

Credit, Wages and Bankruptcy Laws*

Bruno Biais[†]

Thomas Mariotti[‡]

Revised: October 2006

Abstract

We analyze how bankruptcy laws affect the general equilibrium interactions between the credit and the labor markets. Soft laws reduce the frequency of ex-post inefficient liquidations, while they worsen credit rationing ex-ante. This hinders firm creation and thus reduces the demand for labor, which depresses wages. Yet, rich entrepreneurs, who need little credit, can invest even if creditor rights are weak. They therefore favor soft laws that exclude poor entrepreneurs from the credit market and thus reduce the competition for labor. Due to incentive and general equilibrium effects, however, soft laws can maximize social welfare. Indeed, by reducing wages, they raise the pledgeable income of the entrepreneurs who can still access the credit market, which reduces the frequency of ex-post inefficient liquidations.

Keywords: Bankruptcy Law, Credit Rationing, Financial Contracts.

JEL Classification: D82, G33, K22.

*We have benefited from discussions with Stéphane Auray, Alberto Bennardo, Patrick Bolton, Catherine Casamatta, Georges Casamatta, Denis Gromb, Roman Inderst, Steven Kaplan, Nobuhiro Kiyotaki, Jean-Jacques Laffont, David Martimort, Marco Pagano, Fausto Panunzi, Jean-Charles Rochet, Howard Rosenthal, Gilles Saint-Paul, Klaus Schmidt, Andrei Shleifer, Jean Tirole and Luigi Zingales. We also thank workshop participants at the CEPR/Princeton University Conference on the Political Economy of Financial Markets and the Banca d'Italia/CEPR Conference on Money, Banking and Finance, as well as seminar participants at Saïd Business School, Stanford University, Università Bocconi, Université du Québec à Montréal and Université de Toulouse for useful comments.

[†]Université de Toulouse 1, CRG, GREMAQ (UMR CNRS 5604) and IDEI, 21 Allée de Brienne, 31000 Toulouse, France, and CEPR. E-mail: biais@cict.fr

[‡]Université de Toulouse 1, GREMAQ (UMR CNRS 5604) and IDEI, 21 Allée de Brienne, 31000 Toulouse, France, and CEPR. E-mail: mariotti@cict.fr.

1. INTRODUCTION

Should contracts be enforced? If they were not, agents would fail to commit resources to meet their contractual obligations. This would jeopardize economic activity. Yet, violations of contracts can be legal. Bankruptcy laws offer one the most important and blatant examples of such violations. They are the focus of this paper. Given the crucial role of corporate borrowing for investment and economic activity, it is important to study the causes and consequences of legal provisions weakening creditor rights.¹

According to La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998), “The most basic right of a senior collateralized creditor is the right to repossess—and then liquidate or keep—collateral when a loan is in default [...] In some countries, law makes it difficult for such creditors to repossess collateral, in part because such repossession leads to liquidation of firms, which is viewed as socially undesirable.” The U.S. Constitution gave Congress large powers to pass bankruptcy laws interfering with contracts (Berglöf and Rosenthal (2000)). Indeed, the Chapter 11 procedure allows to maintain distressed firms in operation. When creditors disagree with the reorganization plan, the judge can decide to use the *cram down* procedure to implement the plan in spite of their opposition. In France, the first stated objective of the bankruptcy law is to help distressed firms and to avoid laying off workers. Judges enjoy large discretionary powers, and can unilaterally write-off creditor rights (Biais and Malécot (1996)). These laws contrast with those prevailing in the U.K. or Germany. Franks and Sussman (2005b) show that the English bankruptcy procedure was mainly developed by lenders and borrowers, exercising their right to contract freely. State intervention in this process was relatively limited, and largely confined to enforcing the contracts signed by private parties. Correspondingly, the current U.K. bankruptcy code emphasizes the protection of creditor rights. Under the German law, companies that default on their debt repayment obligations are usually liquidated and the proceeds distributed to debtholders. This reflects that, as stated in La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998), “German-civil-law countries are very responsive to secured creditors.”

Previous literature has emphasized the trade-off between the ex-ante and ex-post effects of bankruptcy laws (White (1989)). While debtor-oriented (soft) laws can avoid inefficient liquidations ex-post, they have adverse effects ex-ante because, anticipating creditor rights’ violations, banks are reluctant to lend. Empirically, La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 1998) and Giannetti (2003) find that access to debt financing is lower in countries with soft bankruptcy codes.²

The key contribution of the present paper is to approach these issues from a general equilibrium perspective, analyzing the interactions between the credit and the labor markets. We consider a population of risk-neutral agents, who differ only in terms of their initial wealth. They can choose to become workers or entrepreneurs. The latter raise funds to invest in a business project and hire the former in their firm. Workers incur some disutility to supply labor, and are compensated by wages. Entrepreneurs must exert costly effort to make the investment project profitable and are compensated by profits, net of wages and

¹A rich and interesting literature surveys bankruptcy laws in different countries (see for instance Franks and Torous (1989, 1994), Franks, Nyborg and Torous (1996), White (1996)). While this literature studies various aspects of bankruptcy laws, the present paper focuses on the key problem of their impact on the enforcement of creditor rights.

²Similarly, weak enforcement of creditor rights is one of the reasons why Russian companies have virtually no access to external finance (Boycko, Shleifer and Vishny (1993)).

reimbursements, and non-transferable private benefits.

In Section 2, we analyze the benchmark case in which there are no imperfections on the labor and credit markets. In the socially optimal competitive equilibrium, agents are indifferent between becoming workers or entrepreneurs. The first-best aggregate level of investment is independent of the distribution of wealth across agents, and only reflects the disutility of labor and the profitability of investment. When the former is low and the latter is high, it is optimal that a high proportion of agents become entrepreneurs, raise funds and invest in the project.

In Section 3, we turn to the case of imperfect financial markets. In line with Holmström and Tirole (1997), we assume that entrepreneurial effort is unobservable, which raises a moral hazard problem. After the realization of the cash-flow, a firm can be liquidated or maintained in operation, as in Bolton and Scharfstein (1990). We consider the situation where ex-post efficiency goes against liquidation, as private benefits from continuation exceed liquidation proceeds. Nevertheless, an ex-ante optimal financial contract can involve the liquidation of a firm when the cash-flow generated by its investment project is low. This is because the threat of liquidation enhances the entrepreneur's incentives to exert effort, and thus reduces agency rents. Furthermore, since liquidation proceeds are allocated to outside investors, liquidation increases their willingness to fund the project. Hence, the income that entrepreneurs can pledge to outside investors is increasing in the liquidation rate they can commit to. It is also decreasing in the wages paid to the workers.

In equilibrium, agents with low initial wealth cannot obtain a loan, as their need for outside funds exceeds the expected pledgeable income they can generate. They have no other choice than to become workers. In contrast, very wealthy agents need little outside financing and can therefore raise funds without committing to liquidation in case of failure. This corresponds to equity financing. Agents with intermediate levels of wealth need greater outside financing, and thus must promise greater repayments to outside investors. To raise their pledgeable income, they must commit to higher liquidation rates in case of failure, and thus issue risky debt.³ When the bankruptcy law is soft, it can preclude such high liquidation rates and thus prevent these agents from raising funds and becoming entrepreneurs.

In this context, we identify two regimes. The first regime arises when the socially optimal level of investment is low and the bankruptcy law is tough. In that case, moral hazard reduces social welfare by requiring inefficient liquidations, but it does not generate credit rationing, in the sense that all agents who prefer to become entrepreneurs can do so. Hence, as in the first-best, the marginal entrepreneur is indifferent between becoming a worker or an entrepreneur. The second regime arises when the socially optimal level of investment is high or the bankruptcy law is soft. In this case, relatively poor agents who would be better off as entrepreneurs cannot obtain a loan, because the pledgeable income they can generate is less than their outside financing needs. These agents are credit rationed, and must therefore become workers. Not only does this reduce investment: by increasing labor supply and reducing labor demand, this also lowers wages.

In Section 4, we analyze the preferences of different agents towards bankruptcy laws, and the political process through which these laws can emerge. Agents with intermediate wealth favor laws that are tough enough to enable them to access credit. By contrast, rich agents, who can finance their investment project irrespective of the law, are in favor of restricting

³In our model financial contracts are optimal. Agents who issue risky debt, and thus face the risk of inefficient liquidation, would not have been able to rely on equity financing.

the freedom of contracting. Indeed, weak creditor rights increase exclusion from the credit market. This reduces the competition for labor, lowers wages, and thus raises the profits of the rich. This is in line with the finding of Rajan and Zingales (2003) that incumbents are opposed to efficient financial systems, which facilitate entry and thus lower their profits. Our analysis thus predicts that in countries where the economic elite strongly influences the political process, bankruptcy laws should tend to be soft. As an illustration, the very soft 1841 U.S. bankruptcy law was pushed by the Whigs, which represented the economic elite in nineteenth century America. When this law was repealed by the Congress, the New England Whigs, clearly the richest people in the country, still voted in favor of it (Berglöf and Rosenthal (2000)). Another implication of our analysis is that, when the moral hazard problem is severe, middle class voters favor rather tough laws, which help them access credit, and this results in relatively high aggregate leverage.

Finally, in Section 5, we switch from a positive to a normative viewpoint. We show that, in spite of their adverse effect on access to credit, soft laws can maximize the ex-ante utilitarian social welfare. This apparent paradox arises because, with moral hazard, the interaction between the credit market and the labor market endogenously generates externalities. When one agent opts for entrepreneurship, this raises wages. In turn, this reduces the income that the other entrepreneurs can promise to outside investors. To maintain their pledgeable income, these entrepreneurs need to commit to greater liquidation rates in case of failure. This reduces social welfare, by raising the frequency of inefficient liquidations. This mechanism is particularly strong whenever, with a tough law, there is no credit rationing. The marginal entrepreneur commits to a relatively high liquidation rate, such that he has access to funds, and at which he is indifferent between becoming a worker or an entrepreneur. In this context, a softer law generates greater social welfare than the tough law. Indeed, the softer law excludes the marginal entrepreneur from accessing the credit market. But this does not reduce social welfare significantly, since the utility of this agent as a worker is the same as his utility as an entrepreneur. On the other hand, the corresponding decrease in wages benefits all the agents who remain entrepreneurs, by reducing their liquidation rates and the corresponding ex-post inefficiencies.

Our paper builds on the rich literature analyzing the design of bankruptcy procedures (see for instance Bebchuk (1988), White (1989), Aghion, Hart and Moore (1992), Berkovitch, Israel and Zender (1997), Berkovitch and Israel (1999)). There are three major difference between our approach and that literature. First, we emphasize the difference between laws and contracts and study how the agents take into account the bankruptcy law when writing financial contracts. Second, we consider a general equilibrium setting, where the interaction between the credit market and the labor market generates endogenous externalities in the presence of entrepreneurial moral hazard. Third, we study the political underpinnings of the bankruptcy law, and thus analyze how different laws can emerge.

Our focus on the interaction between financial decisions and politics or legislation in general equilibrium is in line with the insightful paper by Bolton and Rosenthal (2002). A key difference is that, in their analysis, voting on moratoria occurs ex-post, while in our setup, the bankruptcy law is set up ex-ante. Furthermore, their focus on how laws complete contracts by making their application contingent on macroeconomic shocks, differs from our focus on how laws take into account externalities imposed on third parties by financial contracts. In contrast to their results, the soft law that can emerge in our setting can be interpreted as a form of contractual incompleteness, since it precludes the enforcement of some financial

contracts.

Our emphasis on the interactions between imperfect credit markets and the labor market is in line with Acemoglu (2001) and Pagano and Volpin (2001). However, their focus differs from ours. Acemoglu (2001) studies how credit market imperfections magnify the consequences of labor market imperfections. This is outside the scope of the present paper, since we consider a perfect labor market. On the other hand, while we offer a detailed analysis of financial contracting, Acemoglu (2001) takes a more reduced form approach, by simply assuming that external financing is impossible. Thus our analysis of determinants of credit rationing such as the legal context or the wage rate are distinct from his approach. Pagano and Volpin (2005) focus on a different instrument to discipline managers, namely takeovers. While we emphasize the classical conflict between managers and workers over wages, they identify a situation where the interests of managers and workers can be aligned. Specifically, incumbent managers favor long-term labor contracts promising high wages, to the extent that these deter takeovers, and thus help them enjoy private benefits. Last, our general equilibrium analysis of credit rationing in a context where some agents seek to become entrepreneurs is in the spirit of Aghion and Bolton (1997). In their analysis, however, the fraction of agents who become entrepreneurs determines the cost of capital, while in ours it determines the wage rate. Besides, our focus on the potential inefficiencies of liquidations and the violation of creditor rights induced by soft bankruptcy laws is a distinctive feature of our analysis.

2. MODEL AND FIRST-BEST BENCHMARK

2.1. *The Environment*

Our basic model is in line with Holmström and Tirole (1997). There is a continuum of mass one of risk-neutral agents, with limited liability. Each agent has an investment project, requiring initial investment I . While all investment projects are identical, agents differ in their initial wealth $A \in [0, I]$. We denote by F the cumulative distribution function of wealth, which is assumed to be continuously differentiable on $[0, I]$, with a density f that is bounded away from zero over this interval. To undertake his investment project, and thus become an entrepreneur, an agent with initial wealth A needs to raise outside funds $I - A$. The supply of funds is provided by international financial markets, and for simplicity we assume perfect capital mobility. Competitive and risk-neutral outside investors are thus willing to lend if they break even on average, and we normalize their required rate of return to zero. Once undertaken, a project can succeed, delivering a revenue R , or fail, delivering no revenue. If an entrepreneur exerts effort, at a disutility cost e , the probability of success is p_H , while if he does not exert effort, the probability of success is lowered to $p_L = p_H - \Delta p$. Success or failure are independent across projects.

Our model departs in two crucial ways from Holmström and Tirole (1997). First, besides the investment I , each project also requires one unit of labor, which is purchased at price w on a competitive labor market.⁴ The workers are agents that chose, or possibly were forced not to become entrepreneurs. Supplying l units of labor entails a disutility $C(l)$. We assume that the function C is strictly increasing, strictly convex, twice continuously differentiable, and satisfies the usual Inada conditions $C(0) = 0$, $C'(0) = 0$ and $\lim_{l \rightarrow \infty} C'(l) = \infty$. Second, after the

⁴By convention, wages are paid ex-post by the entrepreneur whenever his project is successful, and not upfront by the investors. This does not affect our results given that all agents are risk-neutral.

revenue is realized, the project can be continued or liquidated. In the latter case, observable and contractible liquidation proceeds L are obtained. By contrast, if the project is continued, the entrepreneur obtains non-transferable private benefits B . A natural interpretation is that these benefits stem from the private use of the firm's assets by the entrepreneur. Alternatively, non-transferable private benefits from continuation may also arise in a dynamic extension of our model. In that context, they would reflect the present value of the agency rents to be obtained by the entrepreneur in the future. Our parameter B can be interpreted as a reduced form representation of these future rents.⁵

We assume that liquidation is ex-post inefficient, that is:

$$B > L. \quad (1)$$

Condition (1) captures the idea that liquidation often fails to allocate the firm's assets to the party valuing them the most. Indeed, these assets are typically worth less to outsiders than to insiders. Besides, since they must be sold quickly in case of liquidation, they need not end up in the hands of the most efficient outsider. The ex-post inefficiency of liquidation may also reflect that, during the sale of a distressed firm, its operations are impaired, customers and suppliers are reluctant to deal with it, and employees are demotivated.

Next, we assume that each project generates a negative surplus whenever the entrepreneur does not exert effort, even if the project is continued in any case:

$$p_L R + B - I < 0, \quad (2)$$

and that each project generates a positive surplus whenever the entrepreneur exerts effort, and the project is not liquidated except in case of failure:

$$p_H(R + B) + (1 - p_H)L - e - I > 0. \quad (3)$$

Finally, we also assume that:

$$\frac{e}{\Delta p} \geq B. \quad (4)$$

According to (4), the magnitude of the moral hazard problem, as measured by $e/\Delta p$, is large relative to the private benefit B from continuation. As we will see, this limits the income which can be pledged to outside investors.

Remark. We have also analyzed the case in which $B \leq L$ for some firms. It is then efficient to transfer ownership of these firms' assets to the investors. Yet, soft bankruptcy laws can reduce their ability to commit to this policy and thus impair access to credit. Our positive analysis, which relies on the fact that weak creditor rights worsen credit rationing, is unaffected by this alternative assumption. However, it modifies our normative analysis, which hinges on the efficiency gains resulting from less frequent liquidations. Nevertheless, if the fraction of firms for which $B \leq L$ is not too large, our qualitative results are upheld.

2.2. Efficiency and Equilibrium without Moral Hazard

As a benchmark, we characterize the efficient allocation of agents into entrepreneurs and workers when entrepreneurial effort is contractible, so that there is no moral hazard problem.

⁵See Biais, Mariotti, Plantin and Rochet (2006) for an example of a dynamic agency model with endogenous non-transferable managerial benefits from continuation.

It follows from (1)–(3) that for each project that is undertaken, it is efficient to exert high effort and not to liquidate. The first-best surplus from a project is then:

$$S^{FB} = p_H R + B - e - I. \quad (5)$$

Without moral hazard, only the total mass of workers, not their identity, matters for efficiency. Moreover, because the cost of labor function C is strictly convex, efficiency requires that all workers supply the same amount of labor. One then has the following result, whose proof is to be found in the Appendix.

Proposition 1. *An efficient allocation is reached when there is a mass m^{FB} of workers, and each worker supplies l^{FB} units of labor, where m^{FB} and l^{FB} are related by:*

$$m^{FB} l^{FB} = 1 - m^{FB}, \quad (6)$$

$$S^{FB} + C(l^{FB}) = \frac{C'(l^{FB})}{m^{FB}}. \quad (7)$$

Condition (6) requires that the aggregate labor supply be equal to the total mass of entrepreneurs, while condition (7) equalizes the marginal social cost and the marginal social benefit of an extra worker. Proposition 1 implies that the efficient proportion of workers, and thus the level of aggregate investment, does not depend on the distribution of wealth among agents. As shown in the next section, this property of first-best allocations no longer holds in the second-best environment.

Absent moral hazard constraints, efficient allocations can be decentralized in a competitive equilibrium. Let $\ell^*(w)$ be the optimal labor supply by a worker given wage w . Equilibrium requires that expected wages equal the marginal disutility of labor:

$$p_H w = C'(\ell^*(w)). \quad (8)$$

The second equilibrium condition relates to occupational choices, and requests that the utility from becoming a worker equals that from becoming an entrepreneur:

$$p_H w \ell^*(w) - C(\ell^*(w)) = S^{FB} - p_H w. \quad (9)$$

Finally, the labor market clearing condition implies that, at the competitive equilibrium wage w^{CE} , individual labor supply satisfies:

$$m^{CE} \ell^*(w^{CE}) = 1 - m^{CE}, \quad (10)$$

where m^{CE} is the total mass of workers in equilibrium. Using (8)–(10), we obtain that:

$$S^{FB} + C(\ell^*(w^{CE})) = \frac{C'(\ell^*(w^{CE}))}{m^{CE}}. \quad (11)$$

Equations (10)–(11) form the clear counterpart of (6)–(7). It follows that $m^{CE} = m^{FB}$, as expected. The equilibrium proportion of workers is independent of the distribution of wealth. This reflects that gains from trade in (9) are independent of initial endowments.

As for efficient allocations, the identity of workers and entrepreneurs is irrelevant in a competitive equilibrium. However, it will be helpful for future reference to consider the

case in which agents who become workers are those with wealth below some cutoff \hat{A} , to be determined in equilibrium. Labor market clearing implies that individual labor supply is $1/F(\hat{A}) - 1$. In line with our approach in terms of surplus, see (5), we focus on the utility the agent obtains through economic interactions on top of his initial endowment A . The utility of a worker, as a function of the wealth \hat{A} of the marginal agent, is given by:

$$U_W(\hat{A}) = C' \left(\frac{1}{F(\hat{A})} - 1 \right) \left[\frac{1}{F(\hat{A})} - 1 \right] - C \left(\frac{1}{F(\hat{A})} - 1 \right), \quad (12)$$

while the utility of an entrepreneur, as a function of \hat{A} , is given by:

$$U_E^{FB}(\hat{A}) = S^{FB} - C' \left(\frac{1}{F(\hat{A})} - 1 \right). \quad (13)$$

It follows from (12)–(13) along with the strict convexity of the cost of labor function C that $U_W(\hat{A})$ and $U_E^{FB}(\hat{A})$ are respectively decreasing and increasing in \hat{A} . This reflects that the more workers there are, the lower is the wage rate. The equilibrium value of \hat{A} , A^{FB} , can then be obtained from the indifference condition $U_W(A^{FB}) = U_E^{FB}(A^{FB})$, and we have $m^{FB} = F(A^{FB})$. This competitive equilibrium is illustrated on Figure 1.

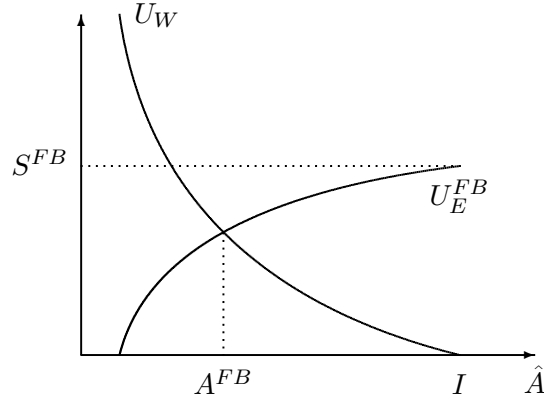


FIGURE 1. A competitive equilibrium without moral hazard.

The figure plots the surplus of the workers and that of the entrepreneurs, as functions of the wealth of the marginal agent. The two curves intersect at the equilibrium point where agents are indifferent between the two occupational choices. Again, while the equilibrium threshold of wealth below which agents become workers depends on the distribution of wealth, the total mass of workers does not.

3. EQUILIBRIUM WITH MORAL HAZARD AND A SOFT BANKRUPTCY LAW

When entrepreneurial effort is not observable, agents cope with the resulting moral hazard problem by designing optimal financial contracts. These contracts must ensure that investors are ready to lend and entrepreneurs are ready to exert effort. To this end, they rely on two instruments. First, a minimal amount of initial wealth may be required in order to grant

funds, as in Holmström and Tirole (1997). Second, inefficient ex-post liquidation in case of failure may be used as an incentive to exert effort, as in Bolton and Scharfstein (1990). However, as discussed in the Introduction, bankruptcy laws in many countries do not strictly enforce financial contracts. Instead of this, they frequently force continuation of activity in cases where the existing contract requested liquidation. In this section, we study the impact of such soft bankruptcy laws on optimal financial contracting, taking into account the general equilibrium interaction between the credit and the labor markets.

3.1. The Credit Market

For each agent with wealth A , a financial contract first stipulates whether or not his project can be financed, that is, whether or not he can become an entrepreneur. In the former case, the contract specifies a transfer τ to the entrepreneur whenever the project succeeds, and a liquidation probability λ whenever the project fails.⁶ Equivalently, λ can be interpreted as the fraction of the firms' assets to be liquidated.⁷

As we shall see below, when an entrepreneur is financed by debt, the optimal financial contract specifies a positive liquidation rate in case of failure. Under a soft bankruptcy law, however, courts can interfere with the application of the contract and impose that the project be continued instead of being liquidated. To model this process in the simplest possible way, we assume that, in the states in which the contract entails liquidation, the project is only liquidated with probability π , while with probability $1 - \pi$ the court overrules the contract and imposes continuation. As a result, when the financial contract states a nominal liquidation rate λ in case of failure, the actual liquidation rate is $\lambda^a = \lambda\pi$. To counter this effect, the investors can insist on a higher nominal liquidation rate. But since the latter cannot exceed one, a soft bankruptcy law constrains actual liquidation rates to be at most equal to π . The parameter π can thus be interpreted as a measure of the toughness of the law: the closer π is to one, the tougher is the law. We will say that the law is tough when financial contracts are perfectly enforced, that is $\pi = 1$.

Given wage w and law toughness π , a financial contract (τ, λ) is incentive compatible whenever the following holds:

$$p_H(\tau + B - w) + (1 - p_H)(1 - \lambda\pi)B - e \geq p_L(\tau + B - w) + (1 - p_L)(1 - \lambda\pi)B.$$

The left-hand side of this inequality is the expected utility the entrepreneur derives from the project if he exerts effort, while the right-hand side is his expected utility without effort. This incentive compatibility constraint requires that the payoff τ to the entrepreneur in case of success be high enough:

$$\tau \geq \tau^{\min} \equiv \frac{e}{\Delta p} + w - \lambda\pi B.$$

⁶One can verify that it is never optimal to liquidate the project following a success, as doing so would result in a tighter incentive constraint for the entrepreneur. To simplify the exposition, we do not allow for contracts in which the financing decision itself is randomly taken. While such contracts could increase efficiency as in other general equilibrium models with moral hazard (Prescott and Townsend (1984)), we have checked that, if the liquidation cost $B - L$ is low enough, our main conclusions still hold even when such random contracts are enforceable.

⁷In practice, when borrowing firms enter financial distress, their files are managed by a special department of the lending bank, that has its own staff and procedures. Franks and Sussman (2005a) offer an empirical analysis of the workings of such recovery units in several U.K. banks. Committing to a given liquidation rate can be achieved by an appropriate specification of the objectives and procedures of the recovery unit.

Given a nominal liquidation rate λ , the highest income in case of success which can be pledged to investors without jeopardizing the entrepreneur's incentives is:

$$R - \tau^{\min} = R + \lambda\pi B - w - \frac{e}{\Delta p}.$$

Condition (4) implies that the payoff to the entrepreneur in case of success must be positive, so that the pledgeable income is lower than the revenue generated by the project. Taking into account ex-post liquidation in case of failure, the expected pledgeable income is then:

$$p_H \left(R - \frac{e}{\Delta p} \right) + \lambda\pi[p_H B + (1 - p_H)L] - p_H w.$$

The expected pledgeable income is decreasing in $e/\Delta p$, which measures the severity of the moral hazard problem. Moreover, the expected pledgeable income is increasing in λ and π . This reflects that an increase in the liquidation rate or in the toughness of the law raises the investors' revenue in case of failure, and strengthens the incentives of the entrepreneur to exert effort in order to avoid liquidation.

Hereafter, we shall assume that the minimum ex-wages pledgeable income is positive, so that agents with high initial wealth can raise funds without committing to liquidation:

$$p_H \left(R - \frac{e}{\Delta p} \right) > 0.$$

We also assume that the maximum ex-wages pledgeable income is less than the investment expenditures, even if the law is tough, so that some initial wealth is required for investing:

$$p_H \left(R - \frac{e}{\Delta p} \right) + p_H B + (1 - p_H)L < I.$$

For investors to break even on average, the expected pledgeable income must exceed the investors' commitment:

$$p_H \left(R - \frac{e}{\Delta p} \right) + \lambda\pi[p_H B + (1 - p_H)L] - p_H w \geq I - A. \quad (14)$$

It follows that, given the wage rate w , an agent can obtain a loan with nominal liquidation rate λ if and only if his initial wealth A is above the threshold level:

$$A(w, \lambda, \pi) = I - p_H \left(R - \frac{e}{\Delta p} \right) - \lambda\pi[p_H B + (1 - p_H)L] + p_H w. \quad (15)$$

The fact that a minimum amount of wealth is required to obtain a loan is directly in line with Holmström and Tirole (1997). It is also similar to the result by Bernanke and Gertler (1989) that the greater the net worth of the borrower, the lower the agency cost implied by the optimal contract. Since liquidation is ex-post inefficient, it is optimal to keep the liquidation rate as low as possible. We therefore obtain two distinct financing regimes, outlined in the following proposition.

Proposition 2. *Given wage w and law toughness π , only agents with wealth $A \geq A(w, 1, \pi)$ can raise external funds. Out of these agents, those with wealth $A \geq A(w, 0, \pi)$ are never*

liquidated in case of failure, while those with wealth $A(w, 1, \pi) \leq A < A(w, 0, \pi)$ are liquidated at a positive rate in case of failure.

If $A < A(w, 1, \pi)$, there is no value of the nominal liquidation rate such that the investors' participation constraint and the manager's incentive compatibility condition jointly hold. Agents with wealth below $A(w, 1, \pi)$ have thus no other choice than to become workers. For agents with wealth $A \geq A(w, 1, \pi)$, a higher initial wealth reduces the required amount of external finance. When $A \geq A(w, 0, \pi)$, the optimal financial contract entails no liquidation in case of failure. Thus, while outside investors obtain a share of the cash-flow in case of success, they cannot force liquidation in case of failure. This corresponds to equity financing by minority shareholders. By contrast, the optimal contract when $A(w, 1, \pi) \leq A < A(w, 0, \pi)$ corresponds to a debt contract. The optimal actual liquidation rate in that case is obtained whenever the investors' participation constraint (14) is binding, that is:

$$\lambda^a(A, w) = \frac{I - A - p_H(R - e/\Delta p) + p_H w}{p_H B + (1 - p_H)L}. \quad (16)$$

The higher the initial wealth of an entrepreneur, the lower the optimal liquidation rate. As wealthy entrepreneurs need relatively little external finance, they need to pledge only limited income. As a consequence, they do not need to concede a high liquidation rate. Entrepreneurs with wealth $A \geq A(w, 0, \pi)$ are never liquidated in case of failure, and therefore $\lambda^a(A, w) = 0$ for these agents. It should be noted that, for a fixed wage w , the actual liquidation rates for entrepreneurs with wealth $A \geq A(w, 1, \pi)$ remain the same as under a tough law. Thus, holding wages constant, the only impact of a soft bankruptcy law is to increase the minimum amount of wealth required to obtain a loan.

3.2. Competitive Equilibrium

Given wage w and law toughness π , the utility of an agent with wealth $A \geq A(w, 1, \pi)$ who decides to become an entrepreneur is given by:

$$S^{FB} - p_H w - \lambda^a(A, w)(1 - p_H)(B - L).$$

Since $B > L$ and $\lambda^a(A, w)$ is a decreasing function of A , the utility of an entrepreneur is an increasing function of his wealth, in contrast with the first-best. This reflects that, since wealthy entrepreneurs can avoid frequent liquidations, they do not need to incur the corresponding welfare losses. In contrast, the utility from becoming a worker,

$$p_H w \ell^*(w) - C(\ell^*(w)),$$

is independent of wealth. Moreover, only agents with wealth above $A(w, 1, \pi)$ can be financed. Thus, in a competitive equilibrium, those who choose, or are forced to become workers are the poorest agents. Let \hat{A} be the cutoff level of wealth below which an agent becomes a worker. Labor market clearing implies that individual labor supply is $\ell^*(w) = 1/F(\hat{A}) - 1$. The wage rate w corresponding to \hat{A} is given by the first-order condition (8). For this to be compatible with equilibrium in the credit market, it must be that:

$$\hat{A} \geq A\left(\frac{1}{p_H} C'\left(\frac{1}{F(\hat{A})} - 1\right), 1, \pi\right), \quad (17)$$

where for all (w, λ, π) , $A(w, \lambda, \pi)$ is defined as in (15). If condition (17) did not hold, the marginal agent with wealth \hat{A} could not obtain a loan. It is not difficult to check that there exists a threshold $\underline{A}(\pi) \in (0, I)$ such that (17) holds if and only if $\hat{A} \geq \underline{A}(\pi)$.⁸ Intuitively, $\underline{A}(\pi)$ is the minimal amount of wealth required from the marginal agent to become an entrepreneur, taking into account the endogeneity of wages. Equivalently, this is the level of wealth for the marginal entrepreneur at which the maximum expected pledgeable income, corresponding to an actual liquidation rate π , is equal to the required funding:

$$p_H \left(R - \frac{e}{\Delta p} \right) + \pi [p_H B + (1 - p_H)L] - C' \left(\frac{1}{F(\underline{A}(\pi))} - 1 \right) = I - \underline{A}(\pi). \quad (18)$$

It is easy to check from (18) that $\underline{A}(\pi)$ is decreasing in π . That is, the tougher the law, the lower the minimum amount of wealth needed to become an entrepreneur.

To complete the description of the equilibrium, it remains to determine the equilibrium value of \hat{A} . For this, we need to compare a worker's utility with the utility that the marginal agent with wealth \hat{A} would obtain if he became an entrepreneur. To compute the latter, define, for any $\hat{A} \geq \underline{A}(\pi)$,

$$\Lambda^a(\hat{A}) = \lambda^a \left(\hat{A}, \frac{1}{p_H} C' \left(\frac{1}{F(\hat{A})} - 1 \right) \right), \quad (19)$$

where for all (A, λ) , $\lambda^a(A, w)$ is defined as in (16), with $\lambda^a(A, w) = 0$ if $A \geq A(w, 0, \pi)$. This is the optimal actual liquidation rate for a marginal entrepreneur with wealth \hat{A} , given the labor market clearing wage rate. Note that, by construction, $\Lambda^a(\underline{A}(\pi)) = \pi$. If he becomes an entrepreneur, the utility of the marginal agent is therefore given by:

$$U_E^{SB}(\hat{A}) = U_E^{FB}(\hat{A}) - \Lambda^a(\hat{A})(1 - p_H)(B - L). \quad (20)$$

It follows from (13), (16) and (19) that $\Lambda^a(\hat{A})$ is decreasing in \hat{A} , and thus that $U_E^{SB}(\hat{A})$ is increasing in \hat{A} .

Relying on the above analysis, we can now study equilibrium credit and wages in our model. In the second-best environment, it may still be the case that, as in the first-best benchmark, the marginal agent is indifferent between becoming a worker or an entrepreneur. Yet, if the moral hazard problem is severe or the bankruptcy law very soft, this indifference condition will not hold. In that case, there is credit rationing, in the sense that the marginal agent would strictly prefer to become an entrepreneur, but is constrained to become a worker. This is stated in the following proposition, where a worker's utility is defined as in (12).

Proposition 3. *There exists a unique competitive equilibrium, with the following properties:*

- (i) *If $U_E^{SB}(\underline{A}(\pi)) \leq U_W(\underline{A}(\pi))$, there is no credit rationing in equilibrium. The agents who become workers are those with wealth below A^{SB} , where A^{SB} is the unique value of \hat{A} such that $U_E^{SB}(\hat{A}) = U_W(\hat{A})$.*
- (ii) *If $U_E^{SB}(\underline{A}(\pi)) > U_W(\underline{A}(\pi))$, credit rationing arises in equilibrium. Agents with initial wealth strictly below $\underline{A}(\pi)$ must become workers, while those with greater initial wealth strictly prefer to become entrepreneurs.*

⁸Using the definition of $A(w, \lambda, \pi)$ along with the convexity of C , it is easy to verify that the right-hand side of (17) is decreasing in \hat{A} . The existence of \underline{A} then follows directly from the positivity of the minimum ex-wages expected pledgeable income, together with the Inada conditions on C .

In case (i) there is no credit rationing, as the marginal agent has more wealth than the minimum required to access credit, $A^{SB} \geq \underline{A}(\pi)$. This occurs when the maximum liquidation rate that would arise in equilibrium with a tough law would be lower than π . In this case, the constraint imposed by the soft law does not bind, and equilibrium and welfare are the same with a tough and with a soft law. Since $\underline{A}(\pi)$ is decreasing in π , this scenario is more likely to happen when π is relatively high, that is, when the law is relatively tough.

In case (ii) there is credit rationing, as the wealth of the marginal agent is not high enough to grant him access to credit, $A^{SB} < \underline{A}(\pi)$. As a result, the marginal entrepreneur obtains a strictly higher utility than the workers do. Without credit market imperfections, this would be corrected by a decline in the number of workers and an increase in wages. However, under moral hazard, wages cannot adjust to restore the indifference condition, because agents with initial wealth below $\underline{A}(\pi)$ cannot have access to credit. Such credit rationing occurs when the maximum liquidation rate that would prevail with a tough law is higher than π . Agents with wealth slightly below $\underline{A}(\pi)$ would rather become entrepreneurs, but to satisfy incentive and participation constraints, they would have to set the actual liquidation rate above π , which is precluded by the soft law. The lower is π , and thus the softer is the law, the more likely is credit rationing to occur, and the lower is the equilibrium wage:

$$w(\pi) = \frac{1}{p_H} C' \left(\frac{1}{F(\underline{A}(\pi))} - 1 \right). \quad (21)$$

A competitive equilibrium with credit rationing is illustrated on Figure 2.

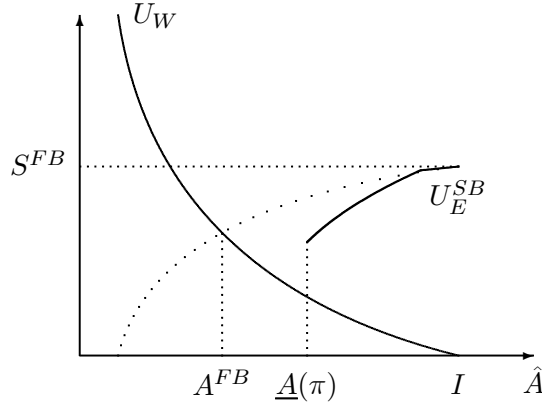


FIGURE 2. A competitive equilibrium with moral hazard and credit rationing.

The figure plots the surplus of the workers and that of the entrepreneurs, as functions of the wealth of the marginal agent. The surplus of the entrepreneurs is defined only above $\underline{A}(\pi)$, the minimum amount of wealth required to become an entrepreneur.

The next corollary states an immediate consequence of Proposition 3.

Corollary 1. *Compared to the first-best benchmark, moral hazard reduces the fraction of agents that become entrepreneurs and thus depresses investment and wages. Whenever $U_E^{SB}(\underline{A}(\pi)) > U_W(\underline{A}(\pi))$, this effect is stronger under a soft law than under the tough law.*

The corollary reflects that moral hazard raises the minimum amount of wealth required to become an entrepreneur:

$$\max \{A^{SB}, \underline{A}(\pi)\} > A^{FB}.$$

Two effects are at work here. First, ex-post inefficient liquidations make entrepreneurship less attractive for the agents relative to the first-best, as can be seen from (20). Second, credit rationing may exclude further agents with relatively low initial wealth from the credit market. The latter effect is magnified under a soft law.

4. THE POLITICAL ECONOMY OF SOFT BANKRUPTCY LAWS

In this section, we examine the political determinants of bankruptcy laws. To this end, we first characterize the preferences of agents over the toughness of the law, as a function of their initial wealth. Next, we take a median voter approach to illustrate how changes in the fundamentals of the economy affect the bankruptcy law and the structure of financial contracts in equilibrium. Finally, we investigate the impact of a shift in political power towards the richest agents.

4.1. Political Preferences

We shall focus on the case in which, under the tough law, no credit rationing occurs, and the marginal entrepreneur with wealth A^{SB} is liquidated at a positive rate λ^{SB} in case of failure, so that debt and equity coexist in equilibrium.⁹ Any law with toughness $\pi \geq \lambda^{SB}$ is outcome equivalent to the tough law, calling for a strict enforcement of contracts, and thus there is no loss of generality in restricting the policy space to $[0, \lambda^{SB}]$. If the bankruptcy law involves a maximum liquidation rate $\pi < \lambda^{SB}$, strict enforcement of financial contracts is precluded, which leads to credit rationing. Agents with wealth below $\underline{A}(\pi) > A^{SB}$ are then constrained to become workers.

Poor Agents. Consider first the case of an agent with wealth $A \leq A^{SB}$. Irrespective of the law, this agent has no other choice than to become a worker and obtain utility $U_W(\underline{A}(\pi))$, which is increasing in π . This reflects that workers benefit from tough laws, which facilitate firm creation and investment, and result in higher labor demand and higher wages. Thus these agents favor the toughest law, $\pi = \lambda^{SB}$.

Rich Agents. Consider next the case of an agent with wealth $A \geq \underline{A}(0)$. Irrespective of the law, this agent becomes an entrepreneur and is never liquidated in equilibrium, thereby obtaining utility:

$$S^{FB} - p_H w(\pi),$$

which is decreasing in π by (21). This reflects that agents who are never credit rationed benefit from soft laws, which hinder firm creation and investment, and result in lower labor demand and lower wages. Thus these agents want the law to be as soft as possible, $\pi = 0$.

Intermediate Agents. Consider finally the case of an agent with wealth $A^{SB} < A < \underline{A}(0)$. There exists a degree $\pi_A \in (0, \lambda^{SB})$ of toughness of the law such that this agent is just rich enough to have access to credit, $A = \underline{A}(\pi_A)$. If a softer law is enacted, this agent is forced to

⁹Formally, these conditions amount to $U_E^{SB}(\underline{A}(1)) \leq U_W(\underline{A}(1))$ and $A^{SB} < \underline{A}(0)$.

become a worker, with a utility $U_W(\underline{A}(\pi))$ that is increasing in π on $[0, \pi_A)$. By contrast, if a tougher law is enacted, he becomes an entrepreneur, thereby obtaining utility:

$$S^{FB} - p_H w(\pi) - \lambda^a(A, w(\pi))(1 - p_H)(B - L),$$

which is decreasing in π by (16) and (21). Because $U_E^{SB}(\underline{A}(\pi_A)) > U_W(\underline{A}(\pi_A))$, there is an upward jump in the agent's utility at the point π_A where he can become an entrepreneur. Conditional on becoming an entrepreneur, he prefers that as few as possible other agents be entrepreneurs, in order to benefit from lower wages. His utility attains a maximum whenever $\pi = \pi_A$, so that he is in effect the marginal entrepreneur.

These results are in line with Rajan and Zingales (2003), who argue that incumbent firms that do not rely much on external capital markets to finance their projects extract a rent from an underdeveloped financial system that does not strictly enforce financial contracts. In our analysis, a tough bankruptcy law enhances competition over labor and thus increases wages, leading to lower profits for those agents who are rich enough to enjoy a privileged access to finance. This implies that these agents should oppose tough bankruptcy laws which would allow newcomers to enter the credit market.

Remark. In order to abstract from any externality on third parties that would not be directly linked to financial contracting, we focused in our analysis on the case in which the liquidation costs are entirely borne by entrepreneurs. A natural question is whether taking into account similar costs for workers would affect their political preferences. It turns out that this depends on whether wages that are set on the labor market adequately reflect these costs. When this is the case, firms with different initial funds, and therefore different liquidation rates ex-post, will typically pay different wages in equilibrium, so as to make the workers indifferent between working in any firm. To see this point, suppose that for each unit of labor that a worker supplies to a given firm, he incurs a disutility k in case this firm is liquidated after a failure. For workers to be indifferent among firms, it must that the wages w_A paid by firms with different levels of initial funds A are such that the expected wage net of the expected liquidation cost for the workers,

$$p_H w_A - (1 - p_H)k\lambda^a(A, w_A),$$

is a constant independent of A . It must also be positive, which requires k not to be too high. It is straightforward to check from (16) that this makes w_A a decreasing function of A . Indeed, firms with low initial funds must commit to higher liquidation rates to raise external funds, and must therefore compensate workers by setting higher wages. This mechanism naturally amplifies credit rationing, by raising the minimal amount of wealth needed to become an entrepreneur. Because workers are perfectly compensated for liquidation costs, their political preferences are unchanged relative to when $k = 0$: they still prefer a tough law which enhances investment and firm creation, and results in higher labor demand and higher wages. Consider by contrast the case in which workers cannot be fully compensated for these liquidation costs. As suggested by Pagano and Volpin (2001), this may occur because workers must invest in firm-specific human capital. For instance, suppose now that there is a fixed liquidation cost K for workers, and that wages are set in the labor market under a veil of ignorance, that is, before workers know the specific liquidation rates of the firms for which they will eventually work. Then, given law toughness π and equilibrium wage $w(\pi)$, a typical worker chooses his

labor supply l so as to maximize:

$$p_H w(\pi)l - C(l) - (1 - p_H)K \frac{\int_{\underline{A}(\pi)}^{A(w(\pi), 0, \pi)} \lambda^a(A, w(\pi)) dF(A)}{1 - F(\underline{A}(\pi))}.$$

The last term in this objective function is the expected liquidation cost for the worker. Since it is independent of l , it does not affect individual labor supply. Whenever $K > 0$, the attractiveness of becoming a worker is reduced. Hence, if there is no rationing in equilibrium, less agents become workers, and wages are higher than when $K = 0$. Because of higher wages, the liquidation rates must increase, and the proportion of entrepreneurs who finance their projects with equity decreases. If K is high, workers will typically favor an intermediate law that trades off the liquidation costs and the positive wage impact of firm creation. If K is low, they will still favor a tough bankruptcy law, and our analysis is unaffected.

4.2. Voting on the Bankruptcy Law

The upshot of the previous discussion is that, under our assumptions, all agents have single-peaked preferences with respect to the toughness of the law, as measured by $\pi \in [0, \lambda^{SB}]$. This implies that the median voter theorem applies, and thus the policy π^M favored by the median agent cannot be defeated under majority voting by any other alternative. In this section, we focus on the case in which the median agent is one with an intermediate level of wealth, that is $A^M = \underline{A}(\pi^M)$ for $A^{SB} < A^M < \underline{A}(0)$, so that some credit rationing takes place in equilibrium. In that case, equation (18) can be rewritten as:

$$p_H \left(R - \frac{e}{\Delta p} \right) + \pi^M [p_H B + (1 - p_H)L] - C'(1) = I - F^{-1} \left(\frac{1}{2} \right). \quad (22)$$

Simple comparative statics implications can be drawn from (22). For instance, an increase in the magnitude of the moral hazard problem, as measured by $e/\Delta p$, makes the bankruptcy law favored by the median voter tougher. In contrast, an increase in the profitability of the project, as measured by R or p_H , tends to soften the bankruptcy law. Similarly, an increase in the private benefit B or in the liquidation proceeds L reduces the attractiveness of a tough law for the median agent. These effects directly reflect the impact of the expected pledgeable income on the toughness of the law, leaving the wealth of the median agent unaffected. By contrast, a shift in the wealth distribution modifies both the bankruptcy law and the minimum amount of wealth required to become an entrepreneur. For instance, if F_2 dominates F_1 in the monotone likelihood sense,¹⁰ then the bankruptcy law is softer under F_2 than under F_1 , while the median agent gets richer.

Equation (22) also allows us to derive implications for the structure of financial contracts in the political equilibrium. Given law toughness π and equilibrium wage $w(\pi)$, the aggregate leverage ratio in the economy is given by:

$$\frac{\int_{\underline{A}(\pi)}^{A(w(\pi), 0, \pi)} (I - A) dF(A)}{\int_{A(w(\pi), 0, \pi)}^I (I - A) dF(A)}, \quad (23)$$

¹⁰This is the case if the corresponding densities f_1 and f_2 are such that f_2/f_1 is an increasing function.

that is, the ratio of the total value of debt to the total value of outside equity. One then has the following result, whose proof is to be found in the Appendix.

Proposition 4. *When agents vote over the bankruptcy law, an increase in the magnitude of the moral hazard problem leads to a tougher law and a higher aggregate leverage, while an increase in the profitability of the project or a positive shift in the wealth distribution in the monotone likelihood sense lead to a softer law and a lower aggregate leverage.*

In the political equilibrium, marginal increases in the magnitude of the moral hazard problem or in the profitability of the project have no impact on the amount of wealth required to become an entrepreneur, but they affect the amount of wealth required to be equity financed, and hence the leverage ratio. By contrast, changes in the distribution of wealth do not affect the debt-equity margin, but they modify the level of wealth at which debt financing becomes feasible.

4.3. Shifts in Political Power

While the previous analysis focuses on the preferences of the median voter, it is however unclear that majority voting adequately reflects the procedure by which bankruptcy laws are chosen in practice. As pointed out for instance by Benabou (2000), relatively poor citizens have less influence on the political process than relatively rich citizens.¹¹ In the context of bankruptcy laws, small entrepreneurs are in a particularly difficult position, as the limited financial resources at their disposal must be used in order to pledge income to outside investors and thus cannot be used for political contributions. An implication of our analysis is that the greater the weight of the relatively rich agents in the political process, the softer the bankruptcy law should be.

To model the link between wealth and political influence, we follow Benabou (2000). Given an increasing weight function γ , let the proportion of votes cast by agents with wealth less than \hat{A} be given by:

$$G(\hat{A}) = \int_0^{\hat{A}} \gamma(A) dF(A),$$

where γ is normalized in such a way that $G(I) = 1$. Thus G represents a positive shift of F in the monotone likelihood sense. Given that preferences are single-peaked and that the preferred policy is monotonic in wealth, with wealthier agents preferring a lower level of π , the agent with wealth $A^G > A^M$ given by $G(A^G) = 1/2$ is pivotal. Assuming for simplicity that the pivotal agent is one with an intermediate level of wealth, $A^{SB} < A^G < \underline{A}(0)$, one obtains the following results. A shift in political power towards the richest agents leads to a softer bankruptcy law, and this increases credit rationing. This makes debt financing more difficult to obtain, which in turn reduces the level of aggregate investment and hence the workers' wage. This decrease in the wage bill benefits the richest agents, who find it easier to finance their projects with equity, with no need to commit to costly liquidation in case of failure. As a result, the aggregate leverage ratio tends to decrease.

¹¹In line with empirical results from Rosenstone and Hansen (1993), Benabou notes that the poorest 16% account for only 12.2% of the votes and 4% of the number of campaign contributors. In contrast the richest 5% account for 6.4% of the votes and 16.3% of the contributors. For campaign contributions the figures understate the bias, since the data reflects only the number of contributions and not their amounts.

5. THE WELFARE MAXIMIZING BANKRUPTCY LAW

A key insight of our analysis is that, because of the conflict of interest between rich and poor agents, bankruptcy laws with different degrees of toughness cannot be compared in the Pareto sense. This suggests that there is no clear efficiency reason why any particular bankruptcy law should be enacted. Our study of the political determinants of bankruptcy laws also suggests that rich agents may influence the political process towards a soft law. The question we investigate in this section is whether this is necessarily detrimental to social welfare, defined in the utilitarian way.

A soft law typically generates more credit rationing than the tough law in which contracts are perfectly enforced. Therefore less investment takes place under a soft than under a tough bankruptcy law. This does not mean, however, that the tough law always maximizes social welfare. Indeed, soft laws reduce wages, and thus relax the pressure on entrepreneurs with intermediate levels of wealth by reducing their equilibrium rates of liquidation in case of failure. This in turn limits the efficiency losses from liquidation.

To see this, let us suppose as above that there is no rationing under the tough law, so that the workers are the agents with wealth below A^{SB} , and that debt and equity coexist in equilibrium, so that the marginal entrepreneur is liquidated at a positive rate λ^{SB} in case of failure. We evaluate the impact on social welfare of decreasing the maximum liquidation rate from its equilibrium value λ^{SB} under the tough law. Social welfare under a soft law with maximum liquidation rate $\pi < \lambda^{SB}$ is equal to:

$$S(\underline{A}(\pi)) = [1 - F(\underline{A}(\pi))]S^{FB} - F(\underline{A}(\pi))C\left(\frac{1}{F(\underline{A}(\pi))} - 1\right) - \int_{\underline{A}(\pi)}^{A(w(\pi), 0, \pi)} \lambda^a(A, w(\pi))(1 - p_H)(B - L) dF(A).$$

The first two terms in this expression reflect the first-best surplus corresponding to a marginal entrepreneur with wealth $\underline{A}(\pi)$. The last term corresponds to the average cost of liquidation for entrepreneurs with wealth between $\underline{A}(\pi)$ and $A(w(\pi), 0, \pi)$ who finance their projects by issuing debt. Using the definitions of the functions U_W , U_E^{SB} and \underline{A} , one can verify that:

$$S'(\underline{A}(\pi)) = -f(\underline{A}(\pi))[U_E^{SB}(\underline{A}(\pi)) - U_W(\underline{A}(\pi))] + [F(A(w(\pi), 0, \pi)) - F(\underline{A}(\pi))]\frac{(1 - p_H)(B - L)}{p_H B + (1 - p_H)L} C''\left(\frac{1}{F(\underline{A}(\pi))} - 1\right) \frac{f(\underline{A}(\pi))}{F^2(\underline{A}(\pi))}.$$

Recalling that an increase in $\underline{A}(\pi)$ corresponds to a reduction of π , this expression has a natural interpretation. The first term on the right-hand side represents the loss of surplus generated by a soft law. It is proportional to the difference between the utility of the marginal entrepreneur with wealth $\underline{A}(\pi)$ and that of a worker, which is positive as $\pi < \lambda^{SB}$. Since the cost of labor function C is strictly convex, the second term on the right-hand side is positive and represents the gain in surplus generated by a soft law. It is proportional to $F(A(w(\pi), 0, \pi)) - F(\underline{A}(\pi))$, the mass of entrepreneurs who finance their projects with debt and are thus liquidated at a positive rate in case of failure. For these entrepreneurs, a decrease in π , and thus an increase in $\underline{A}(\pi)$, has a positive impact on their utility since it lowers the

wage, and thus their liquidation rates. The corresponding effect on wages is:

$$p_H \frac{dw(\pi)}{d\bar{A}(\pi)} = -C'' \left(\frac{1}{F(\bar{A}(\pi))} - 1 \right) \frac{f(\bar{A}(\pi))}{F^2(\bar{A}(\pi))}.$$

The marginal entrepreneur thus exerts an externality on all debt issuers by raising wages, which makes their moral hazard problem more severe and compels them to commit to higher liquidation rates.¹²

We are now ready to characterize the welfare maximizing degree of softness of the law, π^S . From the expression for $S'(\bar{A}(\pi))$, it is clear that slightly lowering the maximum liquidation rate from its initial value λ^{SB} has only a second-order cost since the absence of credit rationing under the tough law entails that:

$$U_E^{SB}(\bar{A}(\lambda^{SB})) = U_W(\bar{A}(\lambda^{SB})).$$

This reflects that, under the tough law, the contribution to social welfare of the marginal entrepreneur is negligible, precisely because there is no rationing. By contrast, there are first-order efficiency gains of slightly lowering π from λ^{SB} , as this allows to reduce the liquidation rates of all entrepreneurs who finance their project by issuing debt. It thus follows that $S'(\bar{A}(\lambda^{SB})) > 0$. Symmetrically, it is easy to see that $S'(\bar{A}(0)) < 0$, which reflects the fact that if liquidation is completely prohibited, the positive impact of a soft law on social welfare vanishes as debt financing is no longer an option.¹³ Hence the following proposition.

Proposition 5. *Whenever the tough law generates no credit rationing and debt and equity coexist in that situation, the welfare maximizing bankruptcy law is soft:*

$$0 < \pi^S < \lambda^{SB},$$

and calls for some credit rationing in equilibrium.

The interpretation of this result is that, because of the wage externality on financial contracting, some credit rationing may be welfare improving, and a soft bankruptcy law can be used as a means to achieve this objective. In particular, from a utilitarian viewpoint, freedom of contracting can be harmful, and interference with the enforcement of contracts beneficial. It should be noted that this result relies only on two ingredients: the existence of a moral hazard problem in the credit market, and the endogeneity of wages. The externality that is corrected by a soft bankruptcy law is endogenous, since it would not occur in the absence of moral hazard, and it does not follow from assuming that the lenders' liquidation rights stand in conflict with the public interest, as when liquidation implies costs for society as a whole. For instance, the positive impact of soft bankruptcy laws would be even more pronounced if workers also incurred a disutility ex-post in case of liquidation. Indeed, by setting the workers' liquidation costs to zero, we have put ourselves in the worst possible scenario for the optimality of a soft law from a utilitarian viewpoint.

¹²This pecuniary externality bears some analogy with the incomplete markets literature (Stiglitz (1982), Geanakoplos and Polemarchakis (1986)). In both cases, the idea is that agents do not internalize the impact of their decisions on prices and thus on other agents' welfare. We depart from this literature by focusing on how legal restrictions on contracting can improve social welfare.

¹³This last point remains true no matter the nature of equilibrium under the tough law.

Remark. The optimality of a soft law hinges on the assumption that there is no credit rationing under the tough law. By continuity, this result remains true if there is little rationing under the tough law, that is, if the difference $U_E^{SB}(\underline{A}(\lambda^{SB})) - U_W(\underline{A}(\lambda^{SB}))$ is small. If this is not the case, then the comparison between the positive and negative impacts of a soft law becomes ambiguous, because the social welfare loss associated to making the marginal entrepreneur a worker is no longer negligible. It can be shown that the welfare maximizing law is tough whenever the marginal disutility of labor is low enough. In that case, the externality generated by the marginal entrepreneur on debt holders is of a small magnitude, because the cost of labor is low, and it is therefore optimal to perfectly enforce the contracts.

6. CONCLUSION

This paper studies the impact of bankruptcy laws on investment and welfare when the credit market is imperfect, due to entrepreneurial moral hazard. Our analysis highlights a two-way link between the credit and the labor markets. On the one hand, the credit market influences the labor market: more efficient credit markets increase investment, and thus labor demand and wages. On the other hand, the labor market influences the credit market: higher wages reduce the revenue that entrepreneurs can pledge to outside investors, which makes higher liquidation rates necessary and increases the incidence of ex-post inefficient liquidations.

A key insight of the paper is that while soft bankruptcy laws that interfere with the enforcement of financial contracts typically worsen credit rationing, a tough law that merely enforces financial contracts does not necessarily maximize ex-ante social welfare. The reason is that, due to moral hazard, contracts signed between certain parties exert externalities on other parties, reflecting general equilibrium effects. Specifically, switching to a somewhat soft law excludes some relatively poor entrepreneurs from the credit market, which lowers investment and thus wages. For richer agents, who still have access to credit, this decrease in wages increases pledgeable income, which in turn lowers the liquidation rates and the associated ex-post inefficiencies.

While our analysis sheds light on the socially optimal bankruptcy law in an utilitarian sense, it also emphasizes that a soft law does not lead to a Pareto improvement compared to a tough law. Agents with different initial resources typically have different preferences towards the bankruptcy law. Hence different laws can be chosen in different countries, reflecting the political influence of the different social classes, and possibly at odds with social welfare. Rich entrepreneurs who issue equity prefer soft laws, as they do not affect their ability to finance their projects, and lower the wage bill. Agents with intermediate levels of initial wealth who issue debt also prefer laws that exclude poorer agents from the credit market, as this reduces their liquidation rates in case of default. By contrast, when the labor market is competitive, workers should favor tough laws that stimulate investment, job creation, and wages.

While we have abstracted from worker-specific liquidation costs, such costs are likely to be significant in practice, because of the lack of mobility of the work force, or the necessity of firm-specific investment. In that case, workers will typically favor an intermediate law that protects them from inefficient liquidations while not lowering excessively investment and wages. Taking these costs into account would tilt even more the balance in favor of soft laws and a certain degree of credit rationing.

Finally, other aspects of the general equilibrium interaction between bankruptcy laws, credit rationing and factor prices would be worth investigating. In the present paper, wages

are affected by the national bankruptcy law, while the cost of funds for lenders is assumed to be set by international capital markets. This is in line with the idea that capital is more mobile across countries than labor. Under the alternative assumption that interest rates are determined locally, an increase in the local supply of funds would reduce the cost of capital, all other things being equal. In that respect, soft bankruptcy laws may play a key role in determining the cost of capital. We leave the analysis of these issues for further research.

APPENDIX

Proof of Proposition 1. Let μ be the measure corresponding to the cumulative distribution function F . An efficient allocation is described by a measurable set $W \subset [0, I]$ of workers' wealth levels and a measurable allocation of labor $\ell : W \rightarrow \mathbb{R}_+$ that maximize the social surplus:

$$[1 - \mu(W)]S^{FB} - \int_W C(\ell(A)) d\mu(A)$$

subject to the resource constraint:

$$\int_W \ell(A) d\mu(A) = 1 - \mu(W).$$

Let (W, ℓ) be an efficient allocation. Suppose that ℓ is not constant, and let $\hat{\ell}$ be the allocation of labor that requires from each agent with wealth in W to supply:

$$\hat{\ell} = \frac{1}{\mu(W)} - 1$$

units of labor. Since C is strictly convex, Jensen's inequality implies that:

$$-\int_W C(\ell(A)) d\mu(A) < -\mu(W) C\left(\frac{1}{\mu(W)} \int_W \ell(A) d\mu(A)\right) = -\mu(W) C(\hat{\ell}),$$

so the allocation $(W, \hat{\ell})$ strictly dominates the allocation (W, ℓ) , a contradiction. Hence, in an efficient allocation, all workers supply the same amount of labor:

$$l = \frac{1}{m} - 1,$$

where m is the total mass of workers. This yields (6). The optimal work force is obtained by solving:

$$\max_{m \in [0, 1]} \left\{ (1 - m)S^{FB} - m C\left(\frac{1}{m} - 1\right) \right\}.$$

Given (6), (7) is simply the first-order condition for this problem. The strict convexity of C guarantees that the second-order condition is satisfied at m^{FB} . ■

Proof of Proposition 4. When the bankruptcy law is determined by the median agent, the equilibrium wage is given by:

$$w(\pi^M) = \frac{C'(1)}{p_H}.$$

Increases in the magnitude of the moral hazard problem or in the profitability of the project have no impact on $\underline{A}(\pi^M)$, but they do affect:

$$A(w(\pi^M), 0, \pi^M) = I - p_H \left(R - \frac{e}{\Delta p} \right) + C'(1).$$

The result then follows immediately from the definition (23) of the aggregate leverage ratio. Consider next a positive shift in the wealth distribution in the monotone likelihood sense from a density f_1 to a density f_2 . Then $\phi = f_2/f_1$ is an increasing function. Denote by π_1^M and π_2^M the corresponding degrees of law toughness. One clearly has:

$$A(w(\pi_1^M), 0, \pi_1^M) = A(w(\pi_2^M), 0, \pi_2^M),$$

and, since dominance in the monotone likelihood sense implies first-order stochastic dominance:

$$\underline{A}(\pi_1^M) < \underline{A}(\pi_2^M).$$

These two relations together imply that:

$$\begin{aligned} \frac{\int_{\underline{A}(\pi_2^M)}^{A(w(\pi_2^M), 0, \pi_2^M)} (I - A) dF_2(A)}{\int_{A(w(\pi_2^M), 0, \pi_2^M)}^I (I - A) dF_2(A)} &< \frac{\int_{\underline{A}(\pi_1^M)}^{A(w(\pi_1^M), 0, \pi_1^M)} (I - A) \phi(A) dF_1(A)}{\int_{A(w(\pi_1^M), 0, \pi_1^M)}^I (I - A) \phi(A) dF_1(A)} \\ &< \frac{\int_{\underline{A}(\pi_1^M)}^{A(w(\pi_1^M), 0, \pi_1^M)} (I - A) dF_1(A)}{\int_{A(w(\pi_1^M), 0, \pi_1^M)}^I (I - A) dF_1(A)}, \end{aligned}$$

where the first inequality follows from the fact that $dF_2 = \phi dF_1$, and the second from the fact that ϕ is increasing. This implies the result given the definition (23) of the aggregate leverage ratio. ■

REFERENCES

- [1] Acemoglu, D. (2001): “Credit Market Imperfections and Persistent Unemployment,” *European Economic Review*, 45, 655–679.
- [2] Aghion, P., and P. Bolton (1997): “A Trickle-Down Theory of Growth and Development,” *Review of Economic Studies*, 64, 151–172.
- [3] Aghion, P., O. Hart, and J.H. Moore (1992): “The Economics of Bankruptcy Reform,” *Journal of Law, Economics and Organization*, 8, 523–546.
- [4] Bebchuck, L.A. (1988): “A New Approach to Corporate Reorganization,” *Harvard Law Review*, 101, 775–804.
- [5] Benabou, R. (2000): “Unequal Societies: Income Distribution and the Social Contract,” *American Economic Review*, 90, 96–129.
- [6] Berglöf, E., and H. Rosenthal (2000): “The Political Economy of American Bankruptcy: The Evidence from Roll Call Voting, 1800-1978,” Mimeo, Princeton University.
- [7] Berkovitch, E., and R. Israel (1999): “Optimal Bankruptcy Laws Across Different Economic Systems,” *Review of Financial Studies*, 12, 347–377.
- [8] Berkovitch, E., R. Israel, and J.F. Zender (1997): “Optimal Bankruptcy Law and Firm-Specific Investments,” *European Economic Review*, 41, 487–497.
- [9] Bernanke, B., and M. Gertler (1989): “Agency Costs, Net Worth, and Business Fluctuations,” *American Economic Review*, 79, 14–31.
- [10] Biais, B., and J.-F. Malécot (1996): “Incentives and Efficiency in the Bankruptcy Process: The Case of France,” PSD Occasional Paper No. 23, The World Bank.
- [11] Biais, B., T. Mariotti, G. Plantin, and J.-C. Rochet (2006): “Dynamic Security Design: Convergence to Continuous Time and Asset Pricing Implications,” *Review of Economic Studies*, forthcoming.
- [12] Bolton, P., and H. Rosenthal (2002): “Political Intervention in Debt Contracts,” *Journal of Political Economy*, 110, 1103–1134.
- [13] Bolton, P., and D. Scharfstein (1990): “A Theory of Predation Based on Agency Problems in Financial Contracting,” *American Economic Review*, 80, 94–106.
- [14] Boycko, M., A. Shleifer, and R.W. Vishny (1993): “Privatizing Russia,” *Brookings Papers on Economic Activity*, 2, 139–181.
- [15] Franks, J.R., K.G. Nyborg, and W.N. Torous (1996): “A Comparison of US, UK, and German Insolvency Codes,” *Financial Management*, 25, 19–30.
- [16] Franks, J.R., and O. Sussman (2005a): “Financial Distress and Bank Restructuring of Small to Medium Size UK Companies,” *Review of Finance*, 9, 65–96.
- [17] Franks, J.R., and O. Sussman (2005b): “Financial Innovations and Corporate Bankruptcy,” *Journal of Financial Intermediation*, 14, 283–317.

- [18] Franks, J.R., and W.N. Torous (1989): “An Empirical Investigation of U.S. Firms in Reorganization,” *Journal of Finance*, 44, 747–769.
- [19] Franks, J.R., and W.N. Torous (1994): “A Comparison of Financial Restructuring in Distressed Exchanges and Chapter 11 Reorganizations,” *Journal of Financial Economics*, 35, 349–370.
- [20] Geanakoplos, J.D., and H.M. Polemarchakis (1986): “Existence, Regularity, and Constrained Suboptimality of Competitive Allocations when the Asset Market is Incomplete,” in W.P. Heller, R.M. Ross and D.A. Starrett (Eds.), *Uncertainty, Information and Communication: Essays in Honor of Kenneth Arrow*, Volume III, pp. 65–95, Cambridge, Cambridge University Press.
- [21] Giannetti, M. (2003): “Do Better Institutions Mitigate Agency Problems? Evidence from Corporate Finance Choices,” *Journal of Financial and Quantitative Analysis*, 38, 185–212.
- [22] Holmström, B., and J. Tirole (1997): “Financial Intermediation, Loanable Funds, and the Real Sector,” *Quarterly Journal of Economics*, 112, 663–692.
- [23] La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R.W. Vishny (1997): “Legal Determinants of External Finance,” *Journal of Finance*, 52, 1131–1150.
- [24] La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R.W. Vishny (1998): “Law and Finance,” *Journal of Political Economy*, 106, 1113–1155.
- [25] Pagano, M., and P.F. Volpin (2001): “The Political Economy of Finance,” *Oxford Review of Economic Policy*, 17, 502–519.
- [26] Pagano, M., and P.F. Volpin (2005): “Managers, Workers and Corporate Control,” *Journal of Finance*, 60, 841–868.
- [27] Prescott, E.C., and R.M. Townsend (1984): “Pareto Optima and Competitive Equilibria with Adverse Selection and Moral Hazard,” *Econometrica*, 52, 21–45.
- [28] Rajan, R., and L. Zingales (2003): “The Great Reversals: The Politics of Financial Development in the Twentieth Century,” *Journal of Financial Economics*, 69, 5–50.
- [29] Rosenstone, J., and J. Hansen (1993): *Mobilization, Participation and Democracy in America*, New York, Mac Millan.
- [30] Stiglitz, J.E. (1982): “The Inefficiency of the Stock Market Equilibrium,” *Review of Economic Studies*, 49, 241–261.
- [31] White, M.J. (1989): “The Corporate Bankruptcy Decision,” *Journal of Economic Perspectives*, 3, 129–151.
- [32] White, M.J. (1996): “The Costs of Corporate Bankruptcy: A U.S.–European Comparison,” in J.S. Bhandari and L.A. Weiss (Eds.), *Corporate Bankruptcy: Economic and Legal Perspectives*, pp. 467–500, Cambridge, Cambridge University Press.