Government-Business Relationship and International Corporate Finance

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Abstract

This paper shows both theoretically and empirically the importance of bureaucratic quality in shaping the corporate finance pattern in different countries. It argues that firm management under corrupt and interventionist governments is particularly powerful in expropriating outside investors because they can threaten to withdraw their government relationship specific human capital that is central to firm survival and growth. The prevalence of concentrated ownership, relative reliance on bank financing and bank ownership of firms under corrupt and interventionist governments are various means of overcoming the management expropriation. This paper also proposes a new synthesis of the legal and political theories: a broad-based legal approach.

Keywords: Financial structure, large shareholders, government quality, broad-based legal approach.

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1 Introduction and Overview

International comparison of corporate finance or corporate governance has been a vibrant research area in recent years. Through various studies, we know that the patterns of corporate finance and corporate control are quite diverse around the world. The relative reliance on bank financing and equity markets in raising external finance and exercising corporate control varies from country to country. This distinction between bank-based and market-based financial systems constitutes a dominant theme in the international comparison of financial systems. (Allen and Gale, 2000) Recent research shows that the corporate ownership pattern also differs substantially across countries. Some countries have many widely-held corporations where the separation between the management and the ownership is a norm, while in many other countries concentrated ownership prevails where large shareholders control the firm management. (La Porta et al 1999a) These kinds of difference in corporate finance pattern prompt us to look for the root that accounts for the variation. One critical angle to examine this issue is to understand how the variation in government quality helps shape the different patterns of corporate finance and corporate governance around the world.

Government quality differs across countries. We define an inferior government as one that is inefficient and interventionist, namely, a government with high corruption, low bureaucratic efficiency and counter-market-competition regulations. Government inefficiency and intervention are highly interrelated. In many cases, excessive regulation itself is an endogenous product of corruption because by setting up more regulations, the government officials can seek more rents. Under this kind of inferior government, the survival and growth of business hinges to a large extent on how well they keep a good relationship with the government officials. Casual observations tell us that this kind of situation is widespread around the world.

Following the resignation of Boris Yeltsin, people realize that a flawed government-business relationship is a big problem in Russia's economic transition in the 1990s. "The biggest flaw was the power which a few tycoons, active in banking, energy and mining, came to wield over the economy. These oligarchs put Mr.Yeltsin in their debt by financing his

election campaign, but they demanded over greater privileges in return: privatization on favorable terms, and a virtual tax holiday which starved the exchequer and kept interest rates high." (*The Economist*, January 8-14, 2000, p.25)

In the period of 1960s to 1990s, the South Korean government adopted industrial policy to boost the development of a few targeted industries. The government guided the large banks to offer loans to large corporations, "chaebols", that helped fulfill the industrial policy. As a return, the government also helped maintain the monopoly power of those "chaebols". In hindsight, many of these investment projects are inefficient, resulting in an accumulation of corporate earnings losses and non-performing loans in the banks.

Looking further into the past, we see that an inferior government did deter financial development and growth of firm. In the 19th century Mexico, "(t)he interventionist and pervasively arbitrary nature of the institutional environment forced every enterprise, urban or rural, to operate in a highly politicized manner, using kinship networks, political influence, and family prestige to gain privileged access to subsidized credit, to aid various strategems for recruiting labor, to collect debts or enforce contracts, to evade taxes or circumvent the courts, and to defend or assert title to land. Success or failure in the economic arena always depended on the relationship of the producer with political authorities - local officials for arranging matters close at hand and the central government of the colony for sympathetic interpretations of the law and intervention at the local level when conditions required it. Small enterprise, excluded from the system of corporate privilege and political favor, was forced to operate in a permanent state of semiclandestiny, always at the margin arbitrary acts and never protected against the rights of those more powerful." (North, 1990, pp. 116-117)

Under an inferior government, bribing and lobbying government officials become the primary precondition for the survival and growth of a firm. The illegal nature of corruption implies that the fewer parties involved in negotiation with the government, the better it would be to keep the deal secret. It is also easier for a small number of parties to maintain a long-term and secret relationship. Bribing or lobbying by multiple parties from one corporation or bank would also incur unnecessary transactions costs. These considerations dictate that it

is optimal to delegate the task of bribing and lobbying to the firm management who run the company on a day-to-day basis. The firm management thus acquire government-relationship-specific human capital, which is vital to the success of the firm. This adds to the capability of the firm management to expropriate outside investors by threatening to withdraw the government-relationship-specific human capital, which would worsen corporate governance, lower economic efficiency and shrink the scale of external finance.

This paper argues that many of the variations in corporate finance patterns around the world can be regarded as a natural response to the difference in government-business relationship.

Large shareholders are one way of overcoming the agency problem of the management team. In a widely-held corporation, dispersed shareholders face the classic free-rider problem: if the shareholder invests time and resources to monitor and improve firm management, the benefits will be enjoyed by all shareholders, while the cost lies wholly on that shareholder. This public good nature of the improvement in corporate governance makes each small shareholder underinvest in the activity of monitoring or improving firm management. Large shareholders can overcome this free-rider problem because they enjoy a large share of the benefits from the strengthening of the corporate governance. (Shleifer and Vishny, 1986) It is also found that large shareholders usually participate and control corporate management. (La Porta et al,1999a) The large shareholding by the corporate managers would help align to some extent the interests of insiders and outsiders, diminishing the loss from management expropriation, and enhancing efficiency. Under more inferior government, the corporate management's government-relationship-specific human capital plays a more essential role in achieving corporate success and thus it is expected that the potential managerial diversion would be more serious. A more prevalent and a larger shareholding proportion of large shareholders are expected for those countries with more inferior governments.

The government-business relationship also sheds light on the choice between bank- and market-oriented financial systems. Raising external funds through the banking system by taking deposits may be another effective way to constrain management expropriation in an

economy where firm management's government-relationship-specific human capital plays a central role. Unlike the dispersed shareholders who tend to underinvest in corporate governance, debtholders are much less prone to the collective action problem because individual creditors can in principle obtain the full benefits of their actions for themselves. Debtholders may independently sue a delinquent borrowing firm, seizing firm assets (collateral) or obtaining a judgment against the firm, while equityholders are subject to collective action problem in achieving a concerted action in corporate voting. In bank financing, the contractual provision for bank depositors to claim investment on demand and the first-come-first-served sequential service arrangement create further credible threat to bank managers' expropriation of outside depositors (Diamond and Rajan, 1999). This strengthens the resistibility of small depositors against expropriation from both bank and firm management.

On the one hand, bank financing can help discipline bank managers. Depositors' bank run can create a credible threat to the bank managers' misbehavior that would potentially harm the depositors' interests. On the other hand, bank financing also disciplines firm management. If the firm management (the entrepreneur) starts expropriation renegotiation, the bank as the creditor can liquidate the firm and control firm assets. It is reasonable to expect that in bank financing both the bank and the entrepreneur can acquire the essential government-relationship-specific human capital. The bank therefore could easily remove the firm management and find another entrepreneur to operate the investment project without harmful effects to the firm survival and growth.

Of course this is the ideal situation. It is possible that the incumbent firm management might have made management-specific investment to entrench themselves. Then the firm value would decrease in the absence of the incumbent firm management. To overcome this kind of holdup problem, it is optimal for banks to own a large share in the firms and be active in controlling firm management so as to achieve synergy between the firm and the bank. We thus regard bank's ownership of firms as a further measure in overcoming the agency problem under inferior government so as to enlarge the size of external finance.

The managerial expropriation is expected to be stronger under more inferior government

because of the larger role that the government-relationship-specific human capital plays in ensuring business success. The strength of debt financing through bank intermediation and bank ownership of firm looms larger in those countries with more inferior governments owing to their superiority in resisting management expropriation. We therefore expect to see a more prevalent relative reliance on bank financing and bank ownership of firms in those countries with inferior governments.

The rest of the paper is organized as follows. Section 2 examines the relationship of this paper to the literature of political economy of international corporate finance and law and finance, pointing out that we can have a broad-based legal approach to international corporate finance. Section 3 presents a simple model showing why large shareholder, bank-based financial system and bank ownership of firms prevail in countries with inferior governments. Section 4 presents some empirical evidence that supports the predictions of the model. Section 5 concludes the paper.

2 A New Synthesis and Relations to the Literature

This paper is a continuation of the growing literature on law and finance. It is also related to the emerging literature on the political economy of international corporate finance, most akin to Rajan and Zingales (1999) and Roe (2000). Rajan and Zingales focus on the politics of financial market development, especially from a historical perspective. They argue that decentralization of political power, coupled with an efficient legal system, tends to promote the development of financial markets, whereas the centralization of political power tends to magnify the interests of those in power who may or may not favor the development of financial markets. Unlike their paper, this paper focuses on how bureaucratic quality, style of economic management and the resultant government-business relationship would foster different types of corporate finance. Also instead of focusing on the time-series variation in the 20th century history, this paper focuses on cross-country comparison using contemporary data in its empirical analysis.

Roe (2000) focuses on the political preconditions to achieving the separation between corporate ownership and control. He compares the continental European social democracies with the U.S. and finds that the political environment in social democracies tends to promote the persistence of large-block shareholding. He argues that because social democracies press managers to stray away from profit-maximization by succumbing to, for example, employment stabilization, large shareholding becomes a way to control the managerial agency costs. Motivated to fight for the equityholder interest by block ownership, large shareholders would resist more vehemently than pure managers the non-profit-maximizing goals that the government imposes on the firm. This paper largely encompasses Roe's main argument because social democracies can be treated as a specific case of interventionist governments.

It is interesting to note that both papers claim that a political thesis is better than a legal thesis in accounting for the variation in corporate ownership structure across countries and financial market development over time. Roe (2000) even proposes a two-tier synthesis of the legal and political theories: when corporate law and legal system in general are decrepit, politics is irrelevant. Public firms won't emerge because the system fails to protect minority shareholders. But once societies have established good corporate institutions, politics explains better the corporate ownership structure.

This paper provides a new synthesis of the legal and political theories from a different angle. In other words, we propose a broad-based legal approach. As we know, the historically determined legal origins or legal traditions are essential to the distribution of power between the State and the private property owners. Common law countries came into existence in Britain largely as a defense of the interests of the Parliament and property owners against the regulation and expropriation of the Sovereign. Civil law, in contrast, has developed in large part as an instrument of the Sovereign to control and expropriate private economic activity. (La Porta et al, 1999b) The predetermined legal tradition still plays a central role in shaping today's legal protection for investors and the current government-business relationship in different countries. As a result, the legal system can cast impact on financial market development and corporate ownership structure through two distinct but related

avenues.

On the one hand, the legal system, mainly reflected in the legal origins, can affect the degree of *de jure* legal protection and its enforcement that minority stockholders and creditors receive in different countries, which in turn determines the size of external finance and the importance of large block shareholders. As a general rule, the common law countries produce a stronger investor protection than the civil law countries do, and thus they have larger external financial markets and more dispersed ownership pattern. (La Porta et al, 1998b) This is the relatively more straightforward channel.

On the other land, as discussed in La Porta et al (1999b) and the empirical part of this paper, the legal origins are one central force driving the quality of bureaucracy and the current government-business relationship around the world. Common law countries tend to produce a less corrupt, less interventionist and thus more efficient government than civil law countries do. A healthy government-business relationship would decrease the importance of and reliance on ownership concentration and bank-oriented financial system to strengthen corporate governance. In this sense, legal tradition determines the quality of government, through which it further determines the corporate ownership structure and the orientation of financial system. This is a more subtle and circuitous channel.

It is important to point out that these two channels are not totally separated or independent. On the contrary, they can reinforce each other. Under more corrupt and interventionist governments, large shareholders and large banks acquire government-relationship-specific human capital, through which they can wield their political power to influence the decision process of the state/legislature. This will promote the enactment of legal codes in favor of large shareholders and large banks, a fact that can be testified by the historical experience of the evolution of corporate law in some major advanced economies. Pistor et al (2001) look at several aspects of the evolution of corporate law in the US, UK, Germany and France. We can reinterpret their factual findings within our framework.

Among these four advanced economies, the common-law countries (the US and UK) tend to have a less interventionist government, which in turn promotes dispersed stock ownership

and a market-based financial system, while the civil-law countries (France and Germany) tend to have a more interventionist government, and as a result contribute to ownership concentration and a bank-based financial structure. It is therefore expected that large shareholders and large banks would exert a more profound impact on the state/legislature in France and Germany than in the US and UK.

The first example is the appraisal of shareholders' in-kind contribution. Corporate capital, including the shareholders' in-kind contribution, is regarded as a trust fund to protect creditors. In case of insolvency, whether the in-kind contribution can be re-assessed shows whether the shareholders are potentially held liable for additional contributions. Countries with different legal traditions show different legal responses. In the US and UK, the laws shield shareholders from the risk of reappraisal so that the valuation of their contributions could not be challenged by creditors in the future. In France and Germany, a third party or independent appraisal of in-kind contributions is required, which leaves room for creditors' challenge on the value of shareholder contribution. This suggests to us that in bank-based financial systems the creditor group dominated by large banks receive more favorable legislative treatment than in countries with market-based financial system.

The second example is the par value requirement for share issuance. In Germany, the law requires that only shares with a minimum par value of DM 100,000 could be issued, which reflects the basic tenet that the publicly traded joint stock company should be reserved for large corporate undertakings. In the US, however, the issuance of non par value stock has been allowed since 1917. This clearly shows to us how the large shareholders are favored by the state and legislature under a more interventionist government in Germany.

The third example concerns the allocation of control rights over authorized stock, preemptive rights, and the repurchase of shares. In the US, the decision on these issues has been largely delegated to the firm managers, while in Germany they remain firmly vested in the hands of shareholders, especially the large shareholders. This is consistent with our assertion that large shareholders emerge as a corporate governance scheme under more interventionist governments and they in turn influence the legal codes through their political power.

These examples show how the political power of large shareholders and large banks can promote the enactment of legal codes in their favor.

Our discussion also directs us to another debate in the literature. One popular approach in characterizing financial systems around the world is based on the distinction between bank-oriented and market-oriented systems by examining the relative reliance of corporate finance on bank loans or stock markets. La Porta et al (2000) argue that the legal approach that focuses on investor protection provides a better account for the variation in financial system across nations than the prevailing theme of bank *vis a vis* market approach. We can say that the legal approach is more fundamental than the bank-market approach. The bank-market approach is largely based on the observation of the existing financial institutions. In fact, the structure and pattern of financial institutions are determined in large part by the government-business relationship and legal system. The broad-based legal approach is more fundamental than the bank-market approach because as we show in this paper legal tradition shapes the government-business relationship, which in turn determines the relative reliance on bank or market financing. We therefore can regard the legal approach as one of the underlying forces that drive the bank *vis a vis* market distinction.

This paper also links two strands of soft-budget constraint literature. We show that there is a tendency toward centralization of corporate finance in countries with inferior governments. A corrupt and interventionist government tends to produce concentrated ownership and tends to rely more on bank financing rather than equity market financing. This centralization is viewed as a natural response to the potentially severe expropriation problem of firm management who takes advantage of their government-relationship-specific human capital. The link between centralization of corporate finance and the inferior government offers a connection between the two strands of literature on soft budget constraint. Kornai (1980) and Shleifer and Vishny (1994) discuss how government's political goals may result in soft budget constraint. Dewatripont and Maskin (1995) and Bolton and Scharfstein (1996) mainly focus on how centralized financing contributes to the softening of budget constraint and how decentralized multiple-party financing helps harden budget constraint. This paper

explains why centralized financing tends to coexist with corrupt and interventionist government, thereby linking the two strands of soft budget constraint literature. This linkage seems to be consistent with our observations of the real world. We often see that those less efficient and more interventionist governments tend to bail out those "too-big-to-fail" bankrupt companies and insolvent banks. This kind of bailout can naturally be treated as part of the protection that those governments provide to the large companies and large banks that bribe and lobby the government officials.

3 The Model

3.1 Large Shareholders and the Quality of Government

Suppose there is a firm financed by dispersed shareholders, and the firm management team holds a share α of the firm's stocks. The firm is going to take an investment project that requires a fixed investment of I.

There are two sectors in the economy. One is the protected sector where government protection is offered to the firm if the firm has successfully curried favor with the government officials through bribery or lobbying. The other sector is the unprotected sector where government doesn't provide protection and support. We assume that the firm would acquire monopoly power in the protected sector under the protection of the government, whereas perfect competition prevails in the unprotected sector.

Due to the secret nature of bribery and the time-consuming process of establishing long-term relationship between government and business through constant interaction, it is virtually impossible for each and every shareholder to keep contact with the government. Also each individual dispersed shareholder doesn't have the incentive to undertake the task of bribing the government officials. Outside investors thus would naturally delegate the acquisition of government-specific skills to the firm management who runs the business. Because the maintenance of long-term relationship with government officials needs constant interac-

tion concerning business decisions with government officials, the firm management is most likely to be responsible for acquiring the skill.

At date 0, the firm management needs to decide whether and by how much to bribe the government official. If they don't bribe the government official, they would have to stay in the unprotected sector, facing stiff competition. The expected revenue is X_1 and there is no expected profit, i.e., the firm only breaks even so that $X_1 = I$. If they bribe and satisfy the government official, they would end up in the monopoly sector and earn an expected revenue of $X_2(k)$, where k indicates the quality of government. A higher k corresponds to a less corrupt, less interventionist and thus better government. We assume that $\frac{\partial X_2}{\partial k} \leq 0$, that is, X_2 is decreasing in the quality of government. In other words, a more inferior government would grant more protection and help maintain stronger monopoly power to the firms that bribe and lobby the government official.

At date 0, the firm management and the government official bargain over the amount of bribery that is necessary for the firm to obtain government protection. Assume equal bargaining power for the two parties. Nash bargaining would lead to the two parties equally dividing the gain in firm value from obtaining government protection through bribery. The amount of bribery at date 0 is thus $b_0 = \frac{1}{2}(X_2(k) - X_1)$. Given that it is profitable for the firm to bribe the government official and gain government protection, the bribery would be made and the firm management does make the fixed investment I.

After bribery is made, the essential government relationship skills are endowed in the firm management. The firm management can commit to contributing his government relationship skills only in the spot market. These skills cannot be transferred and cannot be bought or sold. This naturally implies that the managers would bargain over the surplus that is created when they contribute their human capital.

At date 1, if the managers continue to contribute their human capital, the firm value would be $X_2(k)$. If the managers withdraw their human capital, the shareholders and the board of directors could replace the incumbent management with a new management team. Because the government relationship skills are nontransferable, the new management team

must make new bribery in order to continue the project as a going concern. When the firm rejects to pay bribery, the firm could no longer stay at the protected sector. We assume that the nature of the investment project in the protected sector differs from that in the unprotected sector. Since the fixed investment has already been made, when the firm tries to return to the unprotected sector, the firm must liquidate the investment project. The liquidation value of the firm is L. We assume that the liquidation is inefficient as $L < X_1 < X_2(k)$. Because it is efficient to maintain the firm as a going concern, the incumbent management could extract and put under their discretion an amount of funds that equals the amount of bribery that the firm has to pay to the government official if a new management team is put in place. Under the assumption of equal bargaining power between firm management and government officials, the amount of new bribery at date 1 should be half of the gain in firm value from continuing the investment project through bribery rather than liquidating the firm, i.e., $b_1 = \frac{1}{2}(X_2(k) - L)$. This is also the amount of funds that the incumbent management can extract and use for their own private benefits through the threat of not contributing their government-relationship-specific human capital. When the incumbent managers extract this amount of company funds, the shareholders and the board of directors are indifferent between keeping the incumbent management team and reshuffling the management team. We assume that under this indifference case, the incumbent management team would be retained. The shareholders would receive $L + \frac{1}{2}(X_2(k) - L) = \frac{1}{2}(X_2(k) + L)$ from the renegotiation with the incumbent management team.

The firm management would put the funds extracted, $\frac{1}{2}(X_2(k) - L)$, into two types of projects. One type is zero-NPV project that incurs no net loss on shareholders, and the other type is negative-NPV project that yields zero revenue stream.

Assume that at date 1 the firm management would invest proportion θ of $\frac{1}{2}(X_2(k) - L)$ into the negative-NPV project. The firm management obtains a low private benefit from the zero-NPV project, which is normalized to be zero, while they achieve a high private benefit of $B(\frac{1}{2}\theta(X_2(k) - L))$ from the negative-NPV project. We assume that this private benefit function satisfies $B(0) = 0, B' \geq 0, B'' \leq 0, B''' \geq 0$, i.e., B is a concave function of the

amount of funds channeled into the negative-NPV project and the third-order derivative of this private benefit function is nonnegative. We further assume that this concave function exhibits the following property: $B'(0) > 1$ and $B'(\frac{1}{2}\theta(X_2(k) - I)) < \frac{1}{2}$ and $B'(\frac{1}{2}(X_2(k) - L)) \to 0$, that is, the marginal private benefit from the investment in the negative-NPV project is larger than one for the first unit of investment but declines quickly. It will be equal to zero when all of the extractable funds are channeled into the negative-NPV project.

At date 1, the firm managers need to decide on the proportion θ of the funds extracted to be channeled into the project with high private benefit but negative NPV. To ensure that there is outside investment, the firm management team would make the outside investors at least break even from their investment, which constitutes a participation constraint. The expected value from investment to shareholders is $X_2(k) - \frac{1}{2}(X_2(k) - X_1) - \theta[\frac{1}{2}(X_2(k) - L)] = \frac{1}{2}X_2(k) + \frac{1}{2}X_1 - \frac{1}{2}\theta(X_2(k) - L)$. Given that $X_1 = I$, the participation constraint requires that $\frac{1}{2}X_2(k) + \frac{1}{2}I - \frac{1}{2}\theta(X_2(k) - L) \geq I$.

The firm management's problem is to maximize the net gain from this extraction subject to the constraint that the outside investors can at least break even from their investment. The problem can be expressed as:

$\max_{\theta} B(\frac{1}{2}\theta(X_2(k) - L)) - \alpha[\frac{1}{2}\theta(X_2(k) - L)]$

s.t. $\frac{1}{2}X_2(k) + \frac{1}{2}I - \frac{1}{2}\theta(X_2(k) - L) \geq I$

We can derive the following lemma.

Lemma 1 *When the share of firm management's stock ownership (α) is sufficiently large, the proportion of company funds (θ) that is channeled into the negative-NPV project is declining in α. If α is too small, θ would not be affected by α. In other words, only when firm management is the large controlling or large minority shareholder, management diversion would be alleviated.*

At date 0, the firm management and outside investors would decide on the proportion of shares that the firm management owns after taking into account the effect of management ownership on managerial diversion at date 1. They would choose an optimal α that maximizes the value of the firm.

The problem of the firm value maximization is reduced to

$\max_{\alpha} X_2(k) - \frac{1}{2}(X_2(k) - X_1) - \theta[\frac{1}{2}(X_2(k) - L)]$

As shown in lemma 1, in order to make the management ownership have a deterrent effect on managerial diversion, α must be at least as large as $B'(\frac{1}{2}(X_2(k) - I))$, which constitutes the lower limit of firm management ownership share. It is easy to see that an optimal α must lie above this threshold level because only beyond the threshold level can management ownership exert an effect of diminishing θ, which turns out to be firm value enhancing. Taking advantage of the deterrent effect of firm management expropriation, we expect that a higher share of firm management ownership in the firm is required for countries with more corrupt and interventionist governments, because the amount of firm value that can be extracted by the firm management through threat of withdrawing their government relationship specific human capital is higher. We thus have the following conclusion:

Proposition 2 *When the management private benefit function $B(.)$ satisfies the condition that for any $Y > 0$ the magnitude of $YB'''(Y)$ is larger than that of $B''(Y)$, the share of firm management ownership is higher under more corrupt and more interventionist governments.*

It is worth noting that the condition of $\mid YB'''(Y) \mid > \mid B''(Y) \mid$ is not demanding at all. On the contrary it holds fairly generally. We can easily construct the following numerical example.

Let the private benefit function be defined as $B = 3(Y+1)^{\frac{1}{2}}$. We can compute that $B' = \frac{3}{2}(Y+1)^{-\frac{1}{2}}, B'' = -\frac{3}{4}(Y+1)^{-\frac{3}{2}}, B''' = \frac{9}{8}(Y+1)^{-\frac{5}{2}}$. It is easy to see that when Y is sufficiently larger than 1, we have $YB''' > \mid B'' \mid$.

It is also important to note that our simplified treatment of large shareholders as participating and even controlling firm management is quite plausible. The empirical evidence by La Porta et al (1999) shows that at least for family large shareholders, most of them participate and control the firm management. Even if the large shareholders don't directly control corporate management, we can also easily use the corporate control scheme through corporate voting (see Shleifer and Vishny, 1986) to show how large shareholders can exert tremendous impact on firm management.

3.2 Bank Financing and Equity Financing Under Governments of Different Qualities

We now will extend the model of the previous subsection to the comparison between bank financing and equity financing under governments of different qualities.

We assume there is an entrepreneur who has an investment project. The entrepreneur has no funds so that he must turn to outside investors for external finance. The outside investors could invest in the form of equity. Unlike the previous section, the entrepreneur would not own any firm shares. In other words, the entrepreneur is a pure manager for the equity investors. They could also pool their funds and delegate the funds to a bank, which in turn invests in the firm. The investment is made at date 0, and it doesn't generate revenue until date 2. The investment project is also completed at date 2. Date 1 is an intermediate date when production is conducted.

There are still two sectors in the economy. If the entrepreneur and the bank successfully bribe the government official, they could enter the protected sector where they would enjoy monopoly power with the support of government. The expected revenue from the monopoly sector at date 2 is $Y_2(k, I)$, where k is, as before, the indicator of government quality, and I is the investment made. We assume that Y_2 is concave in I and is decreasing in k. Furthermore, we assume that $\frac{\partial^2 Y_2(k,I)}{\partial k \partial I} \leq 0$, i.e., the higher the government quality (larger k), the smaller the marginal revenue from the monopoly sector. If the entrepreneur and the bank couldn't please the entrepreneur, they would have to remain in the unprotected sector where stiff competition would drive down the firm revenue at date 2 to a lower level of $Y_1(I)$.

At date 0, the firm needs to bribe the government official to enter the government protected sector. In the case of equity investment, the outside equityholders would delegate the task of bribing the government officials to the entrepreneur. With equal bargaining power between government official and the entrepreneur, the firm and the government would equally share the gain from entering the government protected sector through bribery. The bribery at date 0 is thus $b_0 = \frac{1}{2}[Y_2(k, I) - Y_1(I)]$. After the bribery is made, the government relationship specific human capital is endowed in the entrepreneur. The firm enters the

monopoly sector with government protection and investment is made.

At date 1, the firm management may start expropriation renegotiation by threatening to withdraw their government relationship specific human capital so as to extract company earnings. The outside equityholders may accept or refuse to accept this new offer. If they refuse, they would have to fire the entrepreneur and find a new manager. The new manager would have to pay bribery again to the government official. The government could negotiate the firm down to its liquidation value ($L(I)$). We assume $L(I) < Y_1(I) < Y_2(k, I)$. Assuming equal bargaining power, the new firm managers have to pay a bribery at date 1 of $b_1 = \frac{1}{2}(Y_2(k, I) - L(I))$. The earnings that the firm and the equityholders could obtain are $L(I) + \frac{1}{2}(Y_2(k, I) - L(I)) = \frac{1}{2}(Y_2(k, I) + L(I))$. Given that replacing the old management team would incur a new bribery cost, the incumbent management could extract company earnings from the outside investors up to an amount of $\frac{1}{2}(Y_2(k, I) - L(I))$, at which point the outside equityholders would remain indifferent between accepting the new offer and refusing the new offer and replacing the firm management. We assume in the case of indifference, the incumbent management would remain. The return that outside equityholders can expect to obtain from the management at date 2 is thus equal to $\frac{1}{2}(Y_2(k, I) + L(I))$.

At date 0, the equityholders rationally expect that for any investment I, they are expected to obtain $\frac{1}{2}Y_2(k, I) + \frac{1}{2}L(I)$ at date 2. The total amount that could be raised is thus the expected revenue at date 2 minus the expected bribery they have to pay at date 0 to enter the monopoly sector. Hence if we make outside investors at least break even, the amount of funds that could be raised is thus determined by the following equation: $\frac{1}{2}(Y_2(k, I) + L(I)) - \frac{1}{2}(Y_2(k, I) - Y_1(I)) = \frac{1}{2}(Y_1(I) + L(I)) = I$.

We now turn to the case where the investment project is financed by the bank and operated by the entrepreneur. In the beginning, the entrepreneur and the bank coordinate their efforts to bribe the government official at date 0. The amount of bribery at date 0 is the same as that in the case of equity financing. The difference is that the government relationship specific human capital is now endowed in both the entrepreneur and the bank manager.

At date 1, when it is bank financing, the fact that the government-relationship-specific human capital is endowed in both the entrepreneur and the banker helps constrain the opportunistic behavior of both the entrepreneur and the banker.

If the entrepreneur starts expropriation renegotiation with the bank, the banker can refuse the expropriation offer and control the firm assets through liquidation. To avoid unnecessary complications, we follow Diamond and Rajan (1999) in assuming that the bank would have claim to the full value of the firm upon entrepreneur's initiating expropriation renegotiation. Getting rid of the entrepreneur, the bank still has the essential government relationship specific human capital. It can easily find another entrepreneur to operate the investment project without a need to bribe the government officials again. For the time being, we assume that the value of the firm would not be undermined when the bank replaces the incumbent management that exhibits opportunistic behavior. Understanding this situation, the entrepreneur would not initiate expropriation renegotiation in the first place.

Banks have fragile financial structure as they take demand deposits and make longer term loans. This also constrains the bank's expropriation of the outside depositors. If the bank starts expropriation renegotiation with the outside depositors, there would be a bank run resulting from collective action problem. As we know, outside depositors don't have government relationship specific human capital. Once the bank expropriates the depositors, the most that depositors can do is to run the bank and liquidate the bank. Then the depositors would negotiate directly with the entrepreneur. The most the depositors can force the entrepreneur to pay out is the amount that they would get if they capture the firm assets (or collateral), get rid of the entrepreneur, hire a new manager and bribe the government official again so as to remain in the monopoly sector supported by the government, which turns out to be equal to $\frac{1}{2}(Y_2(k,I)+L(I))$. This is also the market value of the deposits.

Suppose that the entrepreneur and the bank initially raise more than $\frac{1}{2}(Y_2(k,I)+L(I))$ from outside depositors. Since the market value of debt ($\frac{1}{2}(Y_2(k,I)+L(I))$) is smaller than the total amount of deposits, each depositor knows that he or she has the risk of not being able to get back his or her deposit investment once a bank run occurs. Because of the first-

come-first-served sequential service nature of the deposit investment, it becomes individually rational for each depositor to rush to claim the deposits ahead of others. Since market value of deposit is less than the external finance raised, the bank would become disintermediated once a bank run occurs. This threat of disintermediation would help the bank to build up a precommitment to not expropriating the outside investors. Then bank financing may raise more than the market value of the deposits. (see Diamond and Rajan, 1999 for more detailed exposition.)

Since bank or entrepreneur could commit to not expropriating the outside deposit investors in the intermediate date (date 1), the outside depositors could expect to obtain $Y_2(k, I)$ at date 2. This is feasible because when the amount of deposits raised is larger than the market value of deposits at date 1, the bank would not expropriate depositors in fear of disintermediation. And because the entrepreneur couldn't expropriate both the bank and deposit investors, the depositors would thus earn an expected revenue of $Y_2(k, I) - \frac{1}{2}(Y_2(k, I) - Y_1(I)) = \frac{1}{2}(Y_1(I) + Y_2(k, I))$. The amount of external finance that can be raised from bank financing is thus determined by $\frac{1}{2}(Y_1(I) + Y_2(k, I)) = I$.

Comparing the total amount of external finance that can be raised through these two channels, we have the following conclusion:

Proposition 3 *Bank financing can raise a larger amount of external finance from outside investors than equity financing. And the difference between the two amounts decreases in the quality of government.*

3.3 Hold-Up Problem and Bank Ownership of Firms

In the previous section that discusses the bank financing, we assume that once the entrepreneur wants to start expropriation renegotiation, the bank can simply capture the firm's assets and find another manager to operate the firm without harming the value of the investment project. This simplified assumption ignores two important issues. One is that when the entrepreneur also has government-relationship-specific human capital, it may not be so

easy for the bank to seize the firm's assets. Inadequate bankruptcy law allows the entrepreneur to manage and control the firm assets even in the process of bankruptcy. This delay in seizing firm assets would decrease dramatically the expected firm value from the transfer of control from the entrepreneur to the bank. The other ignored issue is that the entrepreneur may have made management-specific investment in the investment project so that in the absence of the entrepreneur's human capital, the firm value in the hands of an alternative management team would face a big discount. These two discount factors to the firm value would diminish the power of banks against the expropriation attempts of the entrepreneur.

Let's assume that once the entrepreneur starts expropriation renegotiation, the bank could seize the firm assets with a value of $L(I)$, which is a concave function of investment I and is less than the value of the firm as a going concern. We further assume that $\frac{\partial L(I)}{\partial I} < \frac{\partial Y_2(k,I)}{\partial I}$. Then with equal bargaining power in Nash bargaining, the entrepreneur can expropriate an amount of $\frac{1}{2}(Y_2(k,I) - L(I))$ from the bank. The bank can only expect to obtain a value of $L(I) + \frac{1}{2}(Y_2(k,I) - L(I)) = \frac{1}{2}(Y_2(k,I) + L(I))$. Then the amount of external funds that bank financing can raise is determined by $\frac{1}{2}(Y_2(k,I) + L(I)) - \frac{1}{2}(Y_2(k,I) - Y_1(k,I)) = \frac{1}{2}(Y_1(I) + L(I)) = I$. Compared with the amount of external funds raised in the previous section without taking into account these two concerns, we can easily see that the amount of external funds that can be raised is lower in this case.

Corollary 4 *The amount of external funds that can be raised from bank financing is lower when the entrepreneur can expropriate the bank through her management-specific investments or inadequate bankruptcy procedure.*

To maximize the total amount of external funds raised, it is better to prevent the entrepreneur/management team from conducting expropriation. One way to achieve this is to have the bank become the large shareholder of the firm and control the firm management. This would achieve synergy between the firm and the bank. We thus expect that not only large shareholding in general but also the bank ownership of firm would be more prevalent under more corrupt and interventionist governments.

4 Some Empirical Evidence

4.1 Predicitons

Our theory mainly has the following predictions:

1. More corrupt and interventionist governments contribute to the prevalence of corporations that have large shareholders rather than widely-held companies.

2. Companies where financial institutions, especially the banks, are large shareholders, should be more prevalent in countries with more corrupt and interventionist governments.

3. The ownership share of large shareholders in the companies is on average larger under more corrupt and interventionist governments.

4. In countries with inferior governments, the financial system is more likely to be bank-oriented, where bank credit is the dominant source for external corporate finance.

4.2 Data

A complete description of the data used in this paper is relegated to the data appendix. It is worthwhile, however, to note how we measure the quality of government. We use three indices to evaluate the quality of government in each country.

The first index is the corruption index. We use two sources of corruption index. One is that compiled by the International Country Risk Guide (ICRG), and the other is compiled by the Transparency International (TI). We use the average of the ICRG-based and the TI-based corruption index to establish our corruption index. The higher the index value, the less corruption a country's government is subject to.

The second index is the government intervention index, which is the average of the two indexes that investigate how government intervention particularly distorts the microeconomic activity. One of them describes the extent that countries impose price controls on various goods and services, and the other of them shows the freedom of businesses and cooperatives to compete in the marketplace.

The third index is a comprehensive evaluation of the status of economic freedom in each country – the index of economic freedom.

The latter two indices are both constructed by the Economic Freedom of the World.

Table 1 gives a summary of the major variables used in this paper.

4.3 Regression Results

1. Government Quality and Large Shareholders

Table 2 shows how government quality affects the proportion of large firms that are widely held in the richest countries around the world using the 20% criterion in defining the existence of a large shareholder. We first look at each of the three government quality indices by controlling for logarithm of GNP and logarithm of GNP per capita. We control the logarithm of total GNP on the theory that larger economies have larger firms, which might have a lower ownership concentration. We control the logarithm of GNP per capita on the ground that richer countries might have different ownership patterns from the poorer ones. The OLS regression results show that higher government quality is associated with a larger percentage of widely-held companies among the largest firms. It is also true that larger economies have more widely-held companies. There is no clear, significant and consistent linkage between the richness of a country and the prevalence of widely-held companies.

We then add the Gini coefficient on the ground that countries with more unequal income distribution tends to have higher ownership concentration. The regression results don't show any strong and clear connection between the two variables. Adding Gini coefficient doesn't change the magnitude and significance of the estimated coefficients on government quality indexes.

In table 3, we examine the relationship between the government quality and the prevalence of bank-owned companies. The OLS results show a consistent negative relationship between the two, but it is not very significant.

One potential concern with our OLS regressions is the endogeneity of the government quality index. Particularly, the scarcity of widely-held companies and the prevalence of

large shareholders may initiate bribery and lobbying so as to deteriorate the quality of government. To address this concern, we adopt an instrumental variable approach. We choose ethnolinguistic fractionalization, latitude, legal origins and the proportion of population that are Protestant, Catholic and Muslim as our instrumental variables.

A large ethnolinguistic fractionalization is expected to lead to a weak government. In ethnically heterogeneous societies, it is common for the ruling group (usually the majority group) to use government power to repress the ethnic losers (usually the minorities), resulting in inefficient institutions. Also ethnic heterogeneity would increase the government's tendency to conduct income and wealth distribution, which undermines the economic efficiency. (see La Porta et al, 1999b)

Latitude may also affect government quality because temperate zones have more productive agriculture and healthier climates, which has enabled them to develop their economies and institutions, while countries close to the equator are subject to the epidemic of diseases and weak agriculture. (see Sachs and Warner, 1997, La Porta et al 1999b)

Legal traditions can be viewed as indicators of the relative power of the State vis a vis private property owners. In particular, common law emerged from and has developed in Britain to a large extent as a defense of the Parliament and property owners against the attempts by the Sovereign to regulate and expropriate them. Civil law (French, German and Scandinavian legal origins), in contrast, has developed more as an instrument of the Sovereign for building institutions to outstretch the power of the State and to control the economic life. Socialist law represents the ultimate control of the economy by the State. (see La Porta et al, 1999b)

The religions would also affect government and legal institutions. The cultural theories of institutions state that different societies developed different cultures, including work ethic, tolerance, trust and other characteristics of society, that help shape the different government and legal institutions. Religions play an important role in shaping the culture. Compared with the Protest countries, Catholic and Muslim countries have acquired cultures of intolerance, xenophobia, and closed-mindedness that obviously retarded their economic

development. (see La Porta et al, 1999b) We thus make use of the proportions of population in each country that belong to the Protestant, Catholic and Muslim religions as instrumental variables for the government quality measures.

To have an idea whether the instrumental variables are actually correlated with the government quality in a way we expected, we present in table 9 the regressions of the government quality indexes on these instruments. As expected, ethnolinguistic fractionalization reduces the government quality. A higher latitude increases the government quality. The civil law and socialist legal origin countries generally have a lower government quality compared with the common law countries. This confirms our argument in section 2 on how legal traditions determine government quality and exert further impact on the pattern of corporate finance. Similarly, Protestant countries tend to exhibit a better government, while Catholic and Muslim countries show a lower level of government quality.

In table 2, the instrumental variables regressions confirm the results of OLS regressions. We thus know that the more corrupt and interventionist government does lead to a lower proportion of widely-held companies.

In table 3, the IV regressions turn out a much stronger result, which shows forcefully that bank-owned companies are more prevalent under more corrupt and interventionist governments.

In table 4, we examine the relationship between government quality and the mean level of ownership share of large shareholders. The specification and the control variables are the same as those in tables 2 and 3. The regressions show that a lower government quality leads to a higher average level of share ownership of large shareholders. We apply the same IV regression methodology to this table, which yield consistent results with the OLS regressions. In unreported results, we substitute the median level of ownership share of large shareholders for the mean level and yield qualitatively the same results.

The Hausman tests conducted show that in most cases there is no difference between OLS regressions and the IV regressions so that *a priori* endogeneity problem should not be a concern. The overidentifying restriction tests show that the instrumental variables are

valid.

2. Government Quality and the Bank-oriented vs. Market-oriented Financial Systems.

We use two alternative sets of measures of bank-oriented vs. market-oriented financial systems. One is the qualitative classification of bank-based vs. capital-market-based financial systems constructed by Demirguc-Kunt and Levine (1999). They use a number of indicators on the aggregate size, activity (turnover) and efficiency of a country's respective stock market and banking system to classify countries into bank-based or market-based financial systems. They use a dummy variable with value 1 for bank-oriented financial system. The other set of measures we use is based on the ratio of the size and activity of the banking system versus the market system. We first use the ratio of stock market capitalization of listed companies over domestic bank credit, that is, the relative size of stock market vs. bank credit. As a robustness check, we also use the structure-activity (logarithm of the total stock traded ratio divided by the bank credit ratio) and the structure-size (logarithm of the market capitalization ratio divided by the bank credit ratio) variables constructed by Levine (2000) to indicate the financial structure in different countries.

In table 5, we run probit regressions to examine the relationship between government quality and the occurrence of bank-based financial system. We control for logarithm of GNP and logarithm of GNP per capita on the ground that the choice of financial system may be related to the scale of the whole economy and the economic development level. The regression results show no strong linkage between them. We also control for the average business income tax rate on the basis of conventional corporate finance theory that debt has tax advantage over stocks.

The regression results show consistently that countries with inferior governments are more likely to adopt a bank-oriented financial system. The two stage least squares estimation using the same instrumental variables as in the previous section confirms the results.

In table 6, we estimate the relationship between the relative size of stock market and bank credit. The control variables are the same as in table 5. The OLS results produce strong support that a less corrupt and less interventionist government would increase the relative

size of the stock market financing over bank credit. The instrumental variables regressions largely confirm the results although they are weaker.

In table 7, we run the similar regressions by using the structure-activity and the structure-size variables. The higher value these two variables are, the more market-oriented the financial structure is in a country. The regression results basically confirm that a less corrupt and less interventionist government will promote a bank-based financial structure.

3. Two Distinct Channels: Legal Codes versus Government-Business Relationship

In section 2, we emphasize that the government-business relationship approach that this paper focuses on and the legal approach based on the investors' *de jure* rights that La Porta et al (1998) have examined are two distinct channels that shape the corporate finance patterns across countries, although they are interrelated. In table 8, we show empirically that these two channels are indeed distinct.

The empirical strategy we adopt is to introduce into our regressions the *de jure* rights index of creditors and minority shareholders – creditor rights index and antidirector rights index – constructed by La Porta et al (1998) in addition to the government quality indices that we have been using so far. In table 8, the first three regressions show that a less corrupt and less interventionist government does promote dispersed ownership even after we control for the antidirector rights index that proxies for minority shareholders' legal rights. We can obtain similar results for the other measures of the role of large shareholders such as the mean ownership share of large shareholders.

Regressions 4-6 provide evidence that an inferior government tends to have a bank-oriented financial structure, while a higher value of creditor rights index (better creditor protection) is more likely to lead to a bank-based financial system. When we replace the creditor rights index with the antidirector rights index, the results for the government quality indices remain unchanged, while a higher antidirector rights index has some positive effect on the generation of a bank-oriented financial system.

Regressions 7-12 use the alternative measure of financial structure — the ratio of stock market capitalization of listed companies relative to domestic bank credit. In regressions

7-9, we control for the creditor rights index, and find that the a high government quality shows consistent and statistically significant positive impact on promoting a market-based financial structure, whereas the creditor rights index remains statistically insignificant. In regressions 10-12, we use the difference between the creditor rights index and the antidirector rights index to measure the bias of legal protection toward creditors rather than minority shareholders. We see that the government quality indices continue to exert a positive impact on the occurrence of a market-oriented financial system and remain statistically significant. The difference in the two investor rights indexes doesn't produce a statistically significant result.

These results suggest that the government-business relationship is truly a distinct channel that helps shape the corporate finance pattern around the world.

5 Conclusion

This paper points out the importance of bureaucratic quality in shaping the pattern of corporate finance across countries. Firm management under corrupt and interventionist governments is particularly powerful in expropriating outside investors because they can threaten to withdraw their acquired government relationship specific human capital that is vital to firm survival and growth. The prevalence of large shareholders, relative reliance on bank financing and bank ownership of firms are various means of constraining managerial expropriation under corrupt and interventionist governments. Both theoretically and empirically, this paper shows that the variation in government-business relationship is a significant driving force of the diverse pattern of corporate finance around the world.

Appendix

[proof of Lemma] The participation constraint can be reduced to $0 \leq \theta \leq \frac{X_2(k)-I}{X_2(k)-L}$.

The first order condition is

$F = B'[\frac{1}{2}(X_2(k) - L)] - \alpha[\frac{1}{2}(X_2(k) - L)] = B' - \alpha = 0.$

Since by assumption $B'(0) > 1$, we see that $F \mid_{\theta=0} = B'(0) - \alpha > 0$. This implies that $\theta = 0$ is not the optimal equilibrium.

When $\theta = \frac{X_2(k)-I}{X_2(k)-L}$, that is, the shareholders' participation constraint is binding, F becomes $B'(\frac{1}{2}(X_2(k)-I))-\alpha$. It is obvious that when α is very small so that $B'(\frac{1}{2}(X_2(k)-I)) \geq \alpha$, the management team will divert the maximum proportion of funds into the negative-NPV project, that is, $\theta = \frac{X_2(k)-I}{X_2(k)-L}$ will be the equilibrium choice. When α is sufficiently large so that $B'(\frac{1}{2}(X_2(k)-I)) < \alpha$, the equilibrium proportion of θ will be less than $\frac{X_2(k)-I}{X_2(k)-L}$, i.e., the investors' participation constraint won't be binding. Only when $\theta < \frac{X_2(k)-I}{X_2(k)-L}$, the ownership share of firm management would play a role in constraining managerial diversion.

Taking the derivative of F with respect to θ and α, respectively, we have

$F_\theta = B''[\frac{1}{2}(X_2(k) - L)] \leq 0$, and $F_\alpha = -1$.

By implicit function theorem, we have $\frac{\partial\theta}{\partial\alpha} = -\frac{F_\alpha}{F_\theta} = \frac{1}{B''[\frac{1}{2}(X_2(k)-L)]} \leq 0$.

For future use, we also derive $F_k = B''[\frac{1}{2}\theta X_2'(k)] \geq 0$. Thus we have $\frac{\partial\theta}{\partial k} = -\frac{F_k}{F_\theta} = -\frac{\theta X_2'(k)}{X_2(k)-L} \geq 0$. QED.

[proof of Proposition 1] Consider any α that is above the threshold level of $B'(\frac{1}{2}(X_2(k)-I))$. The first order condition is $G = -\frac{\partial\theta}{\partial\alpha}[\frac{1}{2}(X_2(k) - L)] = 0$. Taking the first derivative of G with respect to k, we have $G_k = -\frac{\partial^2\theta}{\partial\alpha\partial k}[\frac{1}{2}(X_2(k) - L)] - \frac{\partial\theta}{\partial\alpha}[\frac{1}{2}X_2'(k)]$, where $\frac{\partial^2\theta}{\partial\alpha\partial k} = \frac{-B'''[\frac{1}{2}\theta X_2'(k)][\frac{1}{2}(X_2(k)-L)]-B''[\frac{1}{2}X_2'(k)]}{[B''[\frac{1}{2}(X_2(k)-L)]^2]^2}$.

When the condition $\mid B'''[\frac{1}{2}\theta(X_2(k) - L)] \mid \geq \mid B'' \mid$ holds, we have $\frac{\partial^2\theta}{\partial\alpha\partial k} \geq 0$ and thus $G_k \leq 0$.

Taking the first derivative of G with respect to α, we have $G_\alpha = -\frac{\partial^2\theta}{\partial\alpha^2}[\frac{1}{2}(X_2(k) - L)]$, where $\frac{\partial^2\theta}{\partial\alpha^2} = \frac{-B'''[\frac{\partial\theta}{\partial\alpha}\frac{1}{2}(X_2(k)-L)][\frac{1}{2}(X_2(k)-L)]}{[B''(\frac{1}{2}(X_2(k)-L)]^2} \geq 0$ because $\frac{\partial\theta}{\partial\alpha} \leq 0$. Hence $G_\alpha \leq 0$.

Using the implicit function theorem, we have $\frac{\partial\alpha}{\partial k} = -\frac{G_k}{G_\alpha} \leq 0$. QED.

[proof of Proposition 2] The amount of external investment in equity financing (I_1) is determined by $\frac{1}{2}Y_1' + \frac{1}{2}L' = 1$, while the amount of external investment in bank financing (I_2) is determined by $\frac{1}{2}Y_2' + \frac{1}{2}Y_1' = 1$. Because $L' < Y_2'$ for the same I, we have $I_1 < I_2$. Because $\frac{\partial^2 Y_2(k,I)}{\partial k \partial I} \leq 0$, that is, the higher government quality (the bigger k), the smaller the marginal revenue from the monopoly sector, we have that relative to I_1, I_2 would be smaller for countries with higher government quality and bigger for countries with lower government quality. This implies that the gap in the amount of external finance raised through bank and equity financing is increasing in the weakness of government quality. QED.

[proof of Corollary] The amount of funds (I_3) that can be raised in the case where entrepreneur can expropriate is determined by $\frac{1}{2}(Y_1(I)+L(I)) = I$. The first order condition is $\frac{1}{2}(Y_1'(I) + L'(I)) = 1$. In the case where the entrepreneur cannot expropriate, the amount of external funds (I_2) that can be raised is determined by $\frac{1}{2}(Y_1'(I)+\frac{\partial Y_2(k,I)}{\partial I}) = I$. Since Y_1, Y_2, and L are concave in I and $\frac{\partial L(I)}{\partial I} < \frac{\partial Y_2(k,I)}{\partial I}$, we know that $I_3 > I_2$. QED.

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