcy procedure and avoid sharing them with other creditors. This race to be first to remove assets can disrupt the debtor's operations and can be economically costly. To protect the collective debt resolution procedure, bankruptcy includes a stay on legal proceedings against the debtor that stops creditors from attempting to collect and from removing assets—the stay starts as soon as the debtor files for bankruptcy.

Third, bankruptcy law punishes bankrupts for failing to repay their debts in full. Punishment is intended to protect lenders by discouraging default generally and discouraging debtors from hiding assets that could be used to repay. In the past, punishments for bankruptcy have been

very harsh, including the death penalty, maiming, exile, selling bankrupts into slavery, and putting them in debtors' prisons. Modern punishments for bankruptcy are less severe, but still exist. In the U.S., bankrupts' names are made public and their bankruptcy filings remain on their credit records for 10 years, thus lowering their credit scores and making it more difficult for them to borrow, rent housing, and get jobs. In the U.K., bankrupts cannot manage firms or hold certain public offices for several years after filing. In France, corporate managers can face criminal charges if they do not file for bankruptcy when their firms become insolvent. Another aspect of the punishment for bankruptcy is whether and when bankrupts receive a discharge of their unpaid debts. In the U.S., most bankrupt individuals obtain a quick discharge. But in France and Germany and other countries, the discharge occurs only after bankrupts have used part of their earnings for several years to repay and the bankruptcy judge decides that they have used reasonable effort. The longer the required period of repayment, the harsher the punishment for bankruptcy. In other countries, there is no debt discharge until the bankrupt person dies. [1]

In analyzing the economic effects of bankruptcy law, a variety of economic objectives needs to be considered and the particular objectives that are important vary depending on whether the bankrupt is a corporation, an individual, or a government. The most important single objective in corporate bankruptcy is deciding efficiently whether corporations in bankruptcy should reorganize versus liquidate. Corporations that reorganize retain some or all of their assets, but adopt a reorganization plan that uses part of their future earnings to repay debt; corporations that liquidate sell all their assets—either piecemeal or as a going concern—and use all of the proceeds to repay pre-bankruptcy debt. From an economic efficiency standpoint, corporations should liquidate if the most efficient use of their assets is different from the current use, so that shutdown frees the assets to move to more valuable uses. And conversely, corporations should reorganize if the best use of their assets is the current use, so that a reorganization allows the assets to remain in place. But deciding whether corporations should reorganize or liquidate is difficult because it involves predicting whether the value of the firms' assets would be higher in a different use, which may be in a different industry. "Filtering failure" in bankruptcy occurs

[1] Sandage (2005) and Mann (2002) discuss attitudes toward debt and default in the U.S. during the 19th century. Efrat (2002) gives multi-country information on punishments for default and bankruptcy.

when economically efficient corporations are liquidated in bankruptcy or economically inefficient corporations are reorganized in bankruptcy. However for individuals in bankruptcy, efficient filtering is not an economic objective. This is because individuals' most valuable asset is usually their human capital, which cannot be liquidated without selling the individual into slavery. Since slavery has been abolished, bankrupt individuals are allowed to keep their human capital and the right to decide whether and how to use it. This means that all individual bankruptcies are reorganizations, although some of individuals' non-human capital may be liquidated to repay their debts in bankruptcy.

Another important economic objective of bankruptcy that applies particularly to corporations is preventing corporate managers from wasting the corporation's assets. When corporations are financially distressed, managers have an incentive to gamble with the assets because a successful gamble benefits managers and shareholders by saving the firm, while a failed gamble only harms creditors by increasing their losses. Allowing corporations to reorganize in bankruptcy has the advantage of reducing managers' incentive to gamble, because they usually remain in charge during at least the initial stages of the reorganization. But because managers always want to save their jobs, allowing them to remain in charge potentially means that too many financially distressed corporations reorganize.

An important economic role of personal as opposed to corporate bankruptcy is that of providing individual debtors with partial consumption insurance by discharging part of their debt when their ability-to-pay turns out to be low and allowing them to keep some of their assets in bankruptcy. The insurance objective of bankruptcy is intended to prevent larger negative effects that may result from sharp drops in debtors' consumption, such as debtors' children being forced to drop out of school in order to work or debtors' health problems going untreated for lack of funds. The insurance objective of bankruptcy is also related to another objective of bankruptcy: that of encouraging individuals to become entrepreneurs. Starting a business is risky and risk-averse individuals are more likely to do so if bankruptcy softens the consequences of failure by discharging the entrepreneur's business and other debts.

A final objective of bankruptcy that applies to all types of bankrupts is that of protecting credit markets. A pro-debtor bankruptcy law makes existing debtors better off, but increases the probability that they will default and reduces the amount they repay conditional on default. This causes lenders to reduce the supply of credit, which harms future borrowers. A pro-creditor

bankruptcy law has the opposite effect. An efficient bankruptcy law needs to strike a balance between the interests of present versus future debtors that assures a reasonable supply of credit.

In this review of bankruptcy law, I examine whether and when the law encourages debtors and creditors to behave economically efficient ways, both before and after they are in financial distress. I also consider how bankruptcy law could be changed to improve economic efficiency. The discussion abstracts from individual countries' bankruptcy laws in order to focus on common features of bankruptcy. However because much of the literature on economic effects of bankruptcy law is U.S.-based, the discussion often focuses on U.S. bankruptcy law in particular. I examine corporate bankruptcy first and then turn to personal and small business bankruptcy.

I. Corporate Bankruptcy

Bankruptcy law affects the economic efficiency of corporate behavior, both when corporations are in financial distress and when they are financially healthy.

A. *Theoretical Research on Corporate Bankruptcy*

1. Priority Rules in Bankruptcy and the Efficiency of Corporate Behavior

Priority rules are rules for dividing repayment in bankruptcy among creditors and shareholders of a corporation. The basic priority rule in bankruptcy is the "absolute priority rule" (APR), which requires that unsecured creditors be repaid in full before shareholders receive anything. When there are multiple creditors, priority among them is determined by whether creditors have a secured interest in a particular asset owned by the corporation or by whether creditors have made agreements with the corporation that specify an ordering. To illustrate, suppose a corporation has creditors A and B and A's loan was made before B's. If A's contract with the corporation specifies that its claim will take priority in bankruptcy over the claims of all later lenders, then A's claim will be paid in full in bankruptcy before B receives anything. Alternately suppose A has a secured claim on the corporation's computer. Then A can take the computer in bankruptcy, which means that A's claim is paid up to the value of the computer before B receives anything. If there is no contractual agreement or security, then A and B have equal priority in bankruptcy and the APR requires that they be paid the same proportion of their

claims. "Deviations from the APR" refer to lower-priority creditors or shareholders being paid some amount in bankruptcy when higher-priority creditors are not paid in full. The legal justification for the APR is that it treats creditors in bankruptcy according to the contracts they made with the corporation outside of bankruptcy.

Priority rules directly affect only the division of the pie, rather than its size. But, indirectly, they have widespread effects on the economic efficiency of corporate behavior. Consider first how priority rules affect the efficiency of managers' bankruptcy decisions. Assume that the corporation is in financial distress and managers—representing the interests of shareholders—must choose between filing for bankruptcy versus continuing to operate the firm outside of bankruptcy. The only bankruptcy procedure is liquidation. Corporations in financial distress may be either economically efficient or economically inefficient. They are economically efficient (despite being in financial distress) if the most valuable use of their assets is the current use and economically inefficient if their assets are more valuable in some other use. When corporations are economically inefficient, the best outcome is liquidation, since liquidation frees their assets to move to higher-value uses. Conversely when they are efficient, the best outcome is for them to continue operating outside of bankruptcy, since this keeps the assets in their current use. Filtering failure occurs when corporations that should liquidate continue to operate or vice versa. Assume that managers and creditors are fully informed about the value of the corporation's assets in both their current and alternate uses.

Suppose the corporation owes a debt of D_A dollars to creditor A which is due in period 1 and a debt of D_B to creditor B which is due in period 2. Total debt *D* equals $D_A + D_B$. The corporation has no cash on hand. If it liquidates in period 1, the value of its assets is *L*. Since $L < D$, the corporation is insolvent. If the corporation continues to operate outside of bankruptcy, then it will earn P_2 with certainty in period 2, but the liquidation value of its assets will fall to zero. Ignoring the time value of money, continuation in period 1 is economically efficient if $P_2 > L$ and liquidation is economically efficient otherwise.

Managers decide between liquidating the corporation in bankruptcy in period 1 or continuing to operate it outside of bankruptcy until period 2. But in order to avoid bankruptcy in period 1, they must repay creditor A and the only way they can do so is to obtain a new loan for the amount owed, which is D_A. Suppose the new loan, if it is made, will be from creditor C and

will be due in period 2. If the corporation obtains the loan and continues to operate until period 2, it will then shut down and distribute its assets according to the APR. Depending on the terms of creditor B's and C's loan contracts, either of them could have priority under the APR or they could have equal priority. Assume first that creditor B takes priority, i.e., priority is in chronological order.

Creditor C and managers are assumed to make the corporation's bankruptcy decision jointly, so that creditor C makes the loan if it and shareholders jointly gain when the corporation continues to operate. This means that shareholders are willing to pay creditor C up to the value of their shares in return for making the loan. If the corporation liquidates in period 1, then all of its assets go to pay creditors and shareholders receive nothing. If the corporation continues to operate in period 1, then creditor C and shareholders together will receive $\max[P_2 - D_B, 0] - D_C$ in period 2. The condition for creditor C and shareholders to prefer continuation over liquidation is that this expression is positive, which implies that $P_2 > D_B + D_C = D$. But since $D > L$, the two conditions together imply that $P_2 > L$. Thus creditor C and shareholders choose continuation only when it is economically efficient. But they may choose liquidation when continuation is more efficient: the inefficient outcome occurs if $L < P_2 < D$. Thus we have a one-sided efficiency result: corporations continue to operate only when doing so is economically efficient, but they sometimes liquidate when continuing to operate is economically efficient. Thus filtering failure occurs in bankruptcy because some economically efficient corporations shut down. This result occurs because choosing continuation increases creditor B's repayment in period 2, but managers and creditor C ignore this gain because they do not share it. Overall, when priority among creditors is in chronological order, too much liquidation occurs in bankruptcy.

Now suppose priority among creditors B and C is in reverse chronological order. Then creditor C is more likely to lend, because creditor C and shareholders receive more in period 2. As a result, financially distressed corporations are more likely to continue operating rather than liquidating in period 1. But the condition for continuation to be economically efficient remains the same. Thus when priority is in reverse chronological order, fewer economically efficient corporations liquidate in bankruptcy, which improves efficiency. But now the opposite type of

filtering failure may occur, since some inefficient corporations may avoid bankruptcy and continue operating.

These simple examples show that priority rules affect the economic efficiency of corporations' bankruptcy decisions and the type of filtering failure that occurs. Too much liquidation occurs when priority among lenders is in chronological order; while too much continuation may occur when priority is in reverse chronological order. Another way to see this result is that priority in reverse chronological order allows late lenders to jump over earlier lenders in the priority ordering, which gives them an incentive to lend and increases the probability that corporations—whether efficient or inefficient—continue to operate.[2]

Now suppose corporations' future earnings are uncertain rather than certain. Suppose earnings if the corporation continues until period 2 are $P_2 + G$ or $P_2 - G$, each with .5 probability. Suppose creditor B has priority over creditor C and assume that earnings in the good outcome are sufficient to repay creditor B in full, while earnings in the bad outcome are not. Now if creditor C lends and the corporation continues to operate, creditor C and shareholders' joint expected return in period 2 is $.5(P_2 + G - D_B) - D_C$. Creditor C lends and the corporation continues to operate if this expression is positive, but continuation is still economically efficient if $P_2 \geq L$. This means that as the corporation's earnings become more uncertain (G rises), continuation is more likely to occur even if it is inefficient. This is because creditor C and shareholders get the additional earnings in the good outcome, but creditor B bears the additional losses in the bad outcome. Corporate managers and shareholders thus tend to prefer risky over safe investments even when risky investments have lower expected returns, because shareholders disproportionately gain when risky investments succeed. This effect applies both to corporations' bankruptcy decisions and to their investment decisions generally.[3]

Now suppose there is a reorganization procedure in bankruptcy.[4] Managers of corporations in financial distress are now assumed to choose among continuing to operate

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[2] See Bulow and Shoven (1978) and White (1980) for coalition models of the bankruptcy decision and Stulz and Johnson (1985) and Bebchuk and Fried (1996) for discussion. These results can be seen as applications in bankruptcy of Myers' (1977) "debt overhang" problem.

[3] See Stiglitz (1972) and Jensen and Meckling (1976) for discussion in the non-bankruptcy context.

[4] In the U.S., managers have the right to choose between reorganization versus liquidation in bankruptcy, but in other countries, this decision is usually made by a trustee or bankruptcy court

outside of bankruptcy, liquidating in bankruptcy, or reorganizing in bankruptcy. When corporations reorganize in bankruptcy, managers are assumed to remain in control at least temporarily and unsecured debt payments are suspended until a reorganization plan is adopted. This temporary debt holiday improves corporations' cash flow and allows them to continue operating. Managers have the exclusive right to propose the reorganization plan and it promises to pay all creditors a fraction *r* of their claims in period 2. (Payments to creditors under the plan must make them at least as well off as they would be in liquidation.) Also assume that the corporation has only one creditor, creditor E, whose claim of D_E is due in period 1. Because of the debt holiday, the corporation no longer needs a new loan in period 1 if it reorganizes in bankruptcy. Assume that if it reorganizes, its earnings in period 2 are still $P_2 \pm G$ in period 2, each with 50% probability, and its assets will still be worthless at the end of period 2.

Introducing reorganization allows us to examine the effects of deviations from the APR. Deviations from the APR often occur when U.S. corporations reorganize in bankruptcy, because reorganization plans must be approved by separate votes of both shareholders and creditors. Shareholders therefore must receive some positive payment in order to induce them to vote for the plan.[5] Suppose shareholders are promised a minimum payment equal to a fraction α of creditors' claims, or αD_E. Deviations from the APR occur when α is positive rather than zero; higher values of α imply that the payoff rate *r* to creditors is lower.

If the corporation reorganizes, shareholders' expected return is $.5(P_2 + G - rD_E) + .5(\alpha D_E)$, where the first term represent shareholders' return in the good outcome and the second term is their return in the bad outcome (earnings are assumed to be high enough even in the bad outcome to make this payment). Thus larger deviations from the APR raise shareholders' return in both the good and bad outcomes and also make it less risky. Because shareholders receive nothing if the firm liquidates in period 1, managers prefer reorganization over liquidation in bankruptcy as long as this expression is positive and they prefer reorganization over continuing to operate

official who replaces the manager. See Franks, Nybourg, and Torous (1996), White (1996), Berkovitch and Israel (1998), and Franks and Sussman (2005) for comparison of bankruptcy law across countries.

[5] Deviations from the APR can alternately be seen as payments by creditors to prevent shareholders from delaying the reorganization process. See Bebchuk and Chang (1992) for a model and Bebchuk (1998) and White (1989) for discussion of the U.S. reorganization process generally.

outside of bankruptcy since $.5(P_2 + G - rD_E) + .5(\alpha D_E)$ exceeds $.5(P_2 + G - D_E)$. But it is economically efficient for the corporation to continue operating only if $P_2 > L$ and this condition is unaffected by introducing reorganization as an alternative to continuation outside of bankruptcy. Thus introducing reorganization in bankruptcy increases filtering failure, since more corporations continue operating in bankruptcy, some of which should liquidate. [6]

Introducing reorganization in bankruptcy also affects managers' incentive to make efficient choices between safe versus risky investment projects. When corporations are in financial distress, suppose the probability of the bad outcome increases in our example from .5 to .9. Shareholders' return thus depends much more strongly on their payoff in the bad outcome. But if deviations from the APR are zero ($\alpha D_E = 0$), shareholders receive nothing in the bad outcome. This means that managers have an incentive to invest in very risky projects (those with high *G*), because shareholders receive a payoff only when the risky investment project is chosen, it succeeds, and its return in the good outcome $(P_2 + G - D_E)$ is large enough to save the corporation. Managers therefore prefer risky projects even when these projects have low expected returns and are economically inefficient. But deviations from the APR give shareholders a positive return even in the bad outcome, so that managers' incentive to select excessively risky investment projects falls. Thus deviations from the APR improve efficiency when corporations are in financial distress by reducing managers' incentive to gamble on extremely risky investment projects.[7]

This discussion shows that introducing reorganization as an alternative bankruptcy procedure increases filtering failure by causing more financially distressed corporations to continue operating when they should liquidate. But the option of reorganizing has the offsetting gain of reducing managers' incentives to invest in excessively risky investment projects when their corporations are in financial distress. The discussion also implies that none of the commonly-used priority rules in bankruptcy always give corporate managers an incentive to make both efficient bankruptcy decisions and efficient investment choices.

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[6] See Wruck and Weiss (1998) for discussion of Eastern Airlines, the best-known example of an inefficient corporation that was saved in bankruptcy under Chapter 11 when it should have liquidated.

[7] But deviations from the APR have the opposite effect on managers' incentives when corporations are not in financial distress. See Bebchuk (2002) and Cornelli and Felli (1997) for discussion.

2. Strategic Default and Managerial Effort

Now turn to the effect of bankruptcy law on whether corporations default on their debt obligations when they are not in financially distress—called strategic default. Suppose there are two types of corporations, solvent versus insolvent, and the most efficient outcome for both types is to continue operating. Managers of both types of corporations decide whether to default or repay in full. If they default, they offer to pay creditors a fraction of their claims and creditors must decide whether to accept or reject. If creditors accept, then the new debt agreement—called a "non-bankruptcy workout"—goes into effect. If creditors reject, then suppose managers of insolvent corporations liquidate in bankruptcy; while managers of solvent corporations repay in full and do not file for bankruptcy. Because bankruptcy is assumed to be costly, the most efficient outcome is for all insolvent corporations to use non-bankruptcy workouts to resolve their financial distress and all solvent corporations to repay their loans in full and avoid bankruptcy. This outcome is efficient because there are no strategic defaults and no costly bankruptcy filings.

Managers of insolvent corporations are always assumed to default and propose workouts, while managers of solvent corporations choose between strategic default and repaying in full. Creditors would like to accept all workout plans offered by insolvent corporations and reject all workout plans offered by solvent corporations. If they could do so, then the efficient outcome would occur, i.e., no strategic defaults and no costly bankruptcies. But models of strategic default assume that there is asymmetric information about corporations' financial status, meaning that managers know whether their corporations are solvent, but creditors do not. As a result, creditors must respond in the same way to all workout offers. Creditors have an incentive to accept non-bankruptcy workout plans, since bankruptcy costs are high and they would receive little in bankruptcy. But creditors have an offsetting incentive to reject workout plans in order to discourage strategic default. In equilibrium, creditors therefore reject some or all workout plans and this means that at least some insolvent corporations end up in bankruptcy. Asymmetric

information thus implies that there is always some strategic default or some costly bankruptcy, or a combination of both.[8]

A number of papers in the financial contracting literature consider ways to reduce this tradeoff. Bolton and Scharfstein (1996) develop a model in which corporations borrow from multiple creditors and they show that doing so reduces managers' probability of strategically defaulting. This is because each individual creditor has the right to force the corporation to liquidate following default, so that strategic default only succeeds if no creditor chooses liquidation and this outcome is less likely as the number of creditors increases. Berglof and von Thadden (1994) consider a similar model in which the corporation has both short-term and long-term debt. Creditors holding long-term debt have a greater stake in the corporation than creditors holding short-term debt, since only the former benefit from its future earnings. As a result, short-term creditors are more likely to liquidate the corporation following default. Berglof and von Thadden show that entrepreneurs are less likely to default strategically if some of the corporation's creditors hold only short-term debt.

There is also research on how bankruptcy law affect managerial effort levels. Povel (1999) develops a model that analyzes how bankruptcy law affects the tradeoff between entrepreneurs' effort levels and whether the number of bankruptcy filings is efficient. In his model, corporations' future earnings may be either high or low. The best outcome is for them to file for bankruptcy when earnings are low and avoid bankruptcy when earnings are high. Entrepreneurs make the bankruptcy decision and they also decide whether to use high or low effort, where high effort increases the probability of high earnings. But creditors cannot observe entrepreneurs' effort levels and they also do not observe a signal that arrives concerning whether earnings will be high or low.

There are two possible bankruptcy laws: "soft" versus "tough," corresponding to reorganization versus liquidation in bankruptcy. Entrepreneurs are assumed to keep their jobs under the soft bankruptcy law and lose them under the tough bankruptcy law. When bankruptcy law is soft, Povel shows that entrepreneurs file for bankruptcy whenever the signal suggests that earnings are likely to be low, since they are treated well in bankruptcy. But because they have a

[8] Models of the tradeoff between strategic default and bankruptcy include Webb (1987), Gertner and Scharfstein (1991), Schwartz (1993), White (1994), Bester (1994), Bolton and Scharfstein (1996), and Hart and Moore (1998).

soft landing in bankruptcy, they use less effort. In contrast, when bankruptcy law is tough, entrepreneurs avoid bankruptcy regardless of the signal, since filing for bankruptcy costs them their jobs. But then they have an incentive to use high effort in order to increase the probability that earnings will be high. Thus there is a tradeoff between the extent of filtering failure and entrepreneurs' effort level: a tough bankruptcy law results in too many bankruptcies but an efficient effort level by managers, while a soft bankruptcy law has the opposite effect. Depending on whether efficient effort by managers or efficient levels of filtering failure is more valuable, either a soft or a tough bankruptcy law could be more economically efficient.

To summarize, theoretical models of bankruptcy law show that bankruptcy affects managers' incentive to make efficient bankruptcy decisions, to default strategically, to make efficient investment decisions, and to use efficient effort levels. The models consider both the effects on economic efficiency of changing the priority rules in bankruptcy and changing bankruptcy law in other ways. The results show that, except in special cases, no one bankruptcy procedure results in economically efficient outcomes along all the dimensions considered. [9]

3. Reforms of Bankruptcy Law—Auctions, Options, and Bankruptcy by Contract

When managers of U.S. corporations file under Chapter 11—the U.S. bankruptcy reorganization procedure—they remain in charge at least temporarily and have the exclusive right for the first few months to propose the reorganization plan. For the plan to be adopted, it must be approved by a majority vote of each classes of creditors and by shareholders as a class. Chapter 11 is thought to encourage too many corporations to reorganize rather than liquidate in bankruptcy, both because managers favor reorganization as a means of saving their jobs and because even economically inefficient corporations can adopt reorganization plans by using deviations from the APR to obtain shareholders' consent. Reform proposals advocate

[9] Related papers include Berkovitch, Israel and Zender (1997), who explore how bankruptcy law affects managers' incentives to invest in firm-specific human capital, Berkovitch and Israel (1999), who explore whether creditors or entrepreneurs should have the right to initiate bankruptcy, Tarantino (2013), who explores the effect of soft versus tough bankruptcy laws on managers' choice between short-term versus long-term investments, and Triantis (1993), who explores how bankruptcy law affects the efficiency of buyers' and sellers' incentives to breach contracts.

substituting market-based methods to value corporate assets in bankruptcy and also propose to take away managers' right to decide whether bankrupt corporations shut down or reorganize.

Auctions. One proposal is to auction all corporations in bankruptcy. If corporations are operating when they file, they would be auctioned as going concerns and, if they have shut down, their assets would be auctioned piecemeal. The proceeds of the auction would be distributed to creditors and equity according to the APR, without deviations. The winner of the auction—rather than old managers—would decide whether the corporation would continue to operate or shut down. Auctions would essentially eliminate the distinction between reorganization and liquidation in bankruptcy.

Auctions have a number of advantages. They would improve economic efficiency by allowing new buyers to decide whether distressed corporations will liquidate or reorganize. While managers and old shareholders always prefer reorganization, buyers have an incentive to make economically efficient choices because they have their own funds at stake. The reorganization process would be also be quicker and less costly, since there would be no need to negotiate and vote on reorganization plans. [10]

But a number of problems with bankruptcy auctions have been noted. One is that, if few bankrupt firms are auctioned, then buyers may assume that they are lemons and respond with low bids. This problem is likely to be less severe if more auctions occur. Another is that auctions may increase the level of concentration in an industry, since the most likely buyers of bankrupt corporations are other firms in the same industry. Finally and most importantly, the theoretical models discussed above do not support the idea that strict application of the APR in bankruptcy reorganization increases efficiency. Instead, using the APR without deviations may result in too many liquidations occurring and may also distort managers' pre-bankruptcy investment decisions.

[10] See Baird (1986), (1987) and (1993), Roe (1983), Jackson (1986), Shleifer and Vishny (1992), Gertner and Picker (1992), Berkovitch, Israel and Zender (1997) and (1998), Baird and Rasmussen (2002) and LoPucki (2003) for arguments in favor and against auctioning corporations in Chapter 11.

Options. Bebchuk (1988) proposed using options to value the assets of corporations in bankruptcy and eliminate deviations from the APR. To illustrate, suppose a bankrupt firm has 100 creditors who are each owed $1, and 100 shares of old equity. Also suppose the reorganized firm will have 100 shares of new equity. Under the options approach, each old shareholder is given an option to purchase the interests of a creditor for $1. Options must be exercised at a particular date. If old shareholders think that their shares are worth less than $1, then they will not exercise their options. Then each loan is converted into a new share in the reorganized corporation, so that each creditor ends up with one new share worth less than $1 and old shareholders receive nothing. But if old shareholders think that their shares are worth more than $1, then they exercise their options. Each creditor then ends up with $1 and each old shareholder ends up with one new share minus $1. Regardless of whether the options are exercised, the APR is followed because old shareholders receive nothing unless creditors are repaid in full. A market for the options would operate before the exercise date, so that creditors and shareholders would have a choice between exercising their options or selling them to investors. This procedure can be extended to multiple classes of creditors, where each class of creditors is given options to purchase the claims of the next highest class of creditors for the face value of their claims.

In Bebchuk's proposal, there is no explicit method for determining whether the old managers will be replaced and how the reorganized firm's assets will be used. After the options are exercised, the new shareholders elect a board of directors that hires a manager—the same procedure as is followed by non-bankrupt firms. Aghion, Hart, and Moore (1992) extended Bebchuk's options scheme to include a vote by the new shareholders on how the reorganized firm's assets will be used. Under their proposal, the bankruptcy judge solicits bids that could involve either cash or non-cash offers for the reorganized firm's new shares or simply offers to manage the firm with the new shareholders retaining their shares. The bids would be announced at the same time that the options are issued, so that the parties could use the information contained to decide whether to exercise their options. After the options are exercised, new shareholders would vote to determine which bid is selected.

Bankruptcy contracts. Bankruptcy is mandatory in the sense that, when firms become insolvent, the bankruptcy law in the relevant country must be followed. Debtors and creditors

are not allowed to contract for any alternative dispute-resolution procedure or (in the U.S.) for any limits on managers' right to file for bankruptcy and to choose between liquidation and reorganization in bankruptcy. They also cannot contract out of use of the APR in bankruptcy liquidation. In this sense, bankruptcy differs from other aspects of commercial law, where the law provides a set of default rules, but the parties are generally allowed to reject the default rules by agreeing on alternatives. A number of authors have argued that efficiency would be enhanced if creditors and debtors could choose their own bankruptcy procedure when they negotiate their debt contracts. This argument makes sense in light of the financial contracting models discussed above, which show that the most economically efficient bankruptcy procedure may vary depending on circumstances. For example in the Povel (1999) model, the most economically efficient bankruptcy law might be either soft or tough.

The most radical approach to bankruptcy contracting was suggested by Adler (1993), who proposed completely abolishing bankruptcy. Instead, debt contracts would incorporate a procedure to deal with financial distress called "chameleon equity." If a corporation became insolvent, equity would be eliminated and the corporation's lowest-priority debts would be converted into new shares. If the corporation was still insolvent, the next-higher-priority debt claims would be converted into equity and the lowest-priority debt claims would be eliminated. The process would continue until the corporation is solvent again. These changes would preserve the APR. Creditors would no longer have the right to sue corporations for repayment following default.

The proposal has a number of problems. The most important is strategic default, since managers would gain from invoking the procedure even if the corporation were solvent. The lack of a penalty for default would undermine credit markets and greatly reduce credit availability. In addition, inefficient corporations would never be forced to shut down, since they could always convert their debt to equity. Overall, the proposal suggests the importance of having a mandatory bankruptcy procedure. While it might improve efficiency to allow debtors and creditors to contract about specifics of bankruptcy, it would not improve efficiency to eliminate bankruptcy completely.

Schwartz (1997) considers a model in which bankruptcy reorganization retains its current form, but debtors and creditors can contract in advance to change some aspects of the law. In particular, creditors could contract in advance to deviate from the APR in bankruptcy by paying

shareholders a pre-determined amount if managers chose liquidation rather than reorganization in bankruptcy. All other aspects of bankruptcy law would remain unchanged.

Schwartz argues that this type of contract can reduce filtering failure by reducing managers' incentive to favor reorganization over liquidation in bankruptcy. The more inefficient is the corporation, the more likely are managers to shift from choosing liquidation to choosing reorganization in bankruptcy when there is a pre-determined payment from creditors, so that fewer inefficient firms would reorganize. But the payments may increase the opposite type of filtering failure, i.e., liquidation of efficient corporations that should reorganize in bankruptcy. This is because a high predetermined payment could induce managers of efficient corporations to choose liquidation over reorganization in order to receive the payment. Thus allowing parties to contract over some aspects of bankruptcy law can may improve economic efficiency relative to the current mandatory bankruptcy regime, but this result depends on specific conditions and does not hold in general.[11]

B. Empirical Research on Corporate Bankruptcy

A problem with empirical research on corporate bankruptcy is that researchers are often interested in behavior of large publicly-traded corporations, but few of them file for bankruptcy. Empirical research is therefore divided between studies of large corporations in bankruptcy that use small samples versus studies of representative samples of corporations in bankruptcy that use large samples, but where the average corporation is small.

1. Characteristics of corporations in bankruptcy and bankruptcy costs

There have been several studies of the characteristics of firms in bankruptcy and the costs of bankruptcy under both Chapter 7—the U.S. bankruptcy liquidation procedure—and Chapter 11. One recent study is Bris, Welch and Zhu (2006), who examined all of the corporations that filed for bankruptcy in two U.S. bankruptcy courts during the late 1990's. They found that the

[11] In most European countries, the choice between reorganizing or liquidating in bankruptcy is not made by managers, but by an appointed administrator or bankruptcy court official. But there may still filtering failure, because the bankruptcy official not always make efficient decisions or may be charged to save the corporation's jobs. In the U.K., too much liquidation is thought to occur because a single creditor has the right to liquidate the corporation's assets following default. See Webb (1991).

average size of corporations filing under Chapter 11 was 10 times as large as that of corporations filing under Chapter 7 and the former were more deeply underwater. The first result suggests that the high fixed costs of reorganizing under Chapter 11 make it prohibitively expensive for small corporations, while the second result is surprising because it goes against the presumption that managers choose reorganization when their corporations' financial condition is less dire, since having more resources improves the chance of a successful reorganization. [12]

Other studies provide evidence that that bankruptcy reorganization is very disruptive, which implies that the costs of bankruptcy must be high. Gilson (1990) found that the turnover rates of top executives and directors were much higher for large corporations that reorganized in bankruptcy than for non-bankrupt corporations. Carapeto (2000) found that when large corporations in bankruptcy offer multiple reorganization plans, the total payoff offered to creditors declines by 14% between the first and the last plan. This implies that the cost of remaining in bankruptcy for longer increases quickly.

2. Deviations from the Absolute Priority Rule.

Several authors have examined the frequency and size of deviations from the APR in corporate reorganizations. The size of deviations from the APR is measured by the amount paid to equity in violation of the APR divided by the total amount paid to creditors under the reorganization plan. For example, suppose a corporation in bankruptcy owes $1,000,000 to creditors, but its reorganization plan pays creditors $500,000 and gives old shareholders $50,000. Then deviations from the APR are $50,000/500,000 or 10%. Studies of deviations from the APR have typically found that between 75% and 90% of large corporations' Chapter 11 plans deviate from the APR and the average APR deviation is in the range of 3% to 7%.[13]

What determines the size of deviations from the APR and how do deviations from the APR relate to the financial condition of corporations in Chapter 11? The first relationship can be estimated by regressing the amount paid to equity as a fraction of unsecured creditors' claims on the amount paid to unsecured creditors as a fraction of their claims (i.e., the payoff rate to

[12] Other studies that examine large corporations in bankruptcy include Weiss (1990), Franks and Torous (1989), LoPucki and Whitford (1990), and Betker (1995). Other studies of small firms in bankruptcy include LoPucki (1983) and White (1983).
[13] See Weiss (1990), Eberhart et al (1990), Betker (1995), and Bris et al (2006).

unsecured creditors). If the APR was always perfectly followed, deviations would be zero as long as the payoff rate to unsecured creditors was less than 100%, but would jump when the payoff rate to creditors reached 100%. But when there are deviations from the APR, shareholders' payoff will increase gradually as unsecured creditors' payoff rate approaches 100%. Thus, in practice, the predicted relationship is a smooth curve with a positive and increasing slope.

White (1989) and Betker (1995) examined this relationship and found that shareholders receive a minimum payoff of about 5 percent of unsecured creditors' claims and that their payoff rate increases as the payoff rate to unsecured creditors rises. This result is consistent with a bargaining model of Chapter 11 such as Bebchuk and Chang (1992), in which equity gets a minimum payoff in return for giving up its right to delay the reorganization and gets more as equity's option on the corporation comes closer to being in the money. Bris et al (2006) also find that deviations from the APR are larger when managers own more of the corporation's equity, which means that managers gain more from avoiding liquidation.[14]

3. Is Chapter 11 Efficient?

Several studies have examined the efficiency of the Chapter 11 in the U.S., sometimes by comparing it to other countries' reorganization procedures. Hotchkiss (1995) and Bris et al (2006) both examined the performance of samples of corporations that successfully completed reorganizations under Chapter 11 and found that one-third and one-half of them liquidated or filed for bankruptcy a second time within a few years. These results suggest that Chapter 11 saves too many firms, including some that should have shut down. Thorburn (2000) compares Sweden's auction-based bankruptcy system with Chapter 11 in the U.S. and argues that the Swedish procedure works better in terms of completing reorganizations quickly and minimizing deviations from the APR. But Ravid and Sundgren (1998) compared Chapter 11 with Finland's reorganization procedure and came to the opposite conclusion.

Chang and Schoar (2007) use an innovative identification method to examine whether a pro-debtor versus pro-creditor version of Chapter 11 would lead to more economically efficient results for corporations that reorganize. They argue that all bankruptcy judges have either a pro-

[14] There is also an empirical literature that compares bankruptcy reorganizations to out-of-bankruptcy workouts—see Gilson et al (1990), Tashjian et al (1996) and Morrison (2009).

debtor or a pro-creditor bias and they develop a measure of individual judges' bias based on how each judge rules on court motions that favor debtors versus creditors. Because Chapter 11 bankruptcy filings are randomly assigned to judges and judges' bias varies, they use the assignment of Chapter 11 filings to bankruptcy judges as a quasi-experiment that randomly assigns corporations in bankruptcy to a pro-debtor or a pro-creditor version of Chapter 11. They find that corporations assigned to the pro-debtor treatment are more likely to shut down, have slower growth after the completion of the bankruptcy procedure, and are more likely to file for bankruptcy a second time. They conclude that Chapter 11 works better when firms are assigned to pro-creditor bankruptcy judges and, by extension, that Chapter 11 would work better overall if it were more pro-creditor.

4. External Effects of Corporate Bankruptcy

Do corporate bankruptcies have external effects on other, solvent firms? There are several ways in which bankruptcies may affect other firms, including both competitors in the same industry and firms in other industries. Corporations benefit when their competitors liquidate, since clients of the liquidated firm transfer their demand to the remaining firms in the industry; but may be harmed when their competitors reorganize if the reorganization cuts their production costs. Corporations may also benefit or be harmed by the liquidation of competitors' assets in bankruptcy, since they can buy up the assets at fire-sale prices, but the value of their own assets that are used as collateral to secure their debt falls when similar assets are sold at low prices. Corporations in general may also be harmed if a large number of bankruptcies during a recession causes banks to cut back on lending generally.

Empirically, Lang and Stulz (1992) show that airline bankruptcies cause the share values of non-bankrupt rival airlines to fall and Benmelech and Bergman (2007) show that airline bankruptcies cause the cost of collateralized borrowing to rise for non-bankrupt airlines that use similar planes as collateral. Jorion and Zhang (2007) show that corporations in a variety of industries are harmed when their competitors file under Chapter 11, but benefit when their competitors file under Chapter 7—these findings presumably reflect the fact that firms gain

when their rivals disappear, but are harmed when their rivals continue to operate and cut their costs by reorganizing in bankruptcy.[15]

II. Personal Bankruptcy

Like corporate bankruptcy law, personal bankruptcy law determines both the total amount that debtors must repay—the size of the pie—and how the pie is divided among creditors. A larger pie benefits future borrowers by increasing the supply of credit and lowering interest rates. But a larger pie is costly to existing debtors, since high repayment obligations may reduce debtors' consumption to the point that they or their families suffer permanent harm. High repayment obligations may also cause debtors to work less and may prevent them from starting new businesses. The division of the pie also has efficiency implications. When debtors default, creditors have an incentive to race against each other to be first to collect, because bankruptcy filings terminate collection efforts. Winning the race to be first means that they collect more at other creditors' expense. But aggressive collection efforts can harm debtors, since they may quit their jobs if creditors garnish wages or lose their jobs if creditors repossess their cars.

Some of the economic objectives of personal bankruptcy are different from those of corporate bankruptcy. Because bankrupt individuals always reorganize rather than liquidate, the issue of filtering failure does not exist in personal bankruptcy. Another feature of personal bankruptcy law that differs from corporate bankruptcy law is that bankrupt individual are protected by a set of exemptions that allow them to keep some or all of their financial assets and future earnings in bankruptcy. An important economic question in personal bankruptcy is how high these exemptions should be. [16]

A. Theoretical Research on Personal Bankruptcy

[15] There is also empirical work on the effect of bankruptcy law on business credit markets—see the discussion of credit markets under personal bankruptcy.

[16] Corporations that reorganize in bankruptcy are also allowed to keep some of their assets, but the justification is that these corporations will repay creditors more from their future earnings if they reorganize than they would if they liquidate.

1. Consumption Insurance and Work Effort [17]

Suppose there is only one personal bankruptcy procedure which obliges bankrupts to repay from both their financial wealth *and* their post-bankruptcy earnings, but provides exemptions for both. These assumptions differ from U.S. bankruptcy law, where most commonly-used personal bankruptcy procedure—Chapter 7 bankruptcy—exempts all future earnings from the obligation to repay. The complete exemption for future earnings is commonly referred to as the "fresh start."[18] Not assuming that all future wages are exempt allows us to consider whether the fresh start is economically efficient.

Assume that the wealth exemption in bankruptcy is X dollars, regardless of the form of the wealth, and the future earnings exemption is x percent of post-bankruptcy earnings.[19] Bankrupts are therefore obliged to use all their wealth above X dollars and $(1 - x)$ percent of their future earnings to repay pre-bankruptcy debt, where the obligation to repay from future earnings is assumed to last for a fixed number of years. If any debt remains unpaid at the end of the repayment period, it is discharged. Bankruptcy filings are also assumed to cost debtors S dollars in court fees and lawyers' fees.

The model that we now discuss illustrates how bankruptcy provides consumption insurance to debtors and how additional consumption insurance is provided when the wealth and earnings exemptions are higher. It also illustrates the tradeoffs involved in determining the levels of the two exemptions.

In period 1, individuals borrow a fixed amount B at interest rate r from a single lender, to be repaid in period 2. The interest rate is determined so as to satisfy the lender's zero profit

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[17] This section draws on Rea (1984), Jackson (1986), White (2005), Fan and White (2003), Wang and White (2000), and Adler, Polak, and Schwartz (2000). Posner (1995) discusses the relationship between the insurance provided by bankruptcy law and government-provided social insurance programs such as unemployment compensation and Fisher (2005) provides an empirical test. See Livshits, MacGee and Tertilt (2007) and Athreya (2002) for macroeconomic models of personal bankruptcy law, which are not discussed here.

[18] Other countries typically require that bankrupts repay from future income for three to eight years after filing. Since 2005, some higher-income bankrupts in the U.S. have also been required to repay from future earnings. See White (2007) for discussion of the U.S. bankruptcy reform of 2005.

[19] The assumption concerning the earnings exemption follows the format of the wage garnishment exemption in the U.S., which applies outside of bankruptcy. It covers 75% of wages, but—unlike the assumption here--it also has a fixed dollar component. See Hynes (2002) for discussion of alternate ways of taxing debtors' post-bankruptcy earnings.

constraint. In period 2, debtors are assumed to have fixed earnings, but an uncertain amount of wealth. At the beginning of period 2, debtors learn their actual wealth, after which they decide whether to file for bankruptcy. They then choose their period 2 labor supply, which may depend on whether they file for bankruptcy. Period 2 is assumed to last for the entire period when bankrupts are obliged to repay from future earnings in bankruptcy. Debtors are assumed to work less after filing for bankruptcy, because their earnings are subject to the "bankruptcy tax" of $(1 - x)$%. (They also have an incentive to work more after filing, because bankruptcy reduces their wealth. But we assume that the substitution effect exceeds the wealth effect, so that they work less.)

Individuals' utility depends positively on consumption and negatively on labor supply in each period and they are assumed to be risk averse. They decide whether to file for bankruptcy based on whether doing so increases their utility. There is a threshold level of period 2 wealth $\hat{W}$ where debtors are indifferent between filing versus not filing; they file if their wealth is below the threshold and do not file otherwise. Figure 1 shows debtors' period 2 consumption as a function of their period 2 wealth. Consumption is divided into three regions: region 3 where debtors repay in full and avoid bankruptcy; region 2 where they file for bankruptcy and partially repay the debt from both wealth and future earnings; and region 1 where they file for bankruptcy and repay only from future earnings, since all of their wealth is exempt. The boundary between regions 2 and 3 occurs at $\hat{W}$. In region 2, consumption is constant because debtors keep X dollars of wealth, but must use any wealth above X to repay. There is a discontinuous drop in consumption from region 3 to region 2, because debtors work less when they file for bankruptcy.

The wealth and earnings exemptions both provide debtors with consumption insurance. To see this, note that raising the wealth exemption X reduces debtors' consumption in region 3 because creditors raise interest rates on loans, but increases debtors' consumption in region 2 because they keep more of their wealth when it is low and they go bankrupt. Consumption is unaffected in region 1 because all of debtors' wealth is already exempt. Similarly, raising the earnings exemption x reduces debtors' consumption in region 3 for the same reason, but increases debtors' consumption in both regions 2 and 1 because debtors keep more of their earnings in bankruptcy. The higher the wealth and/or earnings exemptions, the more consumption insurance that bankruptcy provides to debtors. If we extended the model by

allowing the amount borrowed B to increase, the results would remain the same except that the threshold level of wealth $\hat{W}$ where bankruptcy occurs would shift to the right.

Thus the main tradeoff in raising bankruptcy exemptions is that, when exemption levels rise, existing debtors benefit because they have more consumption insurance, which reduces their downside risk of borrowing. Debtors benefit from the additional consumption insurance as long as they are risk-averse, with more risk-averse debtors benefitting more. On the other side, higher exemption levels raise debtors' default rates and reduce their repayment conditional on default. Lenders respond by reducing the supply of credit and raising interest rates, which makes all future borrowers worse off. The determination of the most economically efficient exemption levels depends on this tradeoff between the value of additional consumption insurance to existing debtors versus the reduction in credit availability to future borrowers.

The model also suggests that the consumption insurance provided by a higher earnings exemption is more valuable than the consumption insurance provided by a higher wealth exemption. This is because a higher earnings exemption raises debtors' consumption in region 1 where it is lowest and also raises debtors' post-bankruptcy work effort, while a higher wealth exemption only raises debtors' consumption in the middle region 2. These results suggest that optimal personal bankruptcy law should have a higher exemption for earnings and a lower exemption for wealth. The higher value of the earnings exemption relative to the wealth exemption suggests an economic justification for the "fresh start." [20]

This sketch of an economic model of bankruptcy exemptions yields several testable hypotheses. First, in jurisdictions that have higher wealth exemptions in bankruptcy, debtors have more consumption insurance and therefore their demand for alternative forms of consumption insurance is lower. Second, lenders are worse off in jurisdictions with higher wealth exemptions. They are therefore predicted to charge higher interest rates and reduce the supply of credit. Third, if debtors are risk averse, then they are predicted to demand more loans when the downside risk of borrowing is lower. This means that demand for credit is predicted to be higher in jurisdictions with higher wealth exemptions. Similarly, if potential entrepreneurs are risk averse, then they are more willing to take the risk of going into business if higher

[20] However, if the earnings exemption covered a fixed dollar amount of earnings rather than a percent of earnings, then the result that the earnings exemption should be higher than the wealth exemption would be weaker. See Wang and White (2000) for a simulation.

bankruptcy exemptions reduce the cost of business failure. Jurisdictions with higher bankruptcy exemptions are therefore predicted to have more entrepreneurs. In the empirical section below, I discuss studies that test these hypotheses.

2. Default versus bankruptcy. In the previous section, debtors were assumed to choose between defaulting on their loans and filing for bankruptcy versus repaying in full. But in fact, debtors often default on their loans without going bankrupt or default first and go bankrupt later. Dawsey and Ausubel (2004) called default without bankruptcy "informal bankruptcy." When debtors default, creditors attempt to collect by calling the debtor and demanding payment. If this doesn't work, their most important legal weapon is garnishment of debtors' earnings. In the U.S., Federal law exempts at least 75% of debtors' wages from garnishment, with several states exempting 90% or more. Garnishment is risky for creditors, since they must obtain a judge's order and it is only successful if the debtor is employed, the creditor can determine the employer, and garnishment does not cause debtors to lose or quit their jobs. Also, debtors may respond to garnishment by filing for bankruptcy, since garnishment of wages ends at the time of the bankruptcy filing.

White (1998b) used an asymmetric information model to examine whether, in equilibrium, debtors might default without going bankrupt. The model assumes that there are two types of debtors, strategic versus non-strategic. Both types decide whether to default and, following default, creditors decide whether to garnish debtors' wages. Garnishment is assumed to be costly for creditors. The two types of debtors differ in how they respond to garnishment: strategic debtors repay in full, while non-strategic debtors file for bankruptcy because they cannot repay. Creditors are assumed unable to identify individual debtors' types, so they must respond in the same way to all defaults. I show that, in equilibrium, all non-strategic debtors default, at least some strategic debtors also default, and creditors play mixed strategies of sometimes instituting garnishment in response to default. This means that, in equilibrium, a group of debtors ends up in informal rather than formal bankruptcy because creditors do not initiate garnishment following default. These debtors obtain the benefit of debt forgiveness without having their wages garnished. The model suggests that having a personal bankruptcy system encourages default by strategic debtors, because creditors do not always respond to default with garnishment. The

model also suggests that wage garnishment rules may be as or more important than exemption levels as determinants of debtors' bankruptcy decisions.

3. Waiving the right to file for personal bankruptcy

In the corporate bankruptcy context, researchers have argued that debtors should be allowed to contract with creditors about bankruptcy procedures to be followed if default occurs (see the discussion above). In the personal bankruptcy context, the issue is whether debtors should be allowed to waive their right to file for bankruptcy.[21]

Would individual debtors ever choose to issue waivers when obtaining loans? The main advantage to debtors of issuing waivers is that more credit would be available at lower interest rates. The main drawback is that if debtors who issued waivers defaulted, they could not use bankruptcy to prevent or end wage garnishment. Issuing a waiver would therefor offset the consumption insurance provided by bankruptcy, because debtors who issued waivers would have higher consumption in region 3 of figure 1, but lower consumption in region 2 and possibly region 1 (if there is no fresh start in bankruptcy). Debtors who issued waivers would probably work more in order to offset some of the extra risk. This suggests that risk-averse debtors would not issue waivers, but risk-neutral or risk-loving debtors might.

However there are a number of externality arguments that support the current policy of prohibiting waivers. One is that waivers may make individual debtors' families worse off, since spouses and children bear most of the cost of reduced consumption if the debtor's wealth turns out to be low, but debtors may not take this into account in deciding whether to issue waivers. Also, debtors may be excessively optimistic about their future wealth prospects or may be hyperbolic discounters, leading them to issue waivers even when it is against their self-interest. Third, prohibiting waivers benefits the government itself, since the government's expenses for social safety net programs are lower when debtors can file for bankruptcy and avoid repaying their debts. Finally, allowing waivers might have adverse macroeconomic effects. This is because if many debtors simultaneously had a bad draw on wealth, all would reduce their consumption simultaneously and the economy might go into a recession.

[21] In the U.S., waivers are unenforceable and the rules of bankruptcy cannot be changed by contract. See Rea (1984), Jackson (1986), Adler, Polak and Schwartz (2000), and Hynes (2004) for discussion.

4. The option value of filing for bankruptcy.

Debtors' right to file for bankruptcy can be expressed as a put option. If debtors' future wealth turns out to be high, they repay their debts in full; but if their future wealth turns out to be low, they can exercise their option to "sell" the debt to creditors by filing for bankruptcy. The price of exercising the put option is the cost of filing plus the amount that debtors are obliged to repay in bankruptcy from their non-exempt wealth and earnings. Also, because debtors in the U.S. can only file for bankruptcy once every six years, they gain from timing their bankruptcy decisions.

White (1998a) calculated the value of the option to file for bankruptcy for a representative sample of U.S. households during the early 1990's. The results showed that at that time, many more households had a positive option value of filing for bankruptcy than had actually filed for bankruptcy.

B. Empirical Research on Personal and Small Business Bankruptcy

Most of the empirical research on personal bankruptcy uses U.S. data and makes use of the fact that bankruptcy law is uniform all over the U.S., except that states are allowed to choose their own exemption levels for wealth.[22] Because exemption levels vary widely, they allow researchers to investigate how differences across states or changes over time in wealth exemptions affect a variety of behaviors by debtors and creditors. In this section, I review empirical research on various aspects of personal and small business bankruptcy.

1. Bankruptcy as consumption insurance.

The model discussed above showed that higher exemption levels for wealth provide debtors with additional consumption insurance. This is because when negative shocks occur, debtors living in states with higher wealth exemptions can have their debts discharged in bankruptcy while keeping more of their assets. One implication of the model is that households' demand for alternate types of consumption insurance will be lower if they live in states with higher wealth

[22] Hynes, Malani and Posner (2003) estimate a model that explains states' wealth exemption levels. Posner (1997) discusses the adoption of the 1978 U.S. Bankruptcy Code, which gave the states the right to adopt their own wealth exemption levels.

exemption levels. One alternative type of consumption insurance is being married, because if both individuals in a couple work or have wealth, they insure each other against negative financial shocks that would reduce their joint consumption. But the insurance provided by marriage is less valuable if households live in states with higher exemption levels, because bankruptcy provides more of the same type of insurance. Traczynski (2011) tests the divorce hypothesis and finds that increases in state exemption levels from 1989 to 2005 resulted in 200,000 additional divorces during this period.

Similarly, debtors have less incentive to buy health insurance if they live in states with higher wealth exemption levels. This is because having health insurance provides individuals with financial protection against negative medical shocks, but the insurance is less valuable if they live in states where bankruptcy provides more of the same type of insurance. Mahoney (2012) shows empirically that individuals are less likely to buy health insurance if they live in states with higher wealth exemption levels.[23]

2. Why do debtors file for bankruptcy?

In the model discussed above, debtors were assumed to file for bankruptcy if doing so makes them better off. This means that they may file when they experience negative financial shocks, but it also means that they gain from behaving strategically in making the bankruptcy decision. Extending the model to allow for variable levels of debt and variable wealth exemptions, debtors have an incentive to compare their financial gain from filing against their costs of filing, where the financial gain equals the value of debt discharged in bankruptcy and the costs of filing equal the value of non-exempt wealth that they must give up in bankruptcy plus the costs of filing plus the cost of reduced access to credit after bankruptcy. Debtors are better off filing for bankruptcy if their financial gain exceeds these costs. This means that the most important determinants of households' bankruptcy decisions are the amount of dischargeable debt they hold and value of their wealth in excess of the wealth exemption in their state. Their earnings do not affect the bankruptcy decision as long as earnings are fully exempt from the obligation to repay in bankruptcy.

[23] See also Grant and Koeniger (2009).

An alternative model of the bankruptcy decision, proposed by Sullivan, Warren and Westbrook (1989), is that debtors do not make their bankruptcy decisions strategically. Instead, they file for bankruptcy only when some adverse event occurs that makes it impossible for them to repay their debts. Under this view, the main determinants of bankruptcy filings are households' income and whether adverse events such as illness, job loss, or divorce have occurred recently.

A third view of bankruptcy is that those who file tend to be hyperbolic discounters who can't follow a budget, rather than people who have experienced negative financial shocks. In this model, income is unlikely to be an important determinant of bankruptcy filings, because even high-income households may be unable to control their spending.

The strategic/economic view of bankruptcy versus the adverse events view can be tested against each other. This is because, under the strategic view, debtors' probability of filing depends on their dischargeable debt and their non-exempt wealth, but does not depend on their income or whether adverse events have occurred. In contrast, under the adverse events model, the main determinants of bankruptcy are income and whether adverse events have occurred. Fay, Hurst and White (2002) tested the two models against each other, using household panel data. They found that debtors are significantly more likely to file for bankruptcy when their financial gain from filing is higher. But they also found that ability-to-pay affects bankruptcy decisions—households with higher incomes were significantly less likely to file. They also tested the importance of adverse events and found that neither job loss nor illness of the household head or spouse in the previous year was significantly related to bankruptcy. But a divorce in the previous year was found to increase the probability of bankruptcy and the result was marginally statistically significant. Thus the study supports both the hypotheses that financial benefit and ability-to-pay affect the bankruptcy decision, but does not support the adverse events hypothesis.[24]

The issue of the extent to which serious illnesses and uninsured medical expenses cause bankruptcy has been especially controversial. Using data from surveys of bankruptcy filers,

[24] Fisher and Lyons (2006) argue that endogeneity causes the effect of divorce on bankruptcy filings to be overstated. However, Keys (2010) finds that job loss does significantly increase debtors' probability of filing for bankruptcy in the following year.

Himmelstein et al (2005) claimed that 55% of bankruptcy filings were caused by illness, injury or uninsured medical bills. Their claim was disputed by Dranove and Millenson (2006), who argued that they over-stated the importance of medical bills by counting bankruptcy filings as triggered by medical bills even when the medical bills were very small. Recent studies have re-examined this question, using experimental approaches. Ramsey et al (2012) examined bankruptcy filing rates of non-elderly individuals who did and did not receive a diagnosis of cancer—an adverse health shock. They found that the cancer patients had much higher bankruptcy filing rates, suggesting that uninsured medical costs and lost earnings due to cancer play an important role in bankruptcy. But Morrison et al (2013) examined whether individuals who were involved in car crashes—another adverse shock—were more likely to file for bankruptcy. They found no relationship between being involved in a crash and filing for bankruptcy once they took account of the fact that the two outcomes are positively correlated, so that individuals who were involved in car crashes were also more likely to file for bankruptcy *before* the crash occurred. Similarly, a study by Baicker and Finkelstein (2011) uses a random expansion of Medicaid to low-income adults in Oregon and finds that those who gained access to Medicaid did not have lower bankruptcy filing rates, suggesting that adverse medical events were not an important determinant of bankruptcy. [25]

Other possible causes of bankruptcy filings include the increased availability of gambling in the U.S. As of 1980, casino gambling was only allowed in Nevada and Atlantic City, New Jersey, but by 2000 it had spread over most of the U.S.. A study by Barron et al (2002) found that bankruptcy filing rates were significantly higher in counties that contained a casino or were adjacent to a county with a casino than elsewhere, although the size of the increase was small. Another recent study by Hankins, Hoekstra and Skiba (2011) examines the effect of winning the lottery on the probability of bankruptcy. They find that winning a large versus a small prize in a lottery postpones rather than reduces debtors' probability of bankruptcy. They interpret their results as supporting the theory that bankruptcy filers are likely to be hyperbolic discounters who can't follow a budget, rather than individuals who have experienced an adverse event.

Payday loans are another possible cause of bankruptcy filings. Payday loans are a type of predatory loans—borrowers receive a short-term loan and give the lender a check for the

[25] See also Gross and Notowidigdo (2011), who found the opposite result using evidence from Medicaid expansions.

principle and interest that is dated after their next paycheck. These short-term loans carry interest rates up to 400% on an annual basis. Although payday loans are usually small, borrowers often renew the loan repeatedly and/or obtain payday loans from multiple lenders, adding to their debt burden. Using a regression discontinuity approach, Skiba and Tabacman (2011) found that when first-time applicants receive payday loans, their bankruptcy filing rate over the following two years doubled.[26]

Finally, several papers have tested the importance of wage garnishment exemptions as a determinant of bankruptcy filings. As discussed above, at least 75% of wages are exempt from garnishment, but some states exempt a higher percent and a few exempt wages completely. Once debtors file for bankruptcy, the bankruptcy prohibition on efforts by creditors to collect ends wage garnishment. This means that in states with higher wage garnishment exemptions, debtors' incentive to file for bankruptcy is weaker since most or all of their wages are already protected outside of bankruptcy. In contrast, wealth exemptions protect debtors' wealth both in and out of bankruptcy, although the amount of the wealth exemption changes in some states when debtors file.

Lefgren and McIntyre (2009) examined the importance of wage garnishment exemptions on bankruptcy decisions. They found that, in states with higher wage garnishment exemptions, more debtors use informal rather than formal bankruptcy, i.e., they default but do not file for bankruptcy. Miller (2013) examined the importance of both wealth exemptions and garnishment exemptions on bankruptcy decisions. She found that garnishment exemptions are more important determinants of bankruptcy for poor households, while wealth exemptions are more important determinants for rich households. These studies results provide support for the strategic model of the bankruptcy decision and for the importance of informal bankruptcy. [27]

3. The Effect of Bankruptcy on Debtors' Labor Supply and Mortality

[26] See also Fay et al (2003), Gross and Souleles (2002), and Cohen-Cole and Duygan-Bump (2010) for studies of the role of bankruptcy stigma in debtors' bankruptcy decisions.
[27] Other papers examining the personal bankruptcy decision and bankruptcy filing rates include Shepard (1984), Boyes and Faith (1986), Peterson and Aoki (1984), White (1987), Domowitz and Eovaldi (1993), Buckley (1994), Domowitz and Sartain (1997), and Dawsey and Ausubel (2004).

In the theoretical model discussed above, debtors are predicted to work less after filing for bankruptcy if they are required to repay from future earnings. However the situation in the U.S. differs from the assumptions of the model, because most bankrupts are not required to repay from post-bankruptcy earnings, but debtors not in bankruptcy are often subject to wage garnishment. This means that filing for bankruptcy reduces rather than increases their obligation to repay from earnings and, as a result, they are predicted to work more rather than less after filing. Han and Li (2007) examined empirically how filing for bankruptcy affects debtors' labor supply. They found that debtors did *not* increase their labor supply after filing for bankruptcy. Their results undermine the argument that the fresh start in bankruptcy is valuable because debtors work more after filing.

A recent paper by Dobbie and Song (2013) revisited this issue, using only bankruptcy filings under Chapter 13—the U.S. procedure for debtors to repay from future wages rather than from non-exempt wealth. Under Chapter 13, debtors in bankruptcy propose a plan to partially repay their debt from future wages and the bankruptcy judge decides whether to accept the plan. Comparing debtors whose Chapter 13 repayment plans have been accepted versus rejected by bankruptcy judges, Dobbie and Song find that having a plan accepted is associated with an increase in debtors' earnings of $6,300 per year and a reduction in debtors' five-year mortality rate of 1.1 percentage point. These large and significant results suggest that successfully going through the bankruptcy process both increases debtors' work effort and improves their health. But because Dobbie and Song focus on debtors whose Chapter 13 repayment plans are accepted versus rejected by bankruptcy judges, it is unclear whether the same large effects would apply when comparing debtors who file versus don't file for bankruptcy. [28]

4. Bankruptcy and Portfolio Composition

Bankruptcy also affects the composition of debtors' portfolios. When debtors live in a state with a higher wealth exemption, they have an incentive to borrow more and to hold more assets, rather than using their assets to repay their debts. This is because if households hold the assets in a form that is exempt in bankruptcy, the debt will be discharged when they file for bankruptcy and they can keep the assets. The assets are usually held in the form of home equity or

[28] Dobbie and Song's identification is based on the fact that debtors in Chapter 13 are randomly assigned to bankruptcy judges, whose acceptance rates for repayment plans vary.

retirement accounts, since these assets are frequently exempt in bankruptcy. Lehnert and Maki (2002) call this behavior call this behavior "borrowing to save." They find empirical support for the hypothesis that households living in states with higher wealth exemptions are more likely to borrow to save.

5. Bankruptcy and Entrepreneurial Behavior

When individuals start or own unincorporated businesses, their consumption has high variance. This is both because their businesses may succeed or fail and because they incur high business debts for which they are personally liable. The personal bankruptcy system provides partial insurance for this risk since, if businesses fail, entrepreneurs can file for personal bankruptcy and have both their business and personal debts discharged. The partial consumption insurance provided by bankruptcy thus makes it more attractive for risk-averse individuals to become entrepreneurs. Also because wealth exemptions vary across U.S. states, high-exemption states provide more consumption insurance than low-exemption states and therefore becoming an entrepreneur is more attractiveness in high-exemption states. In many of these states, entrepreneurs who are homeowners can keep their homes in bankruptcy when their businesses fail.

Fan and White (2003) tested whether households living in states with higher wealth exemptions are more likely to start or own businesses. They focused on homestead exemptions, which are wealth exemptions that apply to home equity; in most states, the exemption for home equity is the largest wealth exemption. They found that homeowners were 35% more likely to own businesses if they live in states with high or unlimited homestead exemptions compared to homeowners in states with low homestead exemptions. They also found a similarly large and significant effect for renters, which suggests that most renters who own businesses expect to become homeowners in the future.[29] Armour and Cumming (2008) also examined whether entrepreneurship rates are higher when bankruptcy law is more favorable to debtors, using cross-country data for 15 countries in Europe and North America. They similarly found that entrepreneurship is higher in countries with more debtor-friendly bankruptcy laws.

[29] Also see Georgellis and Wall (2006), who compare bankruptcy exemption levels with other policy variables as determinants of entrepreneurship rates across U.S. states.

6. Bankruptcy and Credit Markets

Now turn to the effect of bankruptcy law on credit markets. In general, we expect creditors to adjust the supply of loans in response to variations in the strength of their legal rights when default occurs. Because higher wealth exemptions allow debtors to keep more of their assets in bankruptcy and therefore weaken creditors' legal rights, they are predicted to cause lenders to tighten the supply of credit. But higher wealth exemptions also affect demand for credit, since risk-averse debtors demand more credit when higher exemptions reduce the downside risk of borrowing. Thus a rise in exemption levels is predicted to cause both the supply of credit to fall and the demand for credit to rise. This means that interest rates are predicted to rise, but the number and size of loans could either rise or fall.

Gropp, Scholz and White (1997) examined the effect of wealth exemptions on consumer credit markets generally. They found that households were 5.5 percentage points more likely to be turned down for credit if they lived in states with high rather than low wealth exemptions. Also, interest rates were higher in states with high wealth exemptions, but the size of the increase depended strongly on debtors' wealth. Low-wealth households paid higher interest rates if they lived in states with high rather than low wealth exemptions, but high-wealth households paid the same interest rates regardless of the exemption level. Similarly, in states with high rather than low exemptions, low-wealth households borrowed less and high-wealth households borrowed more. The latter finding suggests that, in states with high versus low wealth exemptions, lenders redistribute credit from low-wealth to high-wealth households. While policy-makers often think that high wealth exemptions help the poor, in fact they appear to harm the poor and benefit the rich.

Other studies have examined the effect of wealth exemptions in bankruptcy on specialized credit markets, of which one is the market for small business loans. Wealth exemptions are predicted to affect small business loan markets as well as personal loan markets, since small business loans are personal liabilities of the business owner whenever the business is non-corporate (and often are personal liabilities of the owner when the business is corporate, since the owner may have personally guaranteed the loan). Berkowitz and White (2003) found that small businesses were more likely to be turned down for loans if they were located in states with high wealth exemptions and, if they received loans, interest rates were higher. These results, combined with the effect of bankruptcy on entrepreneurial behavior, suggest that higher wealth

exemptions are a two-edge sword: they encourage more individuals to become entrepreneurs, but cause their businesses to be more credit-constrained. [30]

Other research has used cross-country data to examine the effects of variations in the strength of debtors' or creditors' rights under bankruptcy law on small business credit markets. This type of study is more difficult than comparing bankruptcy law across U.S. states, because many features of bankruptcy law—rather than just a single feature—differ across countries and the overall impact of the differences on the pro-creditor or pro-debtor bias of bankruptcy may not be clear. One recent study is Davydenko and Franks (2008), which compared the effects of bankruptcy law on small business credit markets in France, Germany and the United Kingdom. They characterize bankruptcy law as being most pro-creditor in the U.K., most pro-debtor in France, and intermediate in Germany. Among their results is that, in France, lenders demand higher collateral per dollar of debt, because bankruptcy officials there often sell firms in bankruptcy for less than the highest bid in order to obtain a new owner who will save the firm and preserve its jobs. They also find—surprisingly—that interest rates on small business loans are not strongly influenced by cross-country differences in bankruptcy law.

In the U.S., bankruptcy filings remain on individuals' credit records for up to 10 years. Han and Li (2011) examine how filing for bankruptcy affects debtors' access to credit in the years after the filing. They find that debtors borrow less and pay higher interest rates following bankruptcy and that the effect persists for the entire 10-year period. This suggests that the U.S. practice of allowing bankruptcy filings to remain on debtors' credit records for a full decade is a non-trivial punishment for bankruptcy. The negative effect is magnified by the fact that credit scores are often checked when applicants apply for jobs or apartments, as well as when they apply for loans.

7. Bankruptcy Law and Mortgage Default

Prior to 2005, homeowners in financial distress could use bankruptcy to save their homes. This is because filing for bankruptcy allowed them to have their unsecured debts discharged, which increased their ability-to-pay to make their mortgage payments. But in 2005, a reform of

[30] The effect of bankruptcy law on home mortgage markets has also been studied; see Berkowitz and Hynes (1999), Lin and White (2001), and Chomsisengphet and Elul (2006).

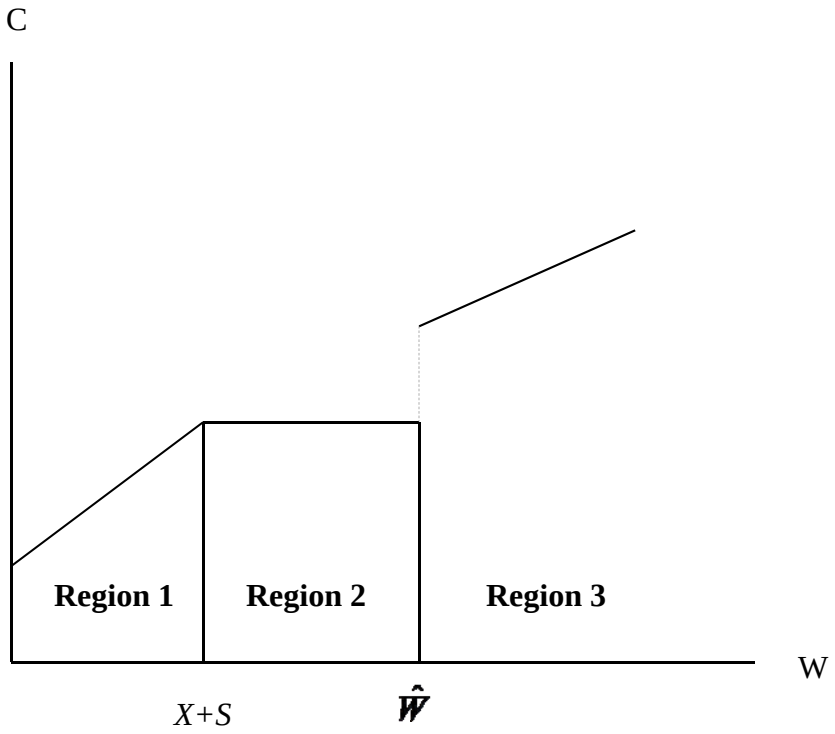
U.S. bankruptcy law made filing for bankruptcy more expensive for debtors and forced high-earning debtors to use some of their post-bankruptcy income to repay unsecured debt.[31] As a result, bankruptcy became less attractive to homeowners as a means of saving their homes, bankruptcy filing rates fell, and this change is hypothesized to have caused default rates on mortgages to rise. Li, White and Zhu (2010) and Morgan, Iverson and Botsch (2011) both tested this prediction and found that default rates on mortgages in fact jumped after the 2005 bankruptcy reform. They argue that the jump in default rates on mortgages was at least partly responsible for the bursting of the housing bubble, which caused housing prices to fall and led to the 2008 mortgage crisis. They conclude that bankruptcy reform was in part responsible for the Great Recession.

Overall, the empirical research on bankruptcy suggests that it has important and wide-ranging effects on individual behavior, corporate behavior and the economy as a whole.

[31] See White and Zhu (2010) for discussion of the treatment of homeowners in bankruptcy. Dobbie and Song (2013) also find that debtors whose Chapter 13 repayment plans were accepted by judges had lower rates of foreclosure.

Figure 1:

The Insurance Effect of Bankruptcy



Note: The diagram shows period 2 consumption on the vertical axis and period 2 wealth on the horizontal axis. Labor supply is assumed to be higher outside of bankruptcy than in bankruptcy. Debtors file for bankruptcy in regions 1 and 2 and do not file in region 3.

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Figure 1:

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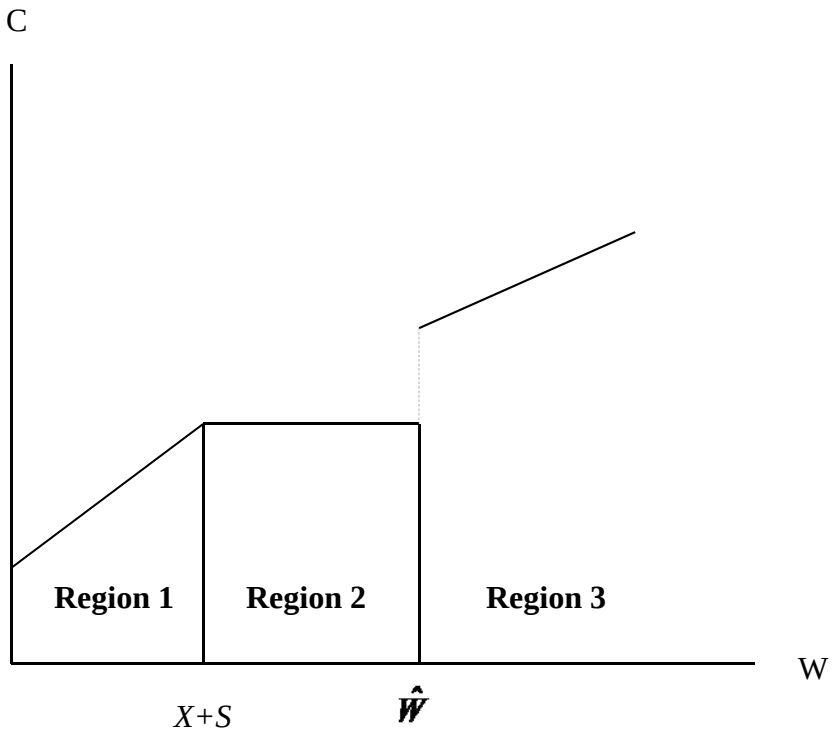

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