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Social relationship and business connections create implicit benefits between borrowers and lenders. We model how implicit benefits and repayment enforcement costs influence credit allocation, cost, and renegotiation. The optimal solution illustrates that financing with implicit benefits can in many circumstances achieve lower financing costs, higher managerial effort, and better economic outcomes for both the borrower and the lender. This result explains the continuing expansion of alternative financing despite advanced formal financial intermediation, the rise of corporate insider debt, and joint ownership of debt and equity. The growing size and complexity of projects and changes in community relationships explain the expansion of bank financing.

JEL Classification: G21, G23, D02

Keywords: Implicit benefits, Debt Financing, banks, corporate insider debt, joint equity-debt ownership, social and business networks

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Implicit Benefits and Financing

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Abstract

Social relationship and business connections create implicit benefits between borrowers and lenders. We model how implicit benefits and repayment enforcement costs influence credit allocation, cost, and renegotiation. The optimal solution illustrates that financing with implicit benefits can in many circumstances achieve lower financing costs, higher managerial effort, and better economic outcomes for both the borrower and the lender. This result explains the continuing expansion of alternative financing despite advanced formal financial intermediation, the rise of corporate insider debt, and joint ownership of debt and equity. The growing size and complexity of projects and changes in community relationships explain the expansion of bank financing.

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1. Introduction

A voluminous literature has modelled various types of debt financing, including bank and non-market-non-bank alternatives such as family loans and trade credits (e.g., Smith, 1987; Biais and Gollier, 1997; Wilner, 2000; Burkart and Ellingsen, 2004; Cunat, 2007; Karlan et al. 2009; Lee and Persson, 2016). These studies model each financing channel's economic mechanism through institutional expertise, family altruism, mutual insurance, informational advantage, social monitoring, etc. However, without a general framework, these independent models do not demonstrate the competition dynamics between various financing channels in the same funding market. The belief is widespread that alternative financing channels will only be a desirable choice when financing through banks and equity markets are not available (e.g., Petersen and Rajan, 1997; Choi and Kim, 2005), because they are more costly or riskier. This perspective raises several puzzles with regard to empirical observations. First, despite the development of banks and markets, alternative financing remains strong in many economies, and family lending has been increasingly important in entrepreneurial finance in Britain and the US (e.g., Basu, 1998; Dunn and Holtz-Eakin, 2000). Second, some types of alternative financing, such as trade credits, are employed more by large or monopoly firms than small firms, despite the former having better access to bank loans (e.g., Lehar et al. 2020). Moreover, controlling for selection, firms that use alternative financing can perform better than those that use bank loans (e.g., Allen et al. 2019) with similar financing costs.

This paper provides a theory that can resolve these puzzles by developing an inclusive framework that models the impact of the institutional and transactional setting on debt contracts, financing costs, and project outcomes. In contrast to existing financing models that illustrate each financing mechanism separately, our theory distinctively subsumes a variety of scenarios. We characterize these using continuous parameters capturing the implicit benefits and possible non-pecuniary penalties and costs in repayment enforcement. That is, we do not model any

specific bank financing or alternative financing. They are special cases of our model, corresponding to particular parameter values describing particular transaction settings. As such, the optimal solution of our model captures the competition dynamics among a variety of financing channels.

The key parameters we use to characterize the transactional setting are implicit benefits and non-pecuniary penalty/enforcement costs in repayment. Implicit benefits between borrowers and lenders arise in financing through formal institutions and alternative financing due to social relationships, business connections, repeated interactions, or transactional externalities. For example, corporate insider debtholders have career and income tied to firm performance (e.g., Sundaram and Yermack, 2007; Cassell et al. 2012). A financial institution providing credits to firms may simultaneously hold the equity of the firms (e.g., Chava et al. 2012; Jiang et al. 2019); The supplier providing trading credits benefits from the buyer's survival and business expansions (e.g., Burkart and Ellingsen, 2004; Cunat, 2007; Dass et al. 2014). Implicit benefits could also be a reputation concern in repeated games, a spill over effect to other clients, or collateral values associated with social or business relationships (e.g., Karlan et al. 2009; Petersen and Rajan, 1997). Non-pecuniary penalty and enforcement costs also rise in both financing through formal institutions and alternative financing, e.g., the bankruptcy threat and consequence associated with a default of bank loans (e.g., Hotchkiss (1995)), social sanctions and enforcement difficulties for repayment in relationship lending (e.g., Kandori, 1992; Udry, 1994; Berger and Udell, 1995).

We first develop a basic general model, in which there is no asymmetric information between the entrepreneur (borrower) and lender, and where monitoring is in place. Agents derive utility from their own financial payoff and from the other party's payoff due to implicit benefits. Enforcement costs and sanction of repayment enter the utility function because of required effort and its influence on risk and recovery. The entrepreneur chooses an effort level

and the lender chooses a loan price to maximize their utilities. They incorporate both their own and the other party's payoff into the utility function through an implicit benefit parameter. With effort level and pricing solved, we compute the corresponding project outcome, expected cash payoff to the lender and the borrower, their utilities, and total social welfare. We solve the model for both a competitive and a monopoly market and consider the impact of the lender having transactional (dis)advantages.

The optimal solution of the model demonstrates the following patterns. First, in a competitive market, the existence of implicit benefits and non-pecuniary penalties on the borrower always motivate higher efforts, and hence larger expected payoffs for both the borrower and the lender. While the positive effects on the efforts and expected cash payoff to the lender are robust in a monopoly market, the interest rate increases in the monopoly market. The expected cash payoff to the borrower involves a trade-off and increases only if the elasticity of interest rate is lower than the elasticity of effort, with respect to the change of implicit benefit. Finally, the expected non-pecuniary penalties/costs on the borrower/lender both increase the effort level. However, their effect on the ex-ante choice of contract and effort works in a way that each of them lower their own (and increase the other's) bargaining power and hence interest rate and payoff. As such, there can be market breakdown when the non-pecuniary cost discrepancy is large, such as in a non-contractual and non-legal environment. The numerical calibrations illustrate these patterns.

The results from our model challenge conventional ideas. First, the results suggest that standard bank financing is not necessarily optimal even when there are not any information asymmetry or moral hazard issues. Without these problems, which are necessary for conventional alternative financing models to demonstrate advantages, alternative financing still generates Pareto improvements in some parts of the parameter space. Second, bank financing is not even necessarily optimal in a formal institutional setting. For some parameters, joint

ownership of debt and equity allows a Pareto improvement. Finally, alternative financing methods, such as family loans or trade credits that are conventionally regarded as second-best, are the preferred choice by a range of lenders who are in the market. These methods offer lower costs and better outcomes. Therefore, in contrast to the conventional assumption that financing through formal institutions is optimal, bank financing can be the second-best alternative among various financing channels.

We extend the model to consider the impact of project heterogeneity, advantages of financial intermediation, information networks, and social-economic dynamics. With economic development, project size and complexity typically expand. Financial intermediation can effectively lower financing costs for large projects and the specialized expertise is useful to deal with project complexity. Moreover, economic development brings community mobility, which causes decreasing benefits from financing with implicit benefits/costs associated with family/social/business networks, and a sharp increase of financing costs due to funding disadvantages in network-based informal financing. Therefore, despite bank financing being suboptimal in some parts of the parameter space in the basic setting, the extended model explains the rise of bank financing in the modern economy. While these characteristics of the modern economy favor bank financing due to informational advantages, financing with implicit benefits within-organization financing or based on business connections, such as insider debt, joint ownership of equity and debt also thrive.

Our model makes three significant new contributions to the financing channel literature. First, it challenges the idea that alternative financing only comes into play when first-best financing through formal institutions is unavailable. Our model shows that financing with implicit benefits arising from business connections, relationship and reputation can actually be first-best, while financing through formal intermediation is a response to increasing project size and complexity, and social dynamics. Second, the results are consistent with trade credits and

family loans persisting and increasing despite the development of formal financial intermediation. The results also explain the increasing use of corporate inside debts and financial institutions' joint ownership of debt and equity since these channels utilize the advantages of implicit benefits in financing contracts. Finally, our model expands the understanding of financing choices with a much broader and holistic framework. The conventional models solve for the optimum in a particular setting.

In addition to the theoretical contributions of our model, the equilibrium choices of the borrower and the lender in the various situations also generate interesting and testable empirical predictions, some of which have been validated by the empirical literature on these topics. Others are yet to be tested, among which are the predicted patterns between culture, legal system, industry competition and financing practices, and the characteristics of surviving lenders and borrowers. For example, when the social and legal environment enables damage to reputation, informal financing can be value destroying. Therefore, the surviving borrowers and lenders both tend to be connected with some source of power, either political or illegal. For another example, firms in cultures that value inter-personal trust in communities are more likely to use trade credits or inter-personal loans, because there will be stronger reputation and spill over effects, and hence higher implicit benefits.

Our model distinguishes itself from existing financing models. First, it models transactional settings of various financing channels, focusing on the equilibrium choice among them. In contrast, existing models demonstrate how each type of financing with banks or family/social/business networks, focusing on how a specific transactional feature overcomes a particular market imperfection.[1] Second, our model assumes no negative externalities that

[1] For example, how the relationship overcomes asymmetric information and moral hazard problems, how altruism among family members lowers financing cost, how suppliers and clients provide insurance or relationship-based investment (Smith, 1987; Biais and Gollier, 1997; Wilner, 2000, Burkart and Ellingsen, 2004; Karlan et al. 2009; Lee and Persson, 2016), or how the costs and benefits trade off due to the credit market and product market conditions (Brennan et al. 1988).

need special mechanisms to overcome, allowing a direct holistic competition of various financing channels, including bank financing and financing with social relationship, business connections, or reputation concerns. Moreover, the model allows us to solve for credit allocation and cost directly, and the optimal efforts of the entrepreneurs, hence the cash flows of projects. As such, our model provides direct answers to the questions concerning the value contributed by each financing channel. Finally, the traditional distinction between formal versus informal financing can hardly capture the recent Fintech developments such as P2P, crowd financing and other innovations. Our model's holistic framework can include these forms of financing by measuring their information and relationship network with implicit benefits and the enforcement cost/sanctions on repayment in their respective contexts.

The rest of the paper is organized as follows. Section 2 presents the model and solves for equilibrium in a general form. Section 3 develops the propositions and compares the three specific cases of financing channels. Section 4 discusses the extensions of the model. Section 5 discusses testable empirical implications and compares them with the existing empirical and anecdotal evidence. Section 6 concludes the paper.

2. The Model

2.1 The basic setting

To allow the model to be as general as possible, we start with a setting that has no asymmetric information with monitoring in place, no heterogeneity of project quality, no capital structure, and no tax concerns. The model considers decisions by a risk neutral borrower (she) and a risk neutral lender (he) in a one period setting. The investment and the payoff scenarios are illustrated in Figure 1. At the beginning of the period, t=0, the borrower has an investment opportunity and tries to finance it. The project matures at the end of the period, t=1,

and the finance will be repaid with interest if possible. The project requires an initial investment of *D,* which will be financed fully with debt.

With probability *e*, the project will succeed and generate a return of *R*, i.e., a cash flow of $(1+R)D$. With probability, 1- *e*, the project fails and in this case, the entrepreneur (borrower) gets zero cash and the lender gets a recovery rate, l, hence cash flow, lD, which could be, for example, funds invested in recoverable assets or collateral. For further simplicity, we assume that the external conditions exert no failure risk. That is the external success rate, ε=1. Therefore, the probability for the project to succeed depends only on the borrower's effort, and we refer to *e* as the borrower's effort level and the probability of success interchangeably. In the case where there is an external risk, the success rate could be scaled by an external success probability.

[Insert Figure 1 here]

Based on this simple general setting, we introduce two types of parameters to capture the implicit benefits related to considerations that can vary across different financing channels. First, a business or social network between the borrower and the lender allows both to derive an implicit benefit from each other's success. Second, renegotiation, repricing, or external penalty can occur in the case of default. We also consider the external heterogeneity in the lender's intermediation cost due to costs in searching, pooling, negotiations, contracting, monitoring, and opportunity cost, and so forth, as it impacts the participation constraint.

2.2 Cash flow and Utility functions

The borrower's and the lender's expected cash flow derived from the project are as follows.

$$EC_B = e(R-r)D \quad (1)$$

$$EC_L = erD + (1-e)(l-1)D - mD \quad (2)$$

where r is the interest rate paid to the lender, m is the financing (dis)advantage parameter for the lender, and the total amount of financing disadvantage is proportional to the principal. This cost is external and could be due to its technology cost to evaluate the borrower or costs to pool funds. For the project to be positive NPV for the borrower and for the lender, the success rate, return of the project, recovery rate, and penalty need to meet the following requirements: R > r and $0 < l < 1$. Both are quite intuitive.

The utility functions for the borrower and for the lender are a weighted sum of utility derived from her (his) private utility and that derived from the expected cash flow of the other party.

$$U_B = (1 - q)[e(R - r)D - (1 - e)c_B D - ce^2 D] + q[erD + (1 - e)(l - 1)D - mD] \quad (3)$$

$$U_L = (1 - q)[erD + (1 - e)(l - 1)D - mD - (1 - e)c_L D] + q[e(R - r)D] \quad (4)$$

where q is the implicit benefit parameter and is symmetric between these two parties. The borrower (lender) assigns a weight, q, to the lender's (borrower's) cash flow and 1- q to her (his) own utility, $q \in [0, 1/2]$. The term $ce^2 D$ is the disutility to the borrower due to the cost of effort. There is also a non-pecuniary cost on the lender in case of default, which could be the loss of clients, breakup of family or social or business relationships, or possibly a cost of seeking salvage values or exerting a penalty on the borrower. The non-pecuniary penalty and cost on the borrower and the lender are respectively $c_B D$ and $c_L D$.

We can gain an intuitive understanding of implicit benefit and penalty parameters by mapping three specific financing channels with specific sets of parameter values. In an efficient bank operated in a contract-based economy, the parameters take the following values: $q = 0$; $m = 0$; $c_L = c_B = 0$. This is because the borrower and lender each aim to maximize their own expected cash flow; the formal financial intermediary has the lowest searching and pooling cost as a financing advantage; and in case of default, the bank penalizes the borrower no more than collecting the collateral or recovery of assets. In a family scenario, $0 < q < \frac{1}{2}$, as the

lender, a family member of the borrower, derives utility from the borrower's well-being. In case of joint equity-debt ownership, if the institution is the sole owner, q might equal ½. An inefficiently operated bank might have $0 < m < 1$, due to either informational or technical disadvantages. Similarly, for a family member facing a high cost to pool large funds. Finally, in a non-contract based economy that enables the lender to take personal assets away from the borrower, or the lender is an illegal loan shark that might threaten physical violence to the borrower in case of default, a non-pecuniary penalty and a cost of imposing that penalty might occur. In the usual situation, $0 < c_L < c_B$, but this is not always the case.

2.3 Equilibrium solutions

The borrower maximizes her utility by choosing her effort level based on the expected interest rate to be set by the lender, while the lender maximizes his utility by choosing the interest rate, taking into consideration capital market conditions and how the interest rate impacts managerial effort. To make the external capital market conditional, we solve for the competitive and monopoly cases separately.

A. Competitive capital market

In a competitive lending market, the interest rate *r* is determined by the opportunity cost of capital in the market (r*). The borrower chooses an effort level to maximize her utility ($\max_e U_B$). Taking the first order condition (FOC) of U_B with respect to *e* gives the borrower's optimal *e* given the project and financing cost:

$$e^* = \frac{(1-q)(R - r^* + c_B) + q(1 + r^* - l)}{2c(1-q)} \tag{5}$$

Correspondingly, the expected cash payoff to the borrower and the lender in the competitive market are derived respectively as follows:

$$EC_B = e(R-r)D = \frac{(1-q)(R-r^*+c_B)+q(1+r^*-l)}{2c(1-q)}(R-r)D \tag{6}$$

$$EC_L = \frac{(1-q)(R-r^*+c_B)+q(r^*-l+1)}{2c(1-q)}(1+r^*-l)D + (l-1-m)D \tag{7}$$

For both parties to participate, their expected cash payoffs need to be positive. While the borrower's participation constraint, $EC_B > 0$ is satisfied as long as R > r and e > 0; the lender's participation constraint, $EC_L > 0$, imposes a restriction:

$$q < \frac{1}{\frac{(1+r^*-l)}{C_B-r^*+R-\frac{2c(1+m-l)}{1+r^*-l}}+1} \text{ or equivalently } C_B > \frac{2c(1+m-l)}{1+r^*-l} - \frac{q(r^*-l+1)}{1-q} + r^* - R \quad (8)$$

That is, the implicit stake can't be too big and the non-pecuniary penalty on the borrower can't be too small, so that enough effort from the borrower can be incentivized to ensure a positive cash payoff for the lender. On the other side of spectrum, once the borrower is incentivized to fully ensure project success, the maximum is reached, and the equilibrium will be fixed with e=1. That is, the effect of the non-pecuniary penalty on the borrower has a de-facto ceiling.

$$C_B \leq 2c + r^* - R - \frac{q(r^*-l+1)}{1-q} \quad (9)$$

Figure 2 presents the feasible equilibrium space where the implicit benefits and non-pecuniary cost jointly meet the condition. The exogenous variables are set at R=0.6, L=0.6, c=0.5m=0.01, and r=0.2 in the illustration. Constraints defined in equations (8) and (9) set the boundary as they are stricter than the other conditions. The feasible space gets narrower when the competitive market's interest rate falls.

[Insert Figure 2 here]

B. Monopoly capital market

In a monopoly market, the lender can choose the interest rate to maximize his utility. This lender-being-a-monopolist[2] assumption is reasonable in many situations, because small,

[2] Other than a perfectly competitive market where the exogenously determined interest rate is identical for all lenders or a monopoly lending market, where the lender can choose the interest rate to maximize his utility, we could also consider the scenario where each type of lending institution has its own competitive market, but the

young, and private firms that are more likely to use informal financing have limited bargaining power with the lender. As there is no asymmetric information with monitoring in place in the network and the efforts are verifiable at the expense of a monitoring cost, the lender can replace *e* with the borrower's optimal level e^*, as in equation (3) but with a variable *r*. Solving the first order condition of U_L with respect to *r* ($\max_r U_L$), gives the optimal interest rate:

$$\mathrm{r}^* = \frac{R + l - 1}{2} + \frac{(1-q)(c_B - c_L)}{2(1-2q)} \tag{10}$$

Correspondingly, we can derive the optimal *e*:

$$\mathrm{e}^* = \frac{1 + R - l}{4c(1-q)} + \frac{c_B + c_L}{4c} \tag{11}$$

We can then derive the expected cash payoff for the lender and the borrower, respectively, as follows:

$$EC_B = [\tfrac{1+R-l}{4c(1-q)} + \tfrac{c_B+c_L}{4c}][\tfrac{1+R-l}{2} - \tfrac{(1-q)(c_B-c_L)}{2(1-2q)}]D \tag{12}$$

$$EC_L = \left[\tfrac{1+R-l}{4c(1-q)} + \tfrac{c_B+c_L}{4c}\right]\left[\tfrac{1+R-l}{2} + \tfrac{(1-q)(c_B-c_L)}{2(1-2q)}\right]D + (l-1-m)D \tag{13}$$

The participation constraint requires, $EC_B > 0$ and $EC_L > 0$, which lead to the following conditions.

$$C_B < C_L + \frac{(1-2q)(R+1-l)}{1-q}R \tag{14}$$

$$m < \left(\frac{R+1-l}{4c(1-q)} + \frac{C_B+C_L}{4c}\right)\left(\frac{R+1-l}{2} + \frac{(1-q)(C_B-C_L)}{2(1-2q)}\right) + l - 1 \tag{15}$$

That is, neither the non-pecuniary cost $C_B$on the borrower nor the financing disadvantage, m, for the lender can be too large for the parties to participate in this transaction.

Moreover, the financing disadvantage can't exceed the interest rate, which imposes a restriction as in equation (16), While the condition, $\mathrm{e} > 0$, holds as long as $l < 1$, as defined,

opportunity cost could vary across the types of institution. We will discuss these possibilities in extensions of the model in Section 4.

the ceiling, e ≤ 1, gives equation (17).

$$C_B \geq C_L + \frac{(2m-(R+l-1))(1-2q)}{1-q}\ , \tag{16}$$

$$C_B \leq -C_L + 4c - \frac{R+1-l}{1-q} \tag{17}$$

The feasible space in the monopoly market condition has three joint dimensions for q, C_B, and C_L. We draw a two-–dimensional drawing with C_B and C_L in Figure 3 by holding q constant. It can be shown that a change in q mainly narrows the feasible space. The three conditions in equations (14), (15), and (17) define the boundary, while the restriction set in equation (16), m < r, is always below the concave curve (15) and intersects only when e = 1.

[Insert Figure 3 here]

Comparing the feasible equilibrium spaces in the monopoly market and the competitive market, we can see that the key change comes from c_B. While the non-pecuniary penalty doesn't matter in the competitive market, as r is exogenously determined, in the monopoly market, the non-pecuniary penalty on the lender needs to be high enough, compared to the non-pecuniary penalty on the borrower, to prevent him from exploiting all surplus through a high r but low enough to have credible threats on the borrower to motivate efforts.

3. Propositions, calibration, and corner cases

In this section, we derive propositions concerning the equilibrium. The propositions focus on the three key sets of parameters: the implicit stake q, the default penalty on the borrower and the lender c_B, c_L, and the financing (dis)advantage m. We then calibrate the model with different parameter values to gain economic insights concerning the optimal solutions. The calibration also highlights and compares the key features of several financing channels as specific cases.

3.1 Competitive capital market

In a competitive market, the interest rate is exogenously determined by the market

funding costs. Neither the lender's financing disadvantage, m, nor the non-pecuniary costs $c_{B,}$ in case of default, could influence the lender's loan. We have also set the salvage (or collateral) exogenously for simplicity. Therefore, the borrower's efforts, the expected cash payoff on the borrower and the lender are only influenced by the implicit stake q and the non-pecuniary penalty on the borrower $c_{B,}$in case of default.

Proposition 1: *In a competitive market, the borrower's effort, hence success rate of the project, increases with the implicit stake q, so are the expected cash payoffs to both the lender and the borrower.*

i) $\frac{\partial e}{\partial q} = \frac{1+r-l}{2c(1-q)^2} > 0;$

ii) $\frac{\partial EC_B}{\partial q} = \frac{1+r-l}{2c(1-q)^2}(R-r)D > 0;$

iii) $\frac{\partial EC_L}{\partial q} = \frac{(1+r-l)^2}{2c(1-q)^2}D > 0.$

Obtaining the proposition is straightforward and just involves taking the partial differential of the outcome variables in the equilibrium with respect to the change of external parameters. The intuition is simple. Given that the cost of the loan is fixed, the implicit benefits stake in the lenders' payoff incentivizes the borrower to exert more effort, this improves the success rate and both parties become better off.

Proposition 2: *In a competitive market, the borrower's effort, hence success rate of the project, increases with the default penalty on the borrower, c_B, and so do the expected cash payoffs to both the borrower and the lender.*

i) $\frac{\partial e}{\partial c_B} = \frac{1}{2c} > 0;$

ii) $\frac{\partial EC_B}{\partial c_B} = \frac{(R-r)D}{2c} > 0;$

iii) $\frac{\partial EC_L}{\partial c_B} = \frac{(1+r-l)D}{2c} > 0.$

This relation is again intuitive. The non-pecuniary penalty on the borrower incentivizes her to work hard to avoid such a penalty, therefore the effort increases, and the two parties share the increased expected cash payoff. Also note that the maximum Pareto improvement is constrained by $e \leq 1$.

3.2 Monopoly capital market

A. The effect of implicit benefit

In a competitive market, the interest rate is exogenously determined. The borrower's caring about the payoff to the lender, with an implicit stake ($1 - q > 0$) always induces higher effort from the borrower. However, in a monopoly market, the lender's implicit stake in the borrower can influence his loan pricing. The direction and magnitude of this influence are jointly determined by the allocation of weights on his private utility, which consists of his own payoff and financing disadvantages and the utility derived from the borrower's payoff.

Proposition 3: *In a monopoly market, the implicit stake, q, motivates higher effort by the entrepreneur, e. The lender charges a higher interest rate, and his expected cash payoff goes up. However, the expected cash payoff to the entrepreneur involves a trade-off between the increased e and financing cost, r. It may increase only if the lender exhausts all the benefits from the increased effort. That is, the elasticity of r with respect to q is smaller than that of e,* $\frac{\partial r}{\partial q}/(R-r) < \frac{\partial e}{\partial q}/e$.

i). $\frac{\partial r}{\partial q} = \frac{c_B - c_L}{2(1-2q)^2} \geq 0;$

ii). $\frac{\partial e}{\partial q} = \frac{R+1-l}{4cq^2} > 0;$

iii). $\frac{\partial EC_L}{\partial q} = D[\frac{\partial e}{\partial q}(1+r-l) + \frac{\partial r}{\partial q}e] > 0;$

iv). $\frac{\partial E_B}{\partial q} = D[\frac{\partial e}{\partial q}(R-r) - \frac{\partial r}{\partial q}e].$

Compared to a competitive market, the role of implicit benefits in a monopoly market has two key differences. First, it increases the interest rate. In a monopoly market, the lender's marginal

return (MR) curve shift downwards when he allocates part of his utility weights to the borrower's cash flow. A lower MR curve meets the same marginal cost (MC) curve, resulting in a lower quantity and a higher price. The magnitude of the shift is related to the two parties' relative *non-pecuniary penalties* in case of default. Second, because of the increased interest rate, the payoff to the borrower involves a trade-off between increased effort and financing costs. The net effect depends on the elasticity of *r* and *e* with respect to *q's* increase.

B. The effect of the non-pecuniary default penalty

Proposition 4: *In a monopoly market, the interest rate, r, the borrower's effort,* e*, hence the success rate of the project, and the payoff to the lender increase with the non-pecuniary costs on the borrower in case of default,* c_B.

i). $\frac{\partial r}{\partial c_B} = \frac{(1-q)}{2(1-2q)} > 0$*;*

ii). $\frac{\partial e}{\partial c_B} = \frac{1}{4c} > 0$;

iii). $\frac{\partial EC_B}{\partial c_B} = -\frac{(R+1-l)q+(1-q)c_B}{4c(1-2q)} D < 0$;

iv). $\frac{\partial EC_L}{\partial c_B} = \frac{(1-q)(1+R-l+c_B)}{4c(1-2q)} D > 0$.*;*

The non-pecuniary costs on the borrower of default, c_B, affects the effort and payoff to the lender positively in a monopoly market just as in a competitive market. Intuitively, the non-pecuniary cost on the borrower at default c_B incentivizes the borrower to exert more efforts to avoid such loses. The lender can charge a higher interest rate to share more profits, resulting in a higher interest rate and a higher expected cash payoff for the lender.

However, instead of improving the payoff to the borrower as in a competitive market, in a monopoly market the non-pecuniary cost on the borrower actually reduces the payoff to the borrower, because the lender can charge a higher interest rate, knowing the borrower will exert higher effort to avoid c_B.

Proposition 5: *The non-pecuniary cost on the lender, c_L, increases the effort of the borrower just as the non-pecuniary cost on the borrower, c_B. However, it has a symmetrically opposite effect on the cost of loan, r, and the expected cash payoff on the borrower EC_B and the lender EC_L .*

i). $\frac{\partial r}{\partial c_L} = -\frac{1-q}{2(1-2q)} < 0;$

ii). $\frac{\partial e}{\partial c_L} = \frac{1}{4c} > 0;$

iii). $\frac{\partial E_B}{\partial c_L} = \frac{(1-q)(1+R-l-c_L)}{4c(1-2q)} D > 0;$

iv). $\frac{\partial E_L}{\partial c_L} = -\frac{q(R+1-l)+(1-q)c_L}{4c(1-2q)} D < 0.$

The increase in the non-pecuniary cost on the lender, c_L, incentivizes the lender to reduce the interest rate, which reduces the debt-overhang problem, and leads to a higher effort. The borrower benefits from two channels. First, a lower interest allows her to keep a higher portion of profits and second, there is an increased project payoff, while the expected cash flow to the lender decreases. In contrast, the payoff to the lender decreases due to the decrease in the interest rate.

In Table 1, we illustrate the outcomes. There are three blocks in the table. From block to block, we vary the parameter values c_B and c_L. Within each block, among the rows, the value of q varies. First of all, comparing the first six rows in Table 2 with those in Table 1 shows that, even if we set c_L to zero, the outcomes are different, because r in Table 2 is an endogenous decision and that will influence e, and EC_B, and EC_L. Specifically, the interest rate in a monopoly market is higher, which increases profits for the lender and lowers profits for the borrower. Moreover, consistent with Proposition 3, all blocks show that the interest rate r, the outcome of the project, e, and the cash payoff to the lender EC_L increases, but the payoff to the borrower EC_B varies the direction.

Comparing block 1 and block 2, then block 3 and block 2 in Table 2 illustrates the effects of changes in numerical c_B and c_L. Consistent with Propositions 4 and 5, the non-pecuniary penalty in case of default on either party in default increases the outcome of the project. The penalty on the borrower increases the interest rate r, lowers EC_B, and increase EC_L, while the penalty on the lender has the opposite effect.

[Insert Table 1]

In Figure 4, we present the border where the expected cash payoff to the borrower switches directions. The relation is clear that, for EC_B to increase with q, C_L needs to be sufficiently larger than C_B, so that the monopoly lender won't exhaust all the surplus from the entrepreneur's efforts.

[Insert Figure 4]

3.3 The effect of financing disadvantage, collateral, and interest rate

As financing disadvantage m is an exogenous lender-specific cost, in conducting the financial intermediation of costs to pool funds or to evaluate borrowers, its heterogeneity only determines whether the lender could survive in a competitive market with participation constraints.

Our model sets the collateral as an exogenous characteristic of the project salvage rate. The equilibrium solution can also illustrate how this exogenous project characteristic can influence loan pricing, efforts of the borrower, and expected payoffs.

We can also examine the effect of interest rate on effort conditional on everything else constant. Although not pursued in this paper, analyses along these two lines are consistent with the conventional debt contract and debt-overhang problem in the investment literature.

3.4 Examples

We use the simplest case as the benchmark, where the borrower and the lender maximize only their own expected cash flow – no implicit stakes with each other, and where

the lender does not exert extra monitoring beyond recovery through collateral in case of default. The values of parameters take the following: (1) $q = 0$; $c_L = c_B = 0$. This benchmark case is like an efficient bank in a contract-based developed financial economy. To compare with this benchmark, we consider another three situations, each varies one of the conditions above. Specifically, in case (2), we consider varying only $m > 0$, while $q = 0$; $c_L = c_B = 0$ remain. This case is like an inefficiently operated bank or a network-based agent that has a disadvantage but no implicit stake. In case (3), we consider varying only $0 < q < \frac{1}{2}$, while $m = 0$; $c_L = c_B = 0$ remain. This case is like a loan within family members or business networks, where the lender and the borrower have implicit stakes with each other, and the project nature in size or complexity does not trigger financing disadvantage in such networks. Finally, we vary only $c_L > c_B > 0$ while $q = 0$ and $m = 0$ remain. This case is like an efficiently operated lender in an economy with weak contract or legal enforcement that allows the lender to salvage assets not only from the borrower's contracted collateral and business assets but also on her personal assets or even physical security or the lender bear a large cost when seeking salvage values.

Although losing the richness of interactive effects among parameters, univariate comparison allows mapping the general model to practical scenarios. We summarize the comparison in Table 2 with the first column reporting the model equilibrium results for an efficiently operated bank and the other three columns for how the three special cases deviate from the benchmark. Panel A shows the comparison in a competitive capital market. Clearly, an inefficiently operated bank would not be able to survive. The mutual implicit interest between the borrower and the lender and the non-pecuniary costs in case of default motivate the borrower to work harder, improving the project success rate and profit sharing for both parties.

Panel B shows the comparison in a monopoly market. Based on the general industry organization studies, aside from Stiglitz and Weiss (1981)'s paper on credit rationing, a

monopoly bank charges higher interest rate and provides less funds than a bank in a competitive market. A monopoly bank that is inefficiently operated can survive with a lower profit. In panel B of column 3, we show the variation of an efficiently operated network loan. As $m = 0$, the MR and MC determine the same interest rate in equilibrium. The project outcome and profit sharing however improve in proportion to the implicit caring to each other in the magnitude of $(1/(1-q))$. Finally, we consider the case where everything else is equal and only the non-pecuniary cost due to non-contract business environment is different. Costs of default for the borrower and the lender (through a lower interest rate) motivates the borrower to work harder and shift both the demand curve of the borrower and marginal return of the lender, hence causing a change in the interest rate. As each party's bargaining power decreases with the cost he/she suffers in case of default, the net deviation of the interest depends on the relative magnitude of c_B and c_L. Deviation in their cash payoff also depends on the relative magnitude of c_B and c_L. When $c_B > c_L > 0$, payoff to the lender (borrower) increases (decreases); when, $c_L \geq c_B > 0$, the payoff to the borrower (lender) increases (decreases). This equilibrium is consistent with and therefore provides a possible explanation of why in a weak legal environment we observe that the surviving lenders and borrowers are often politically connected or backed by some kind of social or business advantages.

[Insert Table 2 here]

4. Extensions

The model in Section 2 demonstrates the generic advantages of financing with implicit benefits arising from social or business relationships compared to financing with formal institutions. However, bank financing, seemingly suboptimal in the basic setting, has expanded dramatically and plays a critical role in the modern economy. In this section, we resolve this puzzle by exploring the dynamic relationship between economic development and the values

of external parameters in the model, namely the implicit benefit parameter q, the financing disadvantage m, the non-pecuniary penalties c_B, and c_L, as well as the cost of capital r.

4.1 The impact of investment heterogeneity

The basic setting of the model considers a homogenous project without considering project heterogeneity in size and complexity. Across industries or with economic advancement, there are often shifts in investment patterns. First, investment size might get larger in more advanced economies or in more complex industries. Intuitively, the implicit benefit parameter q is negatively associated with the size of investment and speedily approaches 0 ($q \to 0$) when the loan size D reaches the lenders' funding threshold. Lending based on family, social or business networks also faces a higher financial disadvantage from pooling large funds and the information advantage from the network also decreases causing m to rise.

Second, with economy advancement, production is increasingly organized more by large corporations than families or individuals. The organization also shifts across industries. The diffusion of ownership could reduce social-network-induced implicit benefits. For example, the lender's *implicit stake,* q, is lower when the borrower is a corporation for which the family member works compared to when the borrower is the family member himself. Using information advantages also becomes more complex in larger corporations, hence the creditor financial advantage decreases or disadvantage increases ($m\uparrow$). As corporations could declare bankruptcy involving no or less personal reputation loss, the non-pecuniary penalty on the borrower in case of default decreases ($c_B\downarrow$), while the cost for the lender to exert non-penalty likely increase ($c_L\uparrow$). An extreme analogue for this change is that, a loan shark who could easily physically penalize a small business owner, may get himself badly hurt if he attempts to do the same to a large corporation, as the latter has the advantage both at the legal level and the physical level.

Third, when investment moves from a labour-intensive project to intellectual-intensive and capital-intensive innovative projects, monitoring becomes more complex hence the creditor's information advantage decreases (m↑), which induces the lender to require higher returns.

Finally, capital-intensive projects or projects that require large investment size raise the demand on capital, which increases the marginal cost of the capital. The cost of capital could jump up (r ↑) when the demand reaches the lender's funding capacity.

4.2 Financial intermediation and capital market development

The financial institutions' intermediation role becomes critical when investment size increases. Financial intermediation enables pooling small funds to form large loans and increase risk sharing, both of which could reduce the marginal cost of capital, and hence the interest rate on the loan. However, a lower interest rate induces lower effort and smaller expected cash payoff to the lender. The specialization of financial intermediation also becomes particularly valuable in credit evaluation and management when projects become more complex in term of technology, organization of production, and co-ordination among stakeholders.

4.3 Social detachment in modern society

Human capital migration due to economic development in the last century has largely reduced social connections, inter-personal trust, and transaction repetition, which could significantly reduce *implicit stake* q, and the viability of reputation loss as a non-pecuniary penalty and the cost for the individual lender to exert penalty (C_B and C_L). In contrast, business ties are relatively less affected. Therefore, although family/friends' loans and trade credits continue to grow, financing through formal institutions expands much faster, and financial institutions' joint ownership of corporate equity and debt has been rising in recent decades.

An analogue of the above dynamics could be illustrated by a static comparison of differences across industries or geography. For example, automobile production versus operating a convenience store or operations in urban versus in rural areas.

4.4 FinTech financing

The traditional classification of formal financing (through institutions) and informal financing (through relationship networks) provides only a vague classification for the recently developed financing forms through internet technology such as P2P and crowd funding. While it is not clear whether these financing channels are formal or informal, our model is able to assess or even categorize and evaluate them by measuring their reliance on information network and financial intermediation role. A social network based crowd funding might take the advantage of both financing with implicit benefit within a social network and the pooling and risk-sharing function of financial intermediation.

4.5 Proposition for the extensions

Proposition 6: *When the economic development and industry sector become more complex, projects become larger and more intellectual- and capital- intensive, the advantages of financing within social and business networks decrease and the advantage of financing through an intermediary increases.*

i). $q\downarrow$, $c_B\downarrow$ $c_L\uparrow$ leads to the benefits of financing within social and business networks decreasing, as $\frac{\partial e}{\partial q} > 0, \frac{\partial e}{\partial c_L} < 0, \frac{\partial e}{\partial c_B} > 0,$ *;* $\frac{\partial EC_B}{\partial q} > 0.$

ii). While larger projects demand higher capital and hence increase the marginal cost of capital for channels with limited capital supply, financial intermediation can effectively lower the cost of capital through pooling. A lower interest rate becomes much more attractive for the borrower, $\frac{\partial EC_B}{\partial r} < 0.$

iii). $m\uparrow$ leads to failure of the participation constraint of the lender.

5. Predictions and empirical evidence

5.1 Predictions of our model

The results of our model generate a rich set of empirical predictions. Most importantly, Propositions 1 and 3 suggest that everything else equal, financing contracts that utilize implicit benefits arising from business connection, joint ownership, social relationship, and reputation discipline etc., are the first-best contracts, even when formal financial intermediaries are the lenders. Along this line, we have a set of implications that have not been previously studied. These predictions resolve the puzzle between conventional thought on alternative financing and observations of real world practice.

The continuing expansion of alternative financing

(1a). Conventional alternative financing such as trade credits and family loans will continue to increase in the business practice;

(1b). Insider debt will also continue to increase and play important managerial disciplinary role;

(1c). Lending practice with joint ownership of debt and equity will expand in formal financial institutions, as implicit benefits in this setting offer a Pareto improvement over conventional bank financing;

(1d). Among the new Fintech lenders, those that can be effective using the advantage of implicit benefits and reduction of repayment costs through the network and use of technology will survive better than those that don't utilize these advantages.

Market players in countries with weak legal systems

As Propositions 4 and 5 suggest, the non-pecuniary penalty and enforcement costs in repayment work like bargaining power over the other party, determining the agent's ability to gain from financing transactions. We have another set of predictions that have not been previously modelled but are observed in reality.

(2a) In countries with weak legal enforcement, lenders tend to be backed by certain political or social arrangements, e.g., state ownership or network dominance and the borrowers tend to be either politically connected or have a social/business relationship with the lender.

(2b) The pattern of economic growth is associated with the organization of power in the economy, namely kinship, state control, or legality.

Our model also generates a rich set of predictions that are consistent with existing empirical results, while these studies may or may not have a theoretical modelling yet.

On the usage of informal financing

(3a) Firms with monopoly power are likely to receive trade credits at lower cost because they have low implicit interest in their suppliers/customers. They are also likely to offer trade credits charging a high interest rate because their supplier/customer have high implicit benefits in them.

(3b) The constructive type of financing with implicit benefits is popular in economies where there is strong inter-personal trust, family values play a significant role, and there is a tight community spirit.

(4) The destructive type of financing with physical threats is the last resort that firms will turn to for financing, therefore, only extremely financially constrained firms will use it.

Implications (3a) and (3b) are derived from Propositions 1 and 3. A high switch cost suggests a high implicit benefit and is consistent with a high borrowing cost: $\frac{\partial r}{\partial q} > 0$. Tight community trust increases implicit benefits, which increase project efforts and payoffs, allowing more projects to be undertaken.

Implication (4) follows Propositions 2 and 4 and the comparison in Table 2. The destructive type of financing yields the lowest economic gain for the borrower: $EC_B^{Relation} > EC_B^{BANK} \geq EC_B^{Weak\ Contract}$, firms only consider this financing when other sources of funds are not available.

On bank financing

(5a) Bank financing is popular in competitive markets or industries, where the switching cost of supplier/customer is low.

(5b) Bank financing is popular in contract-based economies where there is less use of inter-personal relationships in business.

Implications (4a) and (4b) also follow from Propositions 1 and 3. Low switch cost and lack of inter-personal relationship suggests low implicit benefits. When there are no implicit benefits, bank financing dominates if it operates efficiently. The results are also illustrated in Table 2.

Financing costs

(6) Lending through family/relatives or business network such as cross holding, related parties, Chaebol or Keiretsu are likely to reduce the credit premium compared to bank lending. However, the interest rate could be high depending on the condition for profit sharing.

Implication (6) follows from Proposition 3 and the comparisons in Table 2. The implicit benefit increases efforts, hence reduces default risk.

Supporting firm growth

(7a) Financing with implicit benefits will improve firm performance more than bank financing.

(7b) Financing with physical threat, although it induces a high level of effort, will lead to worse firm performance.

Implication (7) follows from Propositions 1 and 3 and comparison in Table 1 and 2: $\frac{\partial e}{\partial q} > 0$ and $EC_B^{Relation} \geq EC_B^{BANK} \geq EC_B^{Weak\ Contract}$. Implication (8) follows Proposition 4 and the comparison in Table 2. Threats of physical punishment to the borrower induces effort. However, the increased efforts mainly benefit lenders rather than borrowers due to a disproportionally increased increase rate.

Renegotiation

(7c) Firms financing with implicit benefits are more willing to renegotiate than firms using bank financing in case of delinquency or default.

Implication (7c) follows from Propositions 3 and 4. The total cash flow for all stakeholders is larger for financing with implicit benefits than bank financing. Whether stakeholders are willing to negotiate depends on the potential expected cash flow from the project. The higher the value of total cash flow to borrowers and lenders, the higher the likelihood for them to reach a debt renegotiation. Therefore, stakeholders, i.e., lenders and borrowers, are more willing to negotiate in case of delinquency or default when financing with implicit benefits than bank financing.

Corporate inside debt

(8a) The use of inside debt increases with the tenure of employees in the firm because longer service induces higher implicit benefits between the borrower (employer) and lender (employee).

(8b) The use of inside debt should reduce agency costs of debt and avoid overinvestment, because of the monitoring incentive.

(8c) The risk premium of inside debt should be lower than the firms' existing bond due to higher managerial effort and economic benefits efforts. However, the endogeneity of introducing the insider debt makes the comparison of interest rate with the market rate unclear.

Implications (8a), (8b), (8c) follow Proposition 3. The advantage of inside debt increases with the implicit benefit. It increases effort and reduces default risk.

Joint ownership of equity and debt by institutions

(9a) In a developed financial market (competitive), the credit spread of loans offered by financial institutions that also hold firm equity will be lower.

(9b) Joint ownership of equity and debt leads to less debt-overhang problems, leading to higher likelihood of out-of-court restructure.

(9c) Loan contracts with joint equity-debt ownership is less likely to impose investment covenants.

Implications (9a), (9b), and (9c) follow Propositions 3 and 4. The equity ownership introduces an implicit benefit in the debt transaction. It increases efforts and reduces the default risk. The increased expected cash flow will allow the firm to take projects that are otherwise infeasible. Covenants can hurt the realization of these benefits, and may also impose a potential penalty on the firm, which will hurt the firm.

5.2 Direct test of our model

To empirically test the predictions generated in our model, we need a sample that includes dispersed observations on firm financing channels, financial conditions, industry density, cross region/culture/country differences in inter-personal trust and contracting environment, etc. To our knowledge, the World Bank's World-wide Enterprises survey is the best dataset available for this purpose. The survey questions cover market, bank, informal financing sources for firms' investments and operations, firm characteristics, industry competition, sales over three years for countries around the world. These observations allow not only a comparison of the use of different financing sources but also to test for the relationship between financing sources and firm performance.

Allen, Qian, and Xie (2019) employ the World Bank's World-wide Enterprises survey dataset and verify many of the predictions made by the model in the paper. First, on the usage of informal financing, they find that firms in countries with better interpersonal trust in the culture do use more constructive informal financing such as trade credits and family loans than other countries. Firms in the less competitive industry (high switch cost) are more likely to receive trade credits. Constructive informal financing is also popular in firms that operate in a

less contract-based way (proxied by cash transactions). Only very small or nearly bankrupt firms turn to underground financing.

Second, on the role of supporting firm growth (project outcomes), Allen, Qian, and Xie (2019) find that constructive informal financing such as family loans and trade credits are positively associated with firms' sales growth in many emerging countries. Bank loans and underground financing do not have such a relation.

5.3 Related evidence

The existing empirical studies, without overcoming the above mentioned challenges, have also demonstrated the above empirical implications with substantial consistency. For example, aligned with our implicit benefits perspective and bargain power, Dass, Kale, and Nanda (2015) show that trade credits increase in upstream firms' relationship-specific investments and downstream firms' market power. McMillan and Woodruff (1999) show that the supplier tends to offer trade credits to the customer when it is hard for the customer to find an alternative supplier and when the customer is identified through a business network. Similar results are found in Cunat (2007). On the cost of trade credit, while Ng, Smith, and Smith (1999) argue that trade credit, Giannetti, Burkart, and Ellingsen (2011) and Klapper, Laeven, and Rajan (2011) show that trade credit may be a means for small suppliers to warranty quality to their large buyers.Several empirical studies demonstrate value contribution of trade credits (e.g., Garcia-Appendini and Montoriol-Garriga, 2013; Murfin and Njoroge, 2015; Barrat, 2016). However, they focus on trade credits overcoming market incompleteness through liquidity insurance, addressing financial constraints, value-adding, etc. Closest to our model, Fisman and Love (2003) show that industries that use trade credits grow faster in all countries, although especially in countries with weak institutions. Allen et al. (2005) show that the sector that relies more on the informal arrangement for financing and governance has grown faster than the sector that has better access to formal institutions for funding and investor protection in China.

The literature on insider debt has also produced empirical results consistent with our model's prediction on its usage, costs, and value-adding in term of financial performance and reduction of risk (e.g., Cassell et al. 2012; Sundaram and Yermack, 2007). Finally, empirical results on the impact of financial institutions' joint ownership of a firm's equity and debt are consistent with our model's prediction that debt financing with implicit benefit reduces default risk, increase negotiation, and reduce hold up problems (e.g., Chava, Wang, and Zou, 2012; Chu et al., 2020; Jiang, Li, and Shao, 2019; He et al. 2021). In particular, consistent with our model's unique results on how non-pecuniary penalty and enforcement play as a power over the other party to bargaining for payoffs, Ferreira and Matos (2012) document that the interest rate is high in usual economic conditions, but low during the financial crises due to a high rate adversely impacts the on-going value of equity stakes.

6. Concluding remarks

This paper introduces a holistic financing model that solves for the optimal funding sources and debt contracts among various financing channels. The model employs parameters, implicit benefits and repayment penalty/costs, to characterize transaction settings. In contrast to conventional models that focus on specific mechanisms, such as business connection, joint ownership, relationship, insurance, liquidity provision, reputation, etc., to overcome specific market incompleteness, our model considers various financing channels under the same market conditions. We use implicit benefits to capture the effective impact on the borrower's and the lender's utility function through various mechanisms. The equilibrium predicts that entrepreneur's efforts and the project's cash flow are the highest if the lender and the borrower have implicit benefits in each other's payoff in a competitive market or in a monopoly market where the lender is reasonably efficiently operated. The non-pecuniary penalty due to breaking a contract works like a counter-bargaining power and leads to powerfully connected lenders

and borrowers only. The extensions of the model explain how project heterogeneity, financial intermediation, and socio-economic dynamics influences these parameter values, leading to the rise of formal financial intermediation and their joint ownership and debt and equity. These theoretical predictions generate testable empirical implications on how firms' financing choices should be related to the industry, culture, and legal environment, economic development, and how the financing cost, and firm performance can be influenced accordingly.

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Figure 1: The payoff of the project:

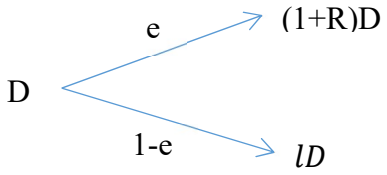

Figure 2: The feasible equilibrium space for implicit benefit and non-pecuniary penalty in a competitive market: r=0.2, R=0.6, L=0.6, c=0.5, m=0.01

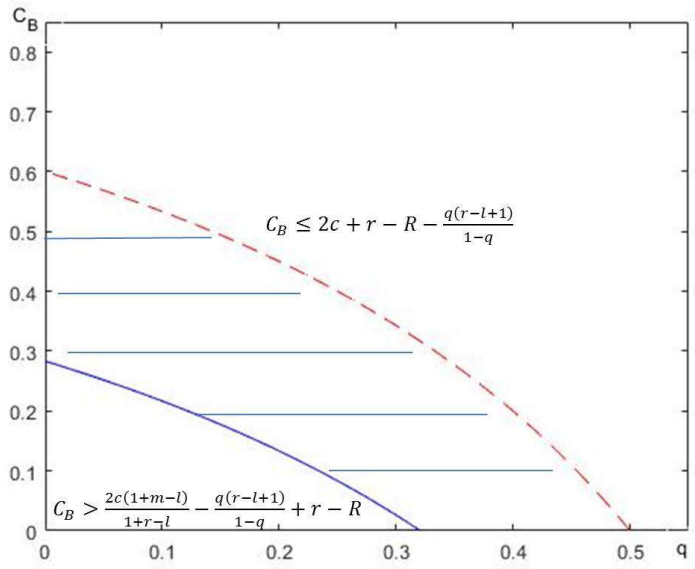

Figure 3: Feasible equilibrium space for non-pecuniary penalties and implicit benefit in a monopoly market: q=0.2, R=0.6, L=0.6 ,c=0.55, m=0.01

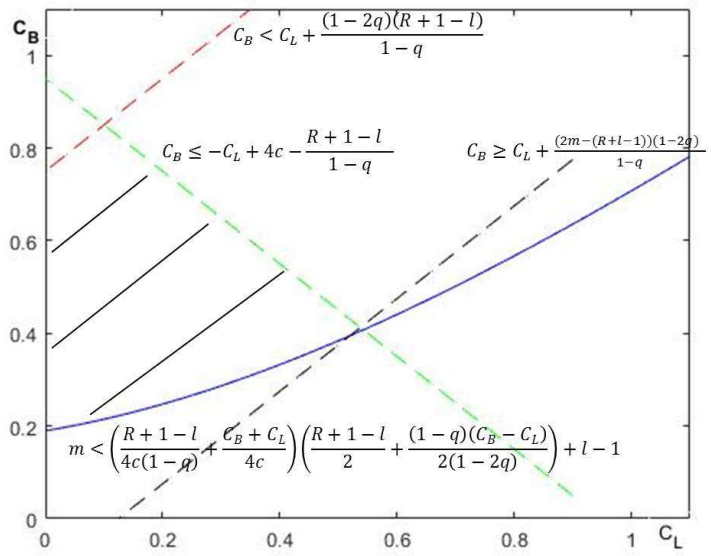

Table 1: Calibration in a monopoly capital market

Exogenous characteristics: D = 1; R = 0.6; l = 0.6; C = 0.5; m=0					
Scenarios	Interest (r)	efforts (e)	EC_B	EC_L	$(\partial EC_B)/\partial q$
C_B = 0.3; C_L=0; q=0.0	0.25	0.65	0.23	0.02	<0
C_B = 0.3; C_L=0; q=0.1	0.27	0.71	0.23	0.07	<0
C_B = 0.3 ; C_L=0; q=0.2	0.30	0.78	0.23	0.14	<0
C_B = 0.4; C_L=0; q=0.0	0.30	0.70	0.21	0.09	<0
C_B = 0.4; C_L=0; q=0.1	0.33	0.76	0.21	0.15	<0
C_B = 0.4; C_L=0 ; q=0.2	0.37	0.83	019	0.23	<0
C_B = 0.4; C_L=0.2; q=0.0	0.20	0.80	0.32	0.08	>0
C_B = 0.4; C_L=0.2; q=0.1	0.21	0.86	0.33	0.12	>0
C_B = 0.4; C_L=0.2; q=0.2	0.23	0.93	0.34	0.18	>0

Figure 4: The switch border of borrower's expected cash payoff on the feasible equilibrium space

q=0.2, R=0.6, l=0.6,c=0.55,m=0.01.

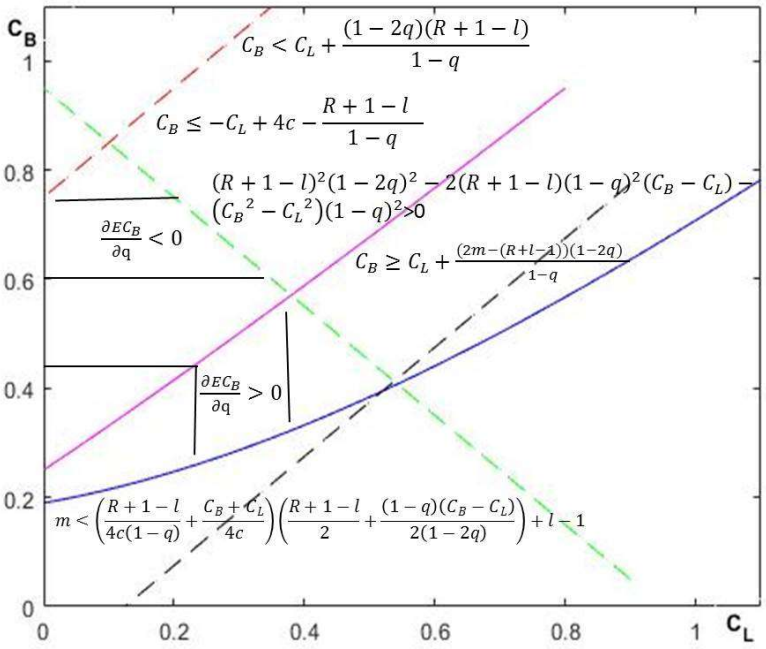

Table 2: Univariate comparison of special (corner) cases

	1. Bank financing	**2. Inefficient bank**	**3. Family or business network**	**4. Weak contract**
	$q = 0;$ $m = 0;$ $c_L = c_B = 0;$	$q = 0;$ $m > 0;$ $c_L = c_B = 0;$	$0.5 > q \geq 0;$ $m = 0;$ $c_L = c_B = 0;$	$q = 0;$ $m = 0;$ $c_L > c_B > 0;$
Panel A: A competitive capital market				
e^*	$\frac{R-r}{2c}$	NON-SURVIVAL	$e^*_{Bank} + \frac{q(r-l+1)}{2c(1-q)}$	$e^*_{Bank} + \frac{c_B}{2c}$
EC_B	$\frac{(R-r)^2 D}{2c}$	NON-SURVIVAL	$EC_{B_{Bank}} + \frac{q(r-l+1)(R-r)}{2c(1-q)} D$	$e^*_{Bank} + \frac{c_B(R-r)D}{2c}$
EC_L	$(l-1)D + \frac{(R-r)(r-l+1)D}{2c}$	NON-SURVIVAL	$EC_{L_{Bank}} + \frac{q(r-l+1)^2}{2c(1-q)} D$	$EC_{L_{Bank}} + \frac{c_B}{2c}(r-l+1)D$
Panel B: A monopoly capital market				
r^*	$\frac{R+l-1}{2}$	r^*_{Bank}	r^*_{Bank}	$r^*_{Bank} + \frac{c_B - c_L}{2}$
e^*	$\frac{R-l+1}{4c}$	e^*_{Bank}	$e^*_{Bank} * \frac{1}{1-q}$	$e^*_{Bank} + \frac{c_B + c_L}{4c}$
EC_B	$\frac{(R-l+1)^2}{8c} D$	$EC_{B_{Bank}}$	$EC_{B_{Bank}} * \frac{1}{1-q}$	$EC_{B_{Bank}} - \frac{(R-l+1)C_L}{4c} D - \frac{{C_B}^2 - {C_L}^2}{8c} D$
EC_L	$\frac{(R-l+1)^2}{8c} D - (1-l)D$	$EC_{L_{Bank}} - mD$	$EC_{L_{Bank}} * \frac{1}{1-q}$	$EC_{L_{Bank}} + \frac{(R-l+1)C_B}{4c} D + \frac{{C_B}^2 - {C_L}^2}{8c} D$