Organizational Form and Financing Constraints: Evidence from the Indonesian Manufacturing Industry

by

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July, 2004♣

Abstract:
This paper investigates how, in a developing country, where credit market and legal institutions are weak, firms' choice of organization form, i.e., noncorporate versus corporate, affects their access to capital markets. I use data from Indonesian manufacturers from 1992 to 1998 to show that incorporated firms are less reliant on internal financing than unincorporated firms. Moreover, a 1995 reform that increased the possibility of seizing firms' assets under bankruptcy and the reporting requirements for corporations decreased their reliance on internal financing relative to unincorporated firms. These results suggest that incorporation, which enables asset seizure in the case of bankruptcy and by requiring reporting of financial statements and enabling asset seizure in the case of bankruptcy, serves as a costly signal of quality and increases access to external financing.

JEL codes: G32, O16, P48, I18

♣ I would like to thank Arik Levinson and Billy Jack, for their comments and supervision; Steve Olley; participants of an empirical microeconomic brown bag seminar sponsored by Georgetown University’s Department of Economics, and Mohamad Ikhsan at the Institute for Economics and Social Studies of the University of Indonesia for granting access to the Indonesian manufacturing industry database. I can be contacted via e-mail at: rahardjs@georgetown.edu.
I.1. Introduction

Firms’ performance monitoring and owners’ credit history report can have a significant effect on firms’ ability to obtain external financing. In a corporate firm, the increase in transaction costs resulting from the separation between ownership and manager exposes corporate owners to agency problems associated with slacking and misuse of funds. Given that a corporate entity limits owners from liability if liquidation takes place, firms’ performance report plays important role for creditors. Meanwhile, noncorporate owners are personally responsible on firms’ liability. The personal credit history of owners of a noncorporate firm is valuable for creditors in determining lending default risk. In an economy where the corporate governance is strong and bankruptcy procedures are well defined, performance report—e.g., income statement, balance sheet, and credit history—serve as an important signal for firms’ type.

However, unlike in developed economies, ineffective bankruptcy courts and poor corporate governance are widespread in developing countries. In addition to the poor judicial system, ineffective bankruptcy courts increases creditors’ risk of failing to secure assets if liquidation takes place. Severe information asymmetry therefore causes creditors to further screen firms based not only on the available performance reports but also on their potential liquidation costs. Therefore, this paper consider the extent to which differences in organizational forms firms’ access to outside financing. In particular, I look at how reform in the corporate organization form accounts for an increase in noncorporate firms’ investment financing constraints relative to incorporated firms.

Several studies find a significant effect of organizational form and liability on firms’ performances and access to external financing. A notable study by Hansen and Wernerfelt (1989) concludes that firms’ organizational form and characteristics explains twice as much variance in profit as economic factors among 60 Fortune 1000 firms. Harhoff, Stahl, and Woywode (1998) find
that West German firms with limited liability have higher growth compared with those with full liability. Other empirical studies also identify possible factors that can relax firms’ investment financing constraints such as the development of financial market (Love, 2000), firm size (Carpenter and Petersen, 2002), and ties to creditors or political groups (Lizar and Svejnar 2002; Samphantharak, 2002). With respect to firms’ organizational form and access to external financing, an empirical study by Storey (1994) finds that new limited liability firms have higher chances in obtaining credits compared with those with full liability. On the contrary, Berkowitz and White (2002) find that organizational form does not significantly affect creditors’ decision in channeling credit for small firms.

However, little has been done to relate organizational form and the ability to access outside financing in the context of a developing economy. Unlike these previous studies, here I explore and present an example of how organizational form can serve as a signaling device that can affect access to outside financing. I highlight how creditors' lending preference is affected by how organizational structures define owners' liability and creditors' ability to secure assets if bankruptcy occurs.¹ If laws in the corporate sector supervising corporate governance and liability enforcement are better than in the noncorporate sector then a decision to organize as a corporation serves as a costly signal for creditors that the firm will be less likely to go bankrupt. This means that high-performing firms have an incentive to separate themselves from the low performing ones by incorporating. Firms with low performance have more incentive to choose a noncorporate status because they could get away with zero liability in the event of bankruptcy. Using firm-level data from the Indonesian manufacturing census, I then examine how reform in corporate law affects corporate firms’ investment financing constraints compared with their noncorporate counterparts.

¹ See Megginson (1997) for a brief description on the differences in firm organizational status and possible implications on the firm's financial outlook.
Focusing on Indonesia is attractive for several reasons. First, the Indonesian economy has both severe asymmetric information problems and ineffective bankruptcy courts. Second, the Indonesian government in 1995 introduced the Company Law to reform the corporate sector. Compared with the previous Commercial Law and the colonial Dutch’s *Staatsblad* 1847:23, the Company Law is considered more compatible with modern business practices because it provides more coverage on corporate governance, increases security for creditors and minority shareholders, and clarifies how bankruptcy and liquidation should be conducted (Papkahan, 1995). This policy can serve as a natural experiment to investigate creditors’ response to a firm’s signal after reform in one organizational form and how the policy affects firms’ financing constraints. Third, previous studies on organizational form are limited by the lack of data on noncorporate firms. The Indonesian Survey of Manufacturers (Survey Industri) data collected by the Indonesian census bureau simultaneously sampled firms’ production and financial condition for various types of establishments including those with corporate and noncorporate organizational form.

In general, I find the results support the hypothesis that limited liability corporate firms have more access to outside financing and therefore cause their capital investment to be less financially constrained than noncorporate firms. Using the data for firms in the Indonesian manufacturing sector, I find that during 1992-1996 investment in noncorporate firms was 65 percent more sensitive to their profitability compared with corporate firms. I also find that the 1995 corporate reform significantly increase noncorporate firms’ financing constraints relative to corporate firms’. By improving law on corporate governance and procedures in securing assets when bankruptcy occurs,

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2 Prior to 1998, personal bankruptcy cases in Indonesia were supervised by outdated early 20th century Dutch colonial bankruptcy codes, the *Staatsblad* 1905:217 and 1906:348. This law and the 1995 Company Law became ineffective because both did not mandate a separate court for bankruptcy proceedings and because they lacked articles regarding on the time-frame of a bankruptcy proceeding (see, for instance, Lindsey 1998). After the 1997 financial crisis, the International Monetary Fund mandated the country to establish better business law. New bankruptcy laws and a separate bankruptcy court in Indonesia were introduced in late 1998.
corporate organizational form has more stringent regulations that can signal seriousness in conducting business. Thus this provides evidence which supports the hypothesis that a firm's organizational form affects its investment financing constraint.

I rely on the Indonesian Survey of Manufacturers firm-level data from 1992-1998. This period is chosen to avoid the result that would be driven by the effect of tight money policy in early 1991 and the financial crisis of late 1997. I also exclude firms in which the use of debt is coupled either by the availability of other financial instruments such as publicly traded firms or government-injected capital such as state enterprises. Firms that publicly trade ownership have the option of using equity in raising capital, which could dilute the role of debt in this study. The government or state-owned firms are excluded because their dependence on government or state funding can imply different firm objectives.

I.2. Organizational Form, Debt Liability, and Financing Constraints

In their seminal work, Stiglitz and Weiss (1981) show how equilibrium in the lending market can be characterized by creditors charging different firms different interest rates. Because of information asymmetry whereby creditors cannot perfectly observe firms' true risk, creditors screen firms' risk-type based on observed characteristics and charge different rates accordingly. Firms that are perceived to have a high risk of default likely face higher borrowing costs than those perceived to have lower risk. As a result, some firms could find it difficult to access debt stemming from excessively high rates charged by creditors.

Several observed characteristics could serve as screening devices for creditors to separate firms by risk-type. Firms' credit histories reveal prudence in their debt policies and repayment behavior. Historical financial reports also serve as a vehicle for firms to signal their performance. Firms with greater earnings volatility could be tagged as riskier compared with those with stable
earnings. The ratio of committed collateral assets such as building, equipment, and machineries to total assets may also signal firms' incentive behind their debt policies. A firm that commits more collateral to its assets, thus displaying a willingness to forgo its tangible assets, could reveal that it does not expect a loan default or bankruptcy to occur. Therefore, in this case, collateral would sufficiently serve as a costly signal on the firm's risk to creditors (Bester, 1985).

So far studies looking at the relationship between organizational form and ability to access external finance show conflicting results. A study by Storey (1994) on new firms in the United Kingdom finds that being a corporation increases the chance of getting bank financing. The study argues that incorporating does not necessarily provide lower borrowing costs since creditors often required personal security on loans. Instead, the higher costs in complying with corporate governance law causes creditors to perceive that incorporating is a signal of seriousness in doing business. Dietmar, Stahl, and Woywode (1998) find that firms with limited liability in West Germany have insolvency rates above average, suggesting that limited liability firms have an easier access to debt compared with firms with unlimited liability. Berkovitz and White (2002) find that for small firms in the United States, organizational form is often disregarded by creditors in making lending decisions. They find that local bankruptcy exemption laws affect creditors' behavior in channeling credit.

Assuming that bankruptcy courts effectively uphold the bankruptcy exemption law, their finding suggests that organizational form per se does not affect firms' investment financing constraints.

Nevertheless, Berkovitz and White (2002) take for granted that a well-functioning credit history reporting mechanism exists and bankruptcy courts are effective. Without these mechanisms, the landscape in which creditors and firms interact can adversely change. Firms can have different incentives in signaling their risk and creditors' perception after observing the firms' signal can also be different. Organizational form, in this case, can amplify the difference on how debt liability is treated.

Think of a reversed situation in which firm credit histories are hard to obtain and bankruptcy
courts are ineffective. A firm with full liability on debt could claim bankruptcy and still repay less than it should have or even get away with "zero" liability. Creditors screen firms by offering more favorable lending terms for those that are more likely to honor their liability commitment. Therefore, high-performance firms show that they are unlikely to renege on their commitment by using the costly signal of their willingness to surrender firm assets if default occurs. Because personal asset seizure is ineffective, low-performance firms are more likely to choose the noncorporate organizational form in which default and walking away with zero liability is a highly possible scenario. As a consequence, corporate firms face a lower lending rate than noncorporate firms. Hence, investment in corporate firms is likely less affected by their internal finance because of better access to debt and favorable lending terms.

I.3. Reform in Performance Monitoring and Bankruptcy Procedures in Indonesian Corporate Law

Indonesia’s Laws on firm's organizational form and bankruptcy have existed since the Dutch colonial era. The colonial laws *Staadsblad* 1847:23, *Staadsblad* 1905:217, and *Staadsblad* 1906:348, marked the birth of the legal infrastructure in facilitating bankruptcy proceedings. These laws were complemented by the Commercial Code, which supervised the establishment, organization, termination, liquidation, ownership, and other legal administrative issues regarding the operation of business entities of all types. Under the Commercial Code, a corporation was separated from its corporate counterpart through articles on owners’ limited liability from firm’s debt, internal

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3 See, for example the translation of 1998 Bankruptcy law by Hanafiah and Ponggawa (1999).
supervision and control, establishment procedure, and termination. For instance, the Commercial Code required a corporate firm to keep all financial records; and it later was amended to include an audit requirement. The Commercial Code also called for the establishment of a corporate firm to be filed through district court. Thus a corporate firm has its own legal entity, which should cause legal disputes such as bankruptcy to be less complicated compared with non-registered noncorporate firms.

For noncorporate firms, regulations supervising their establishment, operation, and termination are far less detailed. The provisions in the Commercial Code pertaining to firms with personal ownership and partnership are very limited. Regarding the insolvency issue, other than provisions requiring personal liability, the Commercial Code did not clearly mention how insolvency and bankruptcy in corporate firms should be handled.

However, for the corporate sector, the Commercial Code was considered not compatible with modern business practices (Pakpahan, 1995). The law had caused corporate business to rely on many unwritten conventions, which in many cases caused complications in legal proceedings (Juwana, 2001). For instance, the Commercial Code did not touch on issues regarding minority shareholders, internal supervision, and penalty for managers or directors in the case of deliberate wrongdoings. These absences in regulation caused uncertainty not only for shareholders but also creditors. Another example is the possibility that a firm unilaterally declares termination if it suffers losses totaling more than 75 percent of its value of capital.

In practice, the bankruptcy procedure in Commercial Code was rarely used. One reason is the incomplete description of how bankruptcy cases should be filed and properly handled. For example, the Commercial Code did not make clear when a hearing should be held after the court first receives a case or how liquidation should be carried out if a firm declares bankruptcy. Another reason is the lack of experience of district courts’ judges in handling bankruptcy. As a consequence, only a
few cases were filed under these two acts, let alone successfully settled. As documented in the annual anthology of district courts rulings (Kumpulan Putusan Pengadilan Negeri), there were only 12 cases involving insolvency filed by creditors in 1982-1993. This suggests that the legal process involving corporate bankruptcy or insolvency was too costly and unpredictable for those seeking to settle business disputes through the courts.4

The Indonesian government introduced a new law for limited liability businesses in 1995. The Company Law changed the guidelines for establishing, selling and transfer of ownership, corporate governance and control, raising equity, and liquidation (see table 2 for descriptions). With respect to administrative issues, the reform simplifies permit processing and requires corporate firms to register with the Department of Justice (articles 9 and 21). This improvement was intended to force all corporations to register, which had not been strictly followed under the Commercial Law. Registration under the new Company Law also gives corporations a legal status that was not clearly mentioned in Commercial Law (Pakpahan, 1995). It also eliminates uncertainty for creditors and owners regarding the legal status of the corporate firm if bankruptcy and termination occurs while the approval from the Department of Justice is still on process. Under the new law, as long as corporate owners are not proven to commit deliberate wrongdoings, owners are no longer liable for obligations of the firm.

With respect to governance, the Commercial Law did not mandate the appointment of a board of commissioners responsible for internal supervision. However, the Company Law reemphasizes the commitment to protect shareholders by strengthening the requirement of

4 The lengthy and uncertain outcome discouraged business entities from using the bankruptcy mechanism to seek bankruptcy claim protection. Hence this situation has created an environment in which most bankruptcy cases and disputes have been settled through an outside court settlement (see, for instance, Kamarul and Tomasic (1999)).
monitoring by commissioners (article 94). The new law also specifies the penalties for managers and commissioners which can involve their personal liability in the case of deliberate wrongdoings. With respect to reporting, the new law provides a legal basis for requiring corporate firms to provide audited and standardized financial statements (article 56).

The 1995 Company Law established new provisions on handling bankruptcy. Articles 114 to 124 introduced measures on how bankruptcy should be handled, which were not covered by the previous Commercial Law. The reform improves procedures for creditors to exercise their right to claim firms’ assets if their liability is not met through a court-appointed liquidator. Theoretically, this law should make it easier for creditors in seizing a firm's assets in a bankruptcy case. The new law also eliminated the creditors’ major concern—a firm's right to dissolve if it suffered losses totaling over 75 percent of its capital.

In theory, these reforms should boost the profile of corporate firms and increase creditors' preference and investors' confidence in corporate firms (Pakpahan, 1995; Tabalujan, 1996). In contrast, the legislation supervising corporate firms, the Commercial Code, still possesses much uncertainty regarding bankruptcy, insolvency and governance issues. Thus, corporate firms should have more access to external financing compared with their corporate counterparts, which can affect how they raise capital.

I.4. A Stylized Example

I do not develop a theoretical model on debt and financing constraints, but I illustrate the problem using a simple example. The example provides empirical predictions for the effect of Indonesia's 1995 corporate reform on firms' investment financing constraints. I begin by setting up a signaling model in which the firm type (low productivity versus high productivity) is unobservable and that firms attempt to signal their type through their choice of organizational form.
Suppose that firms have a choice of two organizational forms; corporate or noncorporate status. For each organizational form, I assume that a specific cost is associated with the establishing the firm, obtaining and maintaining an operating permit, and auditing and reporting financial statements. For simplicity, I assume that such cost, \( C \), is fixed and zero for noncorporate firms and is positive for corporate firms. The latter assumption is based on several facts. First, corporate firms incur costly and complex setup procedures. Second, corporate firms typically are subject to reporting requirements and other monitoring regulations.

I assume that creditors can not observe the return from investment but only the outcome whether the firm repay or claim bankruptcy. However, the bankruptcy system is assumed to be ineffective such that creditors are unable to collect personal assets if default occurs. This implies that noncorporate firms can get away with zero liability. Meanwhile, creditors are assumed to have higher chance in collecting corporate assets because they are not shareholders' personal assets but assets carrying firm's title deed. I also assume that creditors are identical and act competitively.

Suppose that a representative firm borrows from creditors to finance an investment project with gross return, \( R \), with the possibility of having a high return, \( R_H \), and a low return, \( R_L \), where \( R_L \geq C \). Let firm type be denoted by \( \theta \in \{ \theta_1, \theta_2 \} \), where \( \theta_1 > \theta_2 \) and \( \theta_1, \theta_2 \) are probabilities in obtaining a high return for high performing, and low performing, respectively.

Now suppose that the model sequence is as follows. First, the firm decides to choose its ownership structure, i.e., corporate or noncorporate. Second, creditors observe firm's organizational form and lend debt, \( B \), to finance the investment project. The amount to be repaid in the next period is given by \( B_j > B \), where \( j \in \{ c = \text{corporate}, n = \text{noncorporate} \} \). Third, at the end of the first period the firm observes the realized return of the investment project \( R \) and decides either to repay the creditor or to claim bankruptcy. If the firm reneges and does not repay when it receives high return \( R_H \), the firm loses future benefit \( v_H > 0 \), from not being able to access capital market and hence, not
being able to invest in future project. If firm reneges and not repay under low return, \( R_L \), firm loses future benefit \( v^l < v^H \). Here, I assume that the future opportunity loss when return is high is lower than the low return, \( v^H < R_L \), and for simplicity I assume that \( v^l = 0 \).

If a corporate firm gets a high return \( R_H \), the firm repays its creditor and be left with the amount of \( R_H - C - B_C \). Otherwise, not repaying causes firm to loose future benefit \( v^H \) such that firm's pay-off is \( R_H - C - B_C > R_H - C - v^H \). For a corporate firm, if the firm gets a high return, the firm will repay creditor and left with the amount of \( R_H - B_N > R_H - v^H \).

If the profit is low, \( R_L \), a firm chooses to claim bankrupt and is left with \( (1 - \eta)(R_L - C) \). For a corporate firm, \( \eta \in (0,1] \) such that the firm repays \( \eta(R_L - C) \) to creditors. For a noncorporate firm, owners can get away with zero liability, \( \eta = 0 \), repay nothing to creditors and retain the payoff, \( R_L \).

Next I derive the creditors' lending rate offered to corporate and corporate firms and the separating equilibrium of the game. Instead of deriving all possible conditions that sustain equilibrium, I first conjecture that under an ineffective bankruptcy system incorporating is a costly signal. Therefore, high-type firms choose the corporate form to signal creditors that they are less likely to have a low return. Firms with low-type choose a noncorporate form because they can get away with zero liability.

\textbf{I.4.a. Separating Equilibrium}

I conjecture that high-type firms will choose the corporate organizational form. That is, creditors' subjective belief of a firm's type upon observing a firm's organizational forms is such that \( \mu(\theta_1 | c) = 1 \) for a corporate firm, and \( \mu(\theta_1 | n) = 0 \) for a noncorporate firm. Assuming that the credit market is competitive, a representative creditor earns an expected payoff of zero from lending to firms of either organizational form. The creditor's gross lending rate for corporate firms satisfies

\[ EP^{c} = \theta_1 B_c + (1 - \theta_1)\eta(R_L - C) - B = 0, \]

which can be solved for \( B_C \) as
Creditors' gross lending rate for a corporate firm solves the condition $E\Pi_C^{cr} = \theta_c B_c - B = 0$ which implies

$$B_c = \frac{B}{\theta_1} - \frac{(1-\theta_1)\eta(R_n - C)}{\theta_1} \quad (4.1)$$

Thus, under a poor bankruptcy system, creditors will charge a higher rate for noncorporate firm, which implies $B_c < B_n$. This is shown by the following result.

$$B_n - B_c = \frac{\Delta\theta}{\theta_1\theta_2} B + \frac{(1-\theta_1)\eta(R_n - C)}{\theta_1} > 0 \quad (4.3)$$

where $\Delta\theta = \theta_1 - \theta_2 > 0$.

Next, I specify the separating equilibrium and characterize the conditions under which is it sustained. Using equation 4.1, the expected profit for the high-type firm that chooses to incorporate can be written as:

$$E\Pi_{1}(\theta_1;c) = \theta_1 (R_H - C - B_c) + (1 - \theta_1) (1 - \eta)(R_L - C)$$

$$= \theta_1 R_H + (1 - \theta_1) R_n - C - B \quad (4.4)$$

The intuition behind this result is that for high-type firms, corporate form on average result in an expected profit equal to the expected return net the amount of borrowing and set up-cost, $C$. This expected payoff is independent of $\eta$. That is, incorporating serves as a costly signal in which the likelihood of obtaining a high return and repaying is higher than the likelihood of bankruptcy. Using equation 4.2, the expected profit for a low-type firm choosing a noncorporate form can be written as

$$E\Pi_{1}(\theta_2;n) = \theta_2 (R_H - B_n) + (1 - \theta_2) R_L$$

$$= \theta_2 R_H + (1 - \theta_2) R_L - B \quad (4.5)$$

For a noncorporate firm, borrowing will result in expected profit equal to the expected return net of the amount borrowed.
To argue that equations 4.4 and 4.5 are candidates for the separating equilibrium, I need to characterize the conditions under which firms have no incentive to deviate. For high-type firm, the expected profit in the candidate separating equilibrium is greater than that attained by deviating if

$$E\Pi_1(\theta_1; c) > E\Pi_1(\theta_1; n),$$

or

$$E\Pi_1(\theta_1; c) - E\Pi_1(\theta_1; n) = \frac{\Delta \theta}{\theta_1} B - C > 0 \quad (4.6)$$

That is, if the costs of governing a corporate firm is lower enough—in this case, lower than a certain fraction of the amount borrowed from creditors, $C < \frac{\Delta \theta}{\theta_1} B$—high-type firm will not deviate and choose a noncorporate form. For low-type firm the expected profit in the separating equilibrium candidate is greater compared with that obtained by deviating if $E\Pi_1(\theta_2; n) > E\Pi_1(\theta_2; c)$. Letting

$$\Phi_1(\theta_2, a'(n), a(c)) = E\Pi_1(\theta_2; n) - E\Pi_1(\theta_2; c),$$

this term will be positive if

$$\frac{\Delta \theta}{\theta_2} \eta(R_c - C) - \frac{\Delta \theta}{\theta_2} B + C > 0,$$

or

$$\eta > \frac{B}{(R_c - C)} - \frac{\theta_2}{\Delta \theta} \frac{C}{(R_c - C)} \equiv \eta^*_1 \quad (4.7)$$

Thus for low-type firm not to deviate and choose the corporate form, the creditor’s ability to seize a firm’s asset, $\eta$, must be high enough such that incorporating is undesirable for a low-type firm.

If the creditor’s optimal lending rate to a firm with organizational form $j$ is denoted as $B_j$ and the organizational form chosen by a firm with type $\theta$ is denoted as $a'(\theta, j)$, then $\{B_c, B_n\}$,

$$a'(\theta) \in \{a'(\theta_1), a'(\theta_2)\}, \mu(\theta | a) \in \{\mu(\theta_1 | c) = 1, \mu(\theta_2 | c) = 0\}, \quad C < \frac{\Delta \theta}{\theta_2} B,$$

and

$$\eta \in \left[\frac{B}{(R_c - C)} - \frac{\theta_2}{\Delta \theta} \frac{C}{(R_c - C)}, 1\right]$$

characterize the separating equilibrium. That is, under these conditions high-type firm separates from the low-type firm where the former chooses a corporate organizational form and the latter chooses a noncorporate organizational form.

In a separating equilibrium situation, changes in the fraction of assets that can be seized by
creditors, $\eta$, affects the interest rates differential and the low-type firm's expected profit differential $\Phi_s(\theta_2,a'(n),a(c))$. Thus an increase in the fraction of assets that can be seized by creditors, i.e., an increase in $\eta$, has the following effect

$$\frac{\partial}{\partial \eta} \frac{(B_i - B_j)}{B} = \frac{(1-\theta_1) (R_i - C)}{B} > 0,$$

and

$$\frac{\partial}{\partial \eta} \Phi_s(\theta_2,a'(n),a(c)) = \frac{\Delta \theta}{\theta_1} (R_L - C) > 0.$$

That is, the equilibrium interest rate for a noncorporate firm increases relative to a corporate firm. Also, the difference between a low-type firm's expected profit from equilibrium is increasing, diminishing the incentive for a low-type firm to deviate by choosing the corporate form.

As described in table 1, the reform also requires the firm to overhaul its internal control and supervision, thus the cost of governing corporate firm, $C$, increases. For a low-type firm, an increase in such costs will increase its expected pay-off by choosing a noncorporate form

$$\frac{\partial}{\partial C} \Phi_s(\theta_2,a'(n),a(c)) = \frac{\theta_2}{\theta_1} \eta > 0.$$

This implies that increase the in cost of organizing in a corporate form reduces a low-type firm’s incentive to deviate from equilibrium.

I.4.b. Pooling Equilibrium

In pooling equilibrium, creditors solve their expected payoff based on their belief about whether a firm is a high-type after observing its organizational form. In this case, a creditor’s belief that a corporate firm is high performing is $\mu(\theta_1|c)=q$, and low performing, $\mu(\theta_2|c)=(1-q)$. Assuming that the credit market is competitive, a representative creditor charges lending rate $B_p$ which gives the following zero expected payoff a pooling equilibrium.

$$E \Pi^C = q(\theta_1 B_i + (1-\theta_1)\eta (R_L - C)) + (1-q)(\theta_2 B_i + (1-\theta_2)\eta (R_L - C)) - B = 0 \quad (4.8)$$

or
\[ B_p = \frac{B - \eta(R_L - C)}{\alpha} \]  

(4.9)

where \(\alpha = q\theta_1 + (1-q)\theta_2\) and \(\gamma = q(1-\theta_1) + (1-q)(1-\theta_2)\). The expected profit for a firm with a high type under pooling equilibrium \(E\Pi_p(\theta_1; c)\) is

\[ E\Pi_p(\theta_1; c) = \theta_1 R_L + (1-\theta_1)R_L - \eta(R_L - C) - \frac{\theta_1}{\alpha} B - C \]  

(4.10)

and for the low type is

\[ E\Pi_p(\theta_2; c) = \theta_2 R_L + (1-\theta_2)R_L - \eta(R_L - C) - \frac{\theta_2}{\alpha} B - C \]  

(4.11)

To show that a pooling equilibrium in which all types choose to incorporate can be sustained, I look at the payoffs for firms and creditor on the off-equilibrium path. I focus on a candidate for pooling equilibrium with an off-equilibrium path belief is \(\mu(\theta_1|n) = p < q\), where \(q = \mu(\theta_1|c)\), the creditor's belief that a firm is a high-type upon observing its corporate form. I show that I can rule out the case for is \(\mu(\theta_1|n) = p \geq q\). If creditor observes deviation from the equilibrium and if his off-equilibrium path belief is \(\mu(\theta_1|n) = p\), the creditor charges interest rates according to

\[ E\Pi_{\text{off}}(\theta_1;n) = \theta_1 R_L + (1-\theta_1)R_L - \eta(R_L - C) - \frac{\theta_1}{\delta} B - C \]  

(4.12)

where \(\delta = p\theta_1 + (1-p)\theta_2\). A high performing firm expected payoffs from deviating is

\[ E\Pi_{\text{off}}(\theta_1;n) = \theta_1 R_L + (1-\theta_1)R_L - \theta_1 B / \delta \]  

and for low performing firm

\[ E\Pi_{\text{off}}(\theta_2;n) = \theta_2 R_L + (1-\theta_2)R_L - \theta_2 B / \delta . \]

In order a high-type firm not to deviate, the expected profit in candidate for pooling equilibrium must be greater than the expected profit obtained from deviating to noncorporate form. That is if \(\Phi_p(\theta_1, a'(c), a(n)) = E\Pi_p(\theta_1; c) - E\Pi_{\text{off}}(\theta_1;n) > 0\), or
\[
\Phi_p(\theta_1, a^*(c), a(n)) = \frac{(1-q)\Delta\theta}{\alpha} \eta(R_C - C) - \left(\frac{(p-q)\Delta\theta_1}{\alpha\delta}\right)B - C > 0
\]

if \( \eta > \left(\frac{\alpha}{(1-q)\Delta\theta}C + \frac{(p-q)\Delta\theta_1}{(1-q)\delta}B\right) \frac{1}{(R_C - C)} \equiv \eta_p \) \hfill (4.13)

and for the low-type firm not to deviate,

\[
\Phi_p(\theta_2, a^*(c), a(n)) = -\frac{q\Delta\theta}{\alpha} \eta(R_C - C) - \left(\frac{(p-q)\Delta\theta_2}{\alpha\delta}\right)B - C > 0
\]

if \( \eta < \left(-\frac{(p-q)\Delta\theta_2}{(1-q)\delta}B - \frac{\alpha}{q\Delta\theta}C\right) \frac{1}{(R_C - C)} \equiv \eta_p \) \hfill (4.14)

From equation 4.14, if \( p \geq q \), then no \( \eta \) can sustain pooling equilibrium. From equation 4.14, \( p \geq q \) implies a negative \( \eta \) which contradicts \( \eta \) being positive as suggested by equation 4.13. If the creditor’s off-equilibrium belief on high-performing upon seeing a noncorporate type is higher than his equilibrium belief on high-type upon observing a corporate form, i.e., \( p \geq q \), creditor offers lower interest rates for firms that deviate from corporate form. Therefore, in this case being incorporated perceived as high-risk and no positive rate of asset seizure \( \eta_p \) can support such pooling equilibrium in which both types choose to incorporate.

The second candidate for pooling equilibrium is where both performing types choose noncorporate form. In this case, regardless of a creditor’s off-equilibrium beliefs, this pooling equilibrium is not possible because it lowers the high-performing type firm’s payoff. High-performing type firm is better of to signal their credibility by deviating into corporate form. Therefore, \( B_c, B_n; a^*(\theta_1), a^*(\theta_2), \mu(\theta_1|c) = 1, \mu(\theta_1|n) < q, \eta \in (\eta_p, \eta_p) \) characterizes a pooling equilibrium in which both low-performing and high-performing type choose to incorporate.
I.4.c. Mixing (Hybrid) Equilibrium

Although the idea of randomization in a firm's organizational choice seems a little odd, I cannot rule out that it might lead to a sustainable equilibrium. Therefore I explore the possibility of a partial pooling or hybrid equilibrium in which a high-performing firm choose the corporate form and low-performing type firm randomizing its choice between corporate and noncorporate structures.

Suppose that the probability of a low-performing firm choosing the corporate form is denoted by $\lambda$. The creditors' belief in a firm's type upon observing a firm with a corporate form is derived according to Baye's rule $\mu(\theta | c) = q/(q + (1-q)\lambda) = s$. Then creditor's belief in high-type $\theta_1$ upon observing a corporate firm, $\mu(\theta_1 | c) = s$, is higher than in pooling equilibrium, $s > \mu(\theta_1 | c) = q$. This happens because creditors are taking into account the fact that low-type firm randomizes its action; they do not choose corporate form with certainty. Using this belief, I can solve for a creditor's lending rate for corporate firm under mixing equilibrium $B_m$, which is given by

$$B_m = \frac{B - \tilde{\eta}(R_c - C)}{\tilde{a}}$$  \hfill (4.15)

where $\tilde{\eta} = s(1-\theta_1) + (1-s)(1-\theta_2)$ and $\tilde{a} = s\theta_1 + (1-s)\theta_2$. A creditor's lending rate upon observing a noncorporate firm is given by $B_n$, the rates for a corporate firm under separating equilibrium.

The expected profit for a low-type firm choosing to incorporate under mixing equilibrium is

$$E\Pi_n(\theta_2, c) = \theta_2 R_n + (1-\theta_2) R_c - \frac{\theta_2}{\tilde{a}} B - \frac{s\Delta\theta}{\tilde{a}} \eta(R_c - C) - C.$$  \hfill (4.16)

To have a hybrid equilibrium, a low-type firm must be indifferent in choosing between a corporate form in pooling equilibrium or the noncorporate form in separating equilibrium. That is, the expected profit of a low-type firm must be equal in both cases, $E\Pi_n(\theta_2, c, B_n) = E\Pi(\theta_2, n, B_n)$ implying that $\frac{s(\lambda)\Delta\theta}{\tilde{a}(\lambda)} B - \frac{s(\lambda)\Delta\theta}{\tilde{a}(\lambda)} \eta(R_c - C) = C$.

I can then solve for $\lambda^*$, the probability that low-type chooses corporate form in equilibrium.
\[ \lambda^* = \left( \frac{\Delta \theta(B - \eta(R_x - C)) - \theta_2 C)}{C} \right) \frac{q}{(1 - q)\theta_2} \tag{4.16} \]

Then it is easy to see the effect of increase in the ability to seize assets, \( \eta \), on the probability of a low-type firm choosing a corporate form in equilibrium

\[ \frac{\partial \lambda^*}{\partial \eta} = -\frac{q \Delta \theta(R_x - C)}{(1 - q)\theta_2 C} < 0. \]

This implies that if the procedure in seizing corporate assets is improved, then low-performing firm with type \( \theta_2 \) has less incentive to choose a corporate form. Equation 4.16 also predicts that \( \frac{\partial \lambda^*}{\partial C} < 0 \) given that \( R_x < B \). This implies that a reform that increases the setup and governance cost of a corporate firm decreases the probability that a low-type firm chooses a corporate form in equilibrium.

In figure I.1, I show how the probability that a low-performing firm chooses to incorporate \( \lambda^* \) varies with \( \eta \), the creditor’s ability in seizing corporate assets. If the ability to seize corporate assets, \( \eta \), is lower than the upper limit \( \eta_p \) for pooling equilibrium, then low-performing firm \( \theta_2 \) chooses a corporate form. If \( \eta \) is between \( \eta_p \) and \( \eta_s \), the probability that a low-performing firm will randomize and choose corporate form in the equilibrium varies and given by equation 4.16. If \( \eta \) is above \( \eta_s \), a low-performing type firm never chooses to incorporate and thus \( \lambda^* \) is equal to zero.

To conclude, the corporate reform in Indonesia increased the value of the signal from incorporating for the following reasons. First, the Corporate Law made it potentially easier for creditors to seize corporate assets compared with noncorporate assets, i.e. increase in \( \eta \). Prior to the inception of the bankruptcy law in 1998, the Corporate Law provided a mechanism in handling bankruptcy and offered better protection for creditors which had not covered by the Commercial Code. Second, the higher costs associated with requirements to comply with the corporate governance and financial reporting laws could deter low-type firms to choose the corporate
organizational form. Therefore, the 1995 reform should drive the equilibrium away from pooling equilibrium to separating equilibrium.

With respect to the financing constraint, the separating equilibrium in this example suggests that corporate firms receive lower lending rates than noncorporate firms as $\eta$ increases. Thus, higher lending rates for noncorporate firms imply that investment among noncorporate firms is more likely to use internal financing (e.g. retained earnings or private equity). Therefore, one would expect that the reform causes investment in noncorporate firms to be more sensitive to profitability.

I.5. Empirical Model

The empirical model used here is similar to the dynamic investment model proposed by Bond and Meghir (1994). The structure of the model allows for the description of how investment is affected by profitability and the costly adjustment process of installing capital. If investment is positively related to lagged profitability, it indicates that the firm could be experiencing a financing constraint.

The model has couple of underlying assumptions. First, in each period a firm chooses its capital, labor, and debt level to maximize its value, regardless of its organizational form. Second, to simplify the nature of profit distribution in a noncorporate firm, the model assumes that profit distribution is a dividend payment to a single owner. Therefore, a noncorporate firm needs to be concerned only with how big the profit being distributed and not how it is distributed. Third, creditors are identical and risk-neutral. Fourth, capital is costly to install.

In this paper, I add a limited liability constraint (or asset constraint) for corporate and noncorporate firms $$(1 + r_t)B_t \leq p_t^K K_{t+1}^K$$. This constraint dictates that the amount of debt outstanding at period $t+1$ cannot exceed the firm's expected value of its assets. For a corporate firm, creditors could try to assess the value the owner's wealth. Because personal wealth is private information, I
assume that the best assessment a creditor can make is based on the expected value of physical collateral assets $\bar{K}$. Here I define collateralizable assets all physical assets that have value, highly marketable, and can serve as a guarantee for a financial contract (e.g.: land, building, and automobile). Therefore, I can also write the liability constraint as an asset constraint $(1 + \rho_t)B_t \leq p^e_t \bar{K}_t$, where $\bar{K}_t = \xi K_t$, and $0 < \xi \leq 1$ is the fixed proportion of collateral to total assets.

As I discuss in Appendix A, the optimization results in optimal paths for debt and capital, which can be combined with the capital adjustment cost to derive an empirical investment equation for a corporate firm

$$
\frac{I_{i,t+1}}{K_{i,t+1}} = \alpha_0 + \alpha_1 \frac{I_{i,t}}{K_{i,t}} + \alpha_2 \left( \frac{I_{i,t}}{K_{i,t}} \right)^2 + \alpha_3 \frac{Y_{i,t}}{K_{i,t}} + \alpha_4 \frac{\Pi_{i,t}}{K_{i,t}} + \alpha_5 \frac{p_t K_{i,t}}{K_{i,t}} + \alpha_6 \frac{B_{i,t}^2}{p_t K_{i,t}^2} + J_t + \xi_{i,t+1}
$$

(5.1a)

and for noncorporate firm

$$
\frac{I_{i,t+1}}{K_{i,t+1}} = \alpha_0 + \alpha_1 \frac{I_{i,t}}{K_{i,t}} + \alpha_2 \left( \frac{I_{i,t}}{K_{i,t}} \right)^2 + \alpha_3 \frac{Y_{i,t}}{K_{i,t}} + \alpha_4 \frac{\Pi_{i,t}}{K_{i,t}} + \alpha_5 \frac{B_{i,t}^2}{p_t K_{i,t}^2} + J_t + \xi_{i,t+1}
$$

(5.1b)

The first two variables in equation 5.1a and 5.1b show how current investment adjusts to investment in the previous period. As shown in Appendix A, $\alpha_1$ is expected to be positive and $\alpha_2$ to be negative. The third variable, $Y_{i,t}/K_{i,t}$, is the effect of lagged output on current investment, which controls for imperfect competition in output. Firms with higher market power can affect market by lowering price to increase sales, which can increase the output productivity of capital. Thus investment increases to restore equilibrium, suggesting that $\alpha_3$ is positive. The fourth variable, $\Pi_{i,t}/K_{i,t}$, is the firm’s profitability measured by its cash-flow. As shown in Appendix A, the sign for $\alpha_4$ is theoretically negative, indicating that the firm can raise capital indefinitely. However, most
empirical studies find $\alpha_4$ to be non-negative. Thus as in Bond and Meghir (1994), I interpret a non-negative result of $\alpha_4$ as an indication that firms could be experiencing a financing constraint. The fifth variable is the ratio of debt to capital, $p_{i,t}^p B_{i,t} / ((1 + r_p) p_{i,t} K_{i,t})$, which is present because of the inclusion of the liability or asset constraint. It represents how investment will increase if the liability constraint is relaxed (i.e., allowing a firm to increase its leverage). If the limited liability constraint is binding, $\alpha_5$ should be significantly different from zero and is expected to be positive. The sixth variable is $B_{i,t}^2 / p_p K_{i,t}^2$, representing the agency costs of debt financing. As a firm increases its leverage, it also increases the agency costs due to financial distress and bankruptcy risks. Therefore, since investment could be adversely affected by the agency costs of debt, $\alpha_6$ is expected to be negative. The last variable, $J_i$, is the user's cost of capital which is assumed to be captured by time dummy variables. The last term, $\xi_{i,t+1}$, is the composite error term, which consists of a firm-individual effect $\mu_i$ and the random disturbance $\varepsilon_{i,t+1}$.

To estimate the coefficients, I stack those two equations and the data and use dummy variable to identify corporate firms. I use the Arellano and Bond Generalized Method of Moments (GMM) approach to overcome the endogeneity problem caused by the lagged dependent variables, $I_{i,t}/K_{i,t}$ and $(I_{i,t}/K_{i,t})^2$, appearing on the right-hand side. This method estimates the equation in first difference form to eliminate the firm-specific effect and uses lagged level variables as instruments. To identify the effect of external shocks on investment, I include a lagged real borrowing rate, a lagged 3-digit industry level sales, and the real value of foreign direct investment as additional instruments. Providing that $J_i$ is captured by the time variant effect and the overall error term $\xi_{i,t+1}$ has no second order serial correlation, Arellano and Bond GMM produces consistent parameter estimates for the investment equation.
I.6. Estimation Results

Table I.1 provides summary statistics regarding corporate and noncorporate firms in the Indonesian manufacturing sector. Noncorporate firms are on average older than corporate firms. Noncorporate firms are also typically less capital-intensive and their capital-labor ratio is only one tenth of the capital-labor ratio of corporate firms. Because per unit labor in corporate firms has more capital, the labor productivity measured by average output per-labor is higher than in noncorporate firms. In terms of distribution across manufacturing sectors, 35 percent of noncorporate firms are in the food, tobacco, and beverage sector (ISIC31), while 22 percent of corporate firms are in the textile, leather, and footwear sector (ISIC32).

With respect to the use of debt, the data show that leverage level among noncorporate firms (measured by debt over assets) is 47 percent lower compared with corporate firms. But the real difference in how debt plays a role in investment is seen in the use of new debt in financing investment. The use of new debt in investment among corporate firms is 65 percent higher than in noncorporate counterparts. This fact also translates into a more significant role of retained earnings in financing investment. The role of retained earnings in financing investment is 26 percent higher among corporate firms compared with corporate counterparts. Finally, I observe that nociouslate firms in Indonesia invest 55 percent less than their corporate counterparts.

Table I.3 compares summary statistics for several key variables before and after the 1995 reform. To prevent the figures from being driven by a currency crisis and the collapse of Suharto's regime, the sample is restricted to before 1998. The data show that, after the 1995 reform, the use of debt financing for investment decreases for noncorporate firms and did not change for corporate firms. To isolate the effect of organizational form on the use of new debt in financing investment, I test the difference in changes of debt financing in investment. The result shows that the difference in change in debt financing for investment between corporate and corporate firms is -0.05 and
significant. The data also reveal that, after the 1995 reform, the proportion of private equity issued to finance investment among corporate firms increased relative to their corporate counterparts. The table also shows the ratio of incremental debt to private equity issued for investment increases significantly for corporate firms from 6.6 before the 1995 reform to 16 after the reform.

Table I.4 contains GMM estimation results from the empirical investment equation using Indonesian corporate and noncorporate manufacturers. I use two different unbalanced panels, the first is from 1992 to 1998 and the second is 1992 to 1996. The second sample avoids the result driven by the economic crisis which started in late 1997. In estimating the investment equations 5.1a and 5.1b, I use the current investment over capital \(\frac{I_t}{K_t}\) as the dependent variable and express the right-hand side variables in their first-lag form. I combine the data for corporate and noncorporate firms and separate the variables associated with the former type using a dummy variable. To examine the effect of corporate reform, I introduce a reform dummy variable which takes value of one after the year 1995.

The results presented in table 4 confirm that both corporate and noncorporate investment follow the dynamic investment equation suggested by the firm's value maximization problem. This can be seen by the \(\chi^2\) tests for all models indicating that I can reject the null hypothesis that the model does not explain investment variation among firms. Since the consistency of Arellano and Bond GMM estimates is impaired by the presence of a second order serial correlation, the tests show that I can reject the null hypothesis of a second order serial correlation.

The estimation results overall indicate that the lagged terms of investment over capital, debt over capital, and output over capital for both corporate and noncorporate firms have the correct signs. As for the coefficient signs, the lagged investment over capital \(\frac{I_{t-1}}{K_{t-1}}\) and the squared term \((\frac{I_{t-1}}{K_{t-1}})^2\) are both correct and significant. The coefficient of the additional term in investment, lagged debt over capital \(\frac{B_{t-1}}{K_{t-1}}\), also shows a expected positive sign. As discussed in Jaramillo,
Schiantarelli, and Weiss (1996), this suggests that an increase in a creditor’s limit has a positive effect on corporate and noncorporate firms’ investment. The results also show a negative and significant coefficient of interaction between debt over capital and corporate dummy. This suggests that the marginal effect of increasing leverage among noncorporate firms is significantly higher compared with corporate firms. On the other hand, the lagged squared debt over capital \((B_{t-1}/K_{t-1})^2\) has a significant negative sign for noncorporate firms but not significantly different from zero for corporate firms. This suggests that agency cost of debt finance reduces noncorporate firms’ investment but not corporate firms’ investment.

As in Bond and Meghir (1994), I find that, prior to the corporate reform, the coefficient for lagged profit over capital \((\Pi_{t-1}/K_{t-1})\) is positive and significant for both corporate and noncorporate firms (table 5). This rejects the claim that both corporate and noncorporate firms can finance their investment at any cost, which suggests that firms are financially constrained. Using the full sample from 1992 to 1998, the estimated coefficient of lagged profitability before corporate reform is 0.031 and 0.01 for noncorporate and corporate firms, respectively. A hypothesis test also rejects the null that those coefficients are equal, which suggests that even before the reform noncorporate firms are three times more constrained in raising external financing for investment compared with corporate firms. Using an alternative sample for 1992-1996, the estimated coefficients for lagged profitability before the reform is 0.048 and 0.03 for noncorporate and corporate firms, respectively. Similarly, hypothesis test rejects the null hypothesis that both coefficients are the same.

Results presented in table I.4 indicate that the interaction between profitability and reform dummy is significant for both noncorporate and corporate firms. However, for corporate firms I find that the interaction between profitability and reform is negative. This suggests that an increase in investment sensitivity to profit among corporate firms is significantly less compared with noncorporate ones. Using results from table I.4, the estimated increase in the coefficient for the
sensitivity of investment to profit for noncorporate and corporate firms are presented in table I.5.

The higher increase in sensitivity for noncorporate firm supports the hypothesis that the corporate reform increases corporate firms’ investment financing constraint relative to their corporate counterparts. The estimated increase in sensitivity of investment to profitability is 0.04 for noncorporate firms and 0.025 for corporate firms. This suggests that the reform cause an increase in financing constraint for noncorporate firms that is 60 percent higher than for corporate firms.

However, the results could be driven by the economic crisis that started in mid 1997. With interest rates soaring and the banking system collapsing, the lack of liquidity and increase in macroeconomic uncertainty could be driving the previous results. To reduce the influence of the economic crisis, I reestimate the model using only the sample from 1992 to 1996. The second row of table I.5 present the increase in sensitivity of investment to profitability for noncorporate and corporate firms for the 1992 to 1996 sample, respectively. Those results suggest that the reform does not increase financing constraints for corporate firms while it increases noncorporate firms’ by 71 percent.5

The fact that results from 1992 to 1996 sample show that the reform only increases the sensitivity of investment to profitability among noncorporate firms point to possible interesting interpretation. Note that the policy matrix in table I.2 indicates that the reform boosts the profile of firms with corporate status relative to those with noncorporate status. Nevertheless, improving bankruptcy procedure for corporate firms may not be sufficient enough to convince creditors that all corporate firms are high-performing ones. The scenario under which the reform may not be sufficient enough to cause separating equilibrium, i.e. some low-performing firms choose corporate status, can be rationalized using the example from mixing equilibrium. Thus, in this case the reform increases noncorporate firms financing constraints relative to the corporate ones.

5 From table I.4, the sensitivity of investment to profit for noncorporate firms is 0.048 and the reform causes an increase of 0.034 or 0.034/0.048*100% = 71 percent.
I.7. Conclusion

A reform in the corporate sector while maintaining the corporate form intact, affects firms' incentive in choosing their organizational form. A corporate reform can cause incorporating to serve as a signal to creditors such that the firms have higher performance and less likely to default. Thus corporate reform improves creditors' confidence in corporate firms, which in turn could provide corporate firms with more access to external financing for investment. Noncorporate firms are regarded as riskier because of more lenient supervisory requirements, complication in handling bankruptcy which could continue their reliance on unwritten conventions.

The introduction of legislation supervising corporate firms in Indonesia, the 1995 Company Law, affects firms' incentives through improvement in bankruptcy procedures and higher standards in corporate governance. Therefore, high-performing firms, i.e., firms with a higher probability of a high return are more likely differentiate themselves from the low-performing firms by organizing as corporations.

Using firm-level panel data from Indonesian manufacturers, this paper provides evidence that corporate reform further increases noncorporate firms investment financing constraint relative to their corporate counterparts. Limiting the sample to 1992-1996, the results show that the reform increased the sensitivity of investment to internal finance of noncorporate firms relative to corporate ones. This suggests that the reform cause external financing to be relatively more expensive for noncorporate firms compared with corporate counterparts.
References


Juwana, Hikmahanto (2001),"The legal infrastructure of trade and investment in Indonesia" paper presented at the international law conference on ASEAN legal system and regional integration, September 3-4, University of Malaya, Kuala Lumpur, Malaysia.


Appendix I.A

Following Bond and Meghir (1994), the corporate firm's optimization problem can be characterized as follows. In each period, a firm chooses the level of capital and debt that maximizes the firm's value subject to the capital stock equation of motion and assets or liability constraint. Let \( \Pi \) be the firm's profit; \( K \), the capital stock; \( I \) investment; \( B \) debt; \( X^h \) bankruptcy costs a for firm with organizational form \( h \); \( q_{t+1} \), the firm's probability of bankrupt; \( \tau_c \), the corporate tax rate; \( \tau_m \), the personal income tax; \( r \), the interest or lending rate; \( R^0 \), the gross return from risk-free investment; \( p^K \), the price of capital goods; \( \gamma \), the trade-off between income and capital gain tax; and \( \beta \), the discount rate. For a firm with a corporate organizational form, its value function in period-\( t \) is given as

\[
\max_{K_t, L_t} V^c_t = E_t \left( \gamma \left( 1 - \tau_c \right) \Pi_t + \sum_{j=0}^{\infty} \beta^j \gamma \left( 1 - q_{t+j} \right) \left( \tau_c - \tau_m \right) r_{t+j-1} B_{t+j-1} \right. \\
+ \left. E_t \sum_{j=0}^{\infty} \gamma \left( 1 - \beta^j \right) R_{t+j-1}^0 \right) B_{t+j-1} - E_t \sum_{j=0}^{\infty} \beta^j \gamma q_{t+j} X_{t+j}^c - \gamma \left( 1 - \tau_c \right) r_{t-1} B_{t-1}
\]

Similarly, the value function for a noncorporate firm can be derived by taking the corporate tax \( \tau_c = 0 \) where earnings distributed to owners are subject to personal income tax. The firm's optimization is subject to the following constraints.

\[ K_t = (1 - \delta) K_{t-1} + I_t \]

and

\[ (1 + \tau_c) B_t \leq p^K_{t+1} K_{t+1} \]

The first constraint is the standard capital stock equation of motion with depreciation rate \( \delta \). The second constraint is the limited liability constraint for corporate firms. This constraint dictates that the amount of debt outstanding at period \( t+1 \) cannot exceed the firm's expected value of assets. For firms with corporate form, creditors may try to assess the value of a corporate firm's owner's wealth. Given that personal wealth is private information, I assume that the best assessment a
creditor can make is based on the firm's expected value of physical collateral assets $K$. Here I define collateral assets to consist of all physical assets that have value, are highly marketable and can serve as a guarantee for financial contract e.g.: land, buildings, and automobiles. Therefore, I can also write the liability constraint as an asset constraint:

$$1(1 - K t t) + \frac{\zeta}{K} \leq 0$$

where $\zeta$ is the fixed proportion of collateral to total assets.

Taking the first-order condition with respect to capital, I can write the optimal path of capital for a corporate firm as

$$0 = \frac{\Pi}{K} + E_i \left( \beta_i (\tau - m)(dq_{t+1}^i + (1 - q_{t+1}^i))dr_i + \frac{\beta_i dq_{t+1}^i X_{t+1}^i}{B_i^i} \right) \frac{B_i^i}{K_i^i} + \frac{\Pi}{I} - \beta_i (1 - \delta)E_i \frac{\Pi}{I}$$

and let

$$\varphi_i = E_i \left( \beta_i (\tau - m)(dq_{t+1}^i + (1 - q_{t+1}^i))dr_i + \frac{\beta_i dq_{t+1}^i X_{t+1}^i}{B_i^i} \right)$$

be the optimal path of debt. I can write the first order condition for debt as

$$0 = \beta_i \left( (1 - q_{t+1}^i) (\tau_e - \tau_m) - R_i^o \right) - \beta_i dq_{t+1}^i (\tau_e - \tau_m) \frac{B_i^i}{K_i^i}$$

$$+ \beta_i (1 - q_{t+1}^i) (\tau_e - \tau_m) dr_i \frac{B_i^i}{K_i^i} - \beta_i dq_{t+1}^i - \beta_i q_{t+1}^i \frac{\partial X_{t+1}^i}{\partial B_i^i}$$

Rearranging terms, I can rewrite the above equation as:

$$0 = -\beta_i q_{t+1}^i \frac{\partial X_{t+1}^i}{\partial B_i^i} + \beta_i \left( (1 - q_{t+1}^i) (\tau_e - \tau_m) - R_i^o \right) - \varphi_i \frac{B_i^i}{K_i^i}$$

Rearranging terms, and substituting for $\Pi_K$ and $\Pi_I$, I can then rewrite the above equation as

$$\beta_i (1 - \delta)E_i \frac{J_{t+1}}{K_i} = \beta_i (1 - \delta) cb - cb + (1 + c b) \frac{J}{K_i} - b \frac{J}{K_i} - \frac{1}{1 + c b} \frac{Y}{(1 + e) K_i}$$

$$- \frac{1}{(1 + 1/e) K_i} \Pi_Y + \frac{(1 - \delta) \varphi_i^p p_{t+1}^K B_i^i}{(1 + r_i p_t) K_i} - (1 + 1/e) \varphi_i \frac{B_i^i}{(1 + r_i p_t) K_i^i}$$

$$+ (1 - \delta) p_{t+1}^K \frac{p_{t+1}^K (\Phi_i^e + \beta \Delta_i^* e)}{(1 - r_i)(1 + r_i p_t)}$$

where
\[
\Phi_i' = (1 - \beta_i R_i^\alpha) + \beta_i (1 - q_i') (\tau_i - \tau_i^\alpha) r_i
\]
\[
\Phi_i'' = (1 - \beta_i R_i^\alpha) - \beta_i (1 - q_i') \tau_i r_i
\]

and

\[
\Delta_{t+1} = -q_i' \frac{\partial X_i}{\partial B_i}
\]
\[
\Delta''_{t+1} = -q_i' \frac{\partial X''_i}{\partial B_i}
\]

Assuming that forecast errors are compounded in the error term, I can then write the empirical investment equation for firm i as

\[
I_{i,t+1} = \alpha_0 + \alpha_1 \frac{I_{i,t}}{K_{i,t}} + \alpha_2 \left( \frac{I_{i,t}}{K_{i,t}} \right)^2 + \alpha_3 Y_{i,t} + \alpha_4 \frac{\Pi_{i,t}}{K_{i,t}} + \alpha_5 \frac{p_{i,t} B_{i,t}}{(1 + r_i)(1 - \tau_i) p_i K_{i,t}^\alpha} + \alpha_6 \frac{B_{i,t}^2}{(1 - \tau_i) p_i K_{i,t}^\alpha} + J_i + \xi_{i,t+1}
\]

where \( \alpha_0 = cb(1 - 1/\beta_i (1 - \delta)) \), \( \alpha_1 = (1 + c)/(\beta_i (1 - \delta)) > 0 \), \( \alpha_2 = 1/\beta_i (1 - \delta) < 0 \), \( \alpha_3 = 1/(\beta_i (1 - \delta) b(l + e)) > 0 \), \( \alpha_4 = -1/(\beta_i (1 - \delta) b(l + 1/e)) > 0 \), \( \alpha_5 = \varphi_i/\beta_i b > 0 \), \( \alpha_6 = -(1 + 1/e) \varphi_i/\beta_i (1 - \delta) b < 0 \), and

\[
J_i = \frac{\kappa_i - \beta_i (1 - \delta) E_i p_{i,t}^\alpha}{(1 - \tau_i) p_{i,t}} - \frac{\tau_i - \varphi_i}{(1 - \tau_i)^2} \Phi_i'
\]

for \( j = \{ \text{corporate, noncorporate} \} \). The error term \( \xi_{i,t+1} \) is a composite error term containing firm's specific effect \( \Omega_{i,t+1} = -\frac{\tau_i - \varphi_i}{(1 - \tau_i)^2} \beta_i \Delta_i'' \) for \( j = \{ \text{corporate, corporate} \} \) and random disturbance \( \epsilon_{i,t+1} \).

**Appendix I.B**

This paper uses the Indonesian Annual Survey of Manufacturing Industry (Survey Industri) firm level data from 1992 to 1998. The data consists of information on a firm's ownership, a detailed break down of output and costs, and basic financial statement information (assets, liabilities). The relevant variables are constructed as follows.

- **Investment**, \( I_i \), is measured by aggregating the change in each type of firm's fixed-assets (land, building, machineries, automobiles, and others).
- **Capital stock**, \( K_t \), is measured first by computing the capital stock for each type of firm's
fixed asset-j using the equation $K_t = (1-\delta_j)K_{t-1} + I_t$ and then aggregating across type to obtain $K_t = \sum^{J}_{j} K_j$. For each asset depreciation rate $\delta_j$, I use the same depreciation figures as in Harris et.al (1994). The depreciation rates for building, machineries, automobile, land, and others are 0.033, 0.1, 0.2, 0, and 0.2, respectively.

- **Net output**, $Y_t$, is measured by real value added derived from the value of output net of costs for raw materials and production deflated by the wholesale price index.

- **Operating profit**, $\Pi_t$, is measured by value of output sales minus labor wages, operating costs before interest and tax.

- **Stock of debt** $B_t$ is measured using the firm's incremental debt figure provided in the Survey Industri data and stock of debt on 1996 data. Knowing the stock of debt in 1996 and the incremental or flow of debt, I then can measure the firm's stock of debt in other years.
## Appendix Table I.B.1. Sample Construction

<table>
<thead>
<tr>
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<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total matched</strong></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>3,520</td>
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<tr>
<td>1993</td>
<td>18,163</td>
</tr>
<tr>
<td>1994</td>
<td>19,017</td>
</tr>
<tr>
<td>1995</td>
<td>21,551</td>
</tr>
<tr>
<td>1996</td>
<td>22,997</td>
</tr>
<tr>
<td>1997</td>
<td>22,386</td>
</tr>
<tr>
<td>1998</td>
<td>3,919</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>111,553</td>
</tr>
<tr>
<td><strong>Keeping only private firms</strong></td>
<td>109,540</td>
</tr>
<tr>
<td><strong>Keeping only non-publicly traded firms</strong></td>
<td>105,993</td>
</tr>
<tr>
<td><strong>Cleaning based on outlier criteria</strong></td>
<td>65,991</td>
</tr>
<tr>
<td><strong>Keeping firms with at least 3 years of observations</strong></td>
<td>43,000</td>
</tr>
<tr>
<td><strong>Remaining observations</strong></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>433</td>
</tr>
<tr>
<td>1993</td>
<td>5,349</td>
</tr>
<tr>
<td>1994</td>
<td>7,479</td>
</tr>
<tr>
<td>1995</td>
<td>8,808</td>
</tr>
<tr>
<td>1996</td>
<td>9,344</td>
</tr>
<tr>
<td>1997</td>
<td>9,433</td>
</tr>
<tr>
<td>1998</td>
<td>2,154</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>43,000</td>
</tr>
</tbody>
</table>
Figure I.1. Probability of low-performing (type-2) firms choosing corporate organizational form in equilibrium
Table I.1. Data Summary Statistics

<table>
<thead>
<tr>
<th></th>
<th>Non-corporate</th>
<th>Corporate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>14.3</td>
<td>11.8</td>
</tr>
<tr>
<td></td>
<td>(11.6)</td>
<td>(12.9)</td>
</tr>
<tr>
<td>Number of employees</td>
<td>52.2</td>
<td>332.3</td>
</tr>
<tr>
<td></td>
<td>(89.8)</td>
<td>(672.7)</td>
</tr>
<tr>
<td>Real value added / capital</td>
<td>1.1</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>(1.3)</td>
<td>(1.1)</td>
</tr>
<tr>
<td>Real value added / labor</td>
<td>3.2</td>
<td>124.8</td>
</tr>
<tr>
<td>(thousand local currency unit)</td>
<td>(73.0)</td>
<td>(318.6)</td>
</tr>
<tr>
<td>Profit/Capital</td>
<td>0.4</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>(1.0)</td>
<td>(1.3)</td>
</tr>
<tr>
<td>Capital/Labor</td>
<td>10.7</td>
<td>108.4</td>
</tr>
<tr>
<td></td>
<td>(106.8)</td>
<td>(1603.4)</td>
</tr>
<tr>
<td>Investment / capital</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>(1.1)</td>
<td>(0.9)</td>
</tr>
<tr>
<td>Debt / capital</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>(0.7)</td>
<td>(1.5)</td>
</tr>
<tr>
<td>Incremental debt/Investment</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>(0.3)</td>
<td>(0.4)</td>
</tr>
<tr>
<td>Internal finance / investment</td>
<td>0.24</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>(0.4)</td>
<td>(0.3)</td>
</tr>
<tr>
<td>N (n x T)</td>
<td>26,609</td>
<td>16,391</td>
</tr>
</tbody>
</table>

All difference in means are significant under 5% level *

* Pooled standard error \( (S_1^2 N_1 + S_2^2 N_2)^{1/2} \)
Table I.2. Matrix of changes in laws governing corporate and noncorporate organizational form in Indonesia

<table>
<thead>
<tr>
<th>Non-corporation</th>
<th>Before the reform</th>
<th>After the 1995 corporate reform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervising legislation</td>
<td>The Commercial Code and the Civil Code</td>
<td>The Commercial Code and the Civil Code</td>
</tr>
<tr>
<td>Establishment and governance</td>
<td>Only certain type of partnership are required to register and therefore are required by law to keep financial record</td>
<td>No change</td>
</tr>
<tr>
<td>Liability</td>
<td>Unless stated as limited partner, owners or full partners are personally liable for firm’s debt</td>
<td>No change</td>
</tr>
<tr>
<td>Bankruptcy and termination</td>
<td>Only registered partnership may notify the Court.</td>
<td>No change</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Corporation</th>
<th>Pre 1995 reform</th>
<th>Post 1995 corporate reform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervising legislation</td>
<td>The Commercial Code</td>
<td>The 1995 Company Law</td>
</tr>
<tr>
<td>Establishment and governance</td>
<td>Required approval from the Justice Department and registration with the State Court and Department of Trade (article 36) Board of commissioners was optional (note in article 44)</td>
<td>Required approval from the Justice Department and registration with the Department of Trade (article 9 and 21) Required to use the standardized financial reporting (article 96-98) Required to have board of commissioners to supervise managers (article 94 )</td>
</tr>
<tr>
<td>Liability</td>
<td>Limited to the value of firms’ assets</td>
<td>Limited to the value of firm’s asset. However, directors can be personally liable for deliberate wrongdoings acts or negligence (article 87(2)) Articles that protect minority shareholders such as: ability to sue directors and commissioners (article 85 and 110).</td>
</tr>
<tr>
<td>Termination and bankruptcy</td>
<td>Firm had the right to declare bankruptcy and dissolve if suffered losses more than 75% of its capital (article 47)</td>
<td>No longer applied. Termination due to bankruptcy has to be approved by the Court (article 114). Articles that improve procedures for creditors in collecting firm's assets through appointed liquidator (article 118-124)</td>
</tr>
</tbody>
</table>

Source: summarized from Pakpahan (1995) and Tabalujan (1996)
Table I.3. Difference in means of investment ratio

<table>
<thead>
<tr>
<th></th>
<th>Before 1995</th>
<th>Post 1995</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-corporate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental debt/investment</td>
<td>0.23</td>
<td>0.19</td>
<td>-0.04**</td>
</tr>
<tr>
<td>(0.36)</td>
<td>(0.35)</td>
<td></td>
<td>(0.005)</td>
</tr>
<tr>
<td>Equity issued / investment</td>
<td>0.5</td>
<td>0.53</td>
<td>0.03**</td>
</tr>
<tr>
<td>(0.43)</td>
<td>(0.43)</td>
<td></td>
<td>(0.006)</td>
</tr>
<tr>
<td>Incremental debt/ equity issued</td>
<td>0.73</td>
<td>0.77</td>
<td>0.04</td>
</tr>
<tr>
<td>(3.47)</td>
<td>(5.92)</td>
<td></td>
<td>(0.058)</td>
</tr>
<tr>
<td>Number of observation</td>
<td>8,076</td>
<td>18,533</td>
<td></td>
</tr>
<tr>
<td><strong>Corporate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental debt/investment</td>
<td>0.36</td>
<td>0.37</td>
<td>0.01</td>
</tr>
<tr>
<td>(0.40)</td>
<td>(0.41)</td>
<td></td>
<td>(0.007)</td>
</tr>
<tr>
<td>Equity issued / investment</td>
<td>0.45</td>
<td>0.43</td>
<td>-0.02**</td>
</tr>
<tr>
<td>(0.42)</td>
<td>(0.41)</td>
<td></td>
<td>(0.007)</td>
</tr>
<tr>
<td>Incremental debt/ equity issued</td>
<td>6.59</td>
<td>16.05</td>
<td>9.46**</td>
</tr>
<tr>
<td>(117.8)</td>
<td>(415.5)</td>
<td></td>
<td>(4.25)</td>
</tr>
<tr>
<td>Number of observation</td>
<td>5,185</td>
<td>11,206</td>
<td></td>
</tr>
</tbody>
</table>

Standard error in parenthesis. ** significant at 5% level, * significant at 10% level

* Pooled standard error \( \left( S_1^2 N_1 + S_2^2 / N_2 \right)^{1/2} \)
Table I.4. GMM results from investment equation

Dependent variable: investment over capital $\frac{I_t}{K_t}$

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagged investment over capital</td>
<td>0.298**</td>
<td>0.382**</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.018)</td>
</tr>
<tr>
<td>Lagged investment over capital * Corporate (1 if Corporate)</td>
<td>-0.099**</td>
<td>-0.125**</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.021)</td>
</tr>
<tr>
<td>Squared lagged investment over capital</td>
<td>-0.050**</td>
<td>-0.074**</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Squared lagged investment over capital * Corporate</td>
<td>0.033**</td>
<td>0.051**</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Debt over capital</td>
<td>0.122**</td>
<td>0.174**</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>Debt over capital * Corporate</td>
<td>-0.114**</td>
<td>-0.161**</td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.018)</td>
</tr>
<tr>
<td>Squared debt over capital</td>
<td>-0.005**</td>
<td>-0.007**</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Squared debt over capital * Corporate</td>
<td>0.005**</td>
<td>0.007**</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Output over capital</td>
<td>0.027**</td>
<td>0.019**</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Output over capital * Corporate</td>
<td>0.030**</td>
<td>0.033**</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Profit over capital</td>
<td>0.031**</td>
<td>0.048**</td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Profit over capital * Corporate</td>
<td>-0.021**</td>
<td>-0.019*</td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.011)</td>
</tr>
</tbody>
</table>

Continued
Table I.4 continued

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit over capital * Reform</td>
<td>0.040** (0.005)</td>
<td>0.034** (0.007)</td>
</tr>
<tr>
<td>Profit over capital * Reform *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corporate</td>
<td>-0.015** (0.007)</td>
<td>-0.025** (0.009)</td>
</tr>
<tr>
<td>Corporate</td>
<td>0.035** (0.013)</td>
<td>0.060** (0.017)</td>
</tr>
<tr>
<td>Reform dummy</td>
<td>-0.032** (0.005)</td>
<td>-0.034** (0.006)</td>
</tr>
<tr>
<td>Reform * Corporate dummy</td>
<td>-0.013* (0.007)</td>
<td>-0.002 (0.007)</td>
</tr>
<tr>
<td>Crisis (1 if year &gt;=1997)</td>
<td>-0.026** (0.004)</td>
<td>-</td>
</tr>
<tr>
<td>Crisis * Corporate</td>
<td>0.033** (0.005)</td>
<td>-</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.013** (0.003)</td>
<td>-0.005 (0.004)</td>
</tr>
</tbody>
</table>

N                        | 23,100           | 12,368           |
Group (firms)             | 9,082            | 7,069            |
Wald Chi-square statistics| 57,828           | 39,067           |

Arellano-Bond test for:
1st order serial correlation | -29.62          | -15.84           |
2nd order serial correlation | -0.49           | -1.28            |

Note: Arrelano-Bond two step GMM are used for estimation
Standard error are in parenthesis, * and ** indicate coefficient is statistically significant under 10% and 5%, respectively.
Two digit industry and ownership status dummy variables are also included
Table I.5. The effect of reform to change in the sensitivity of investment to profit

<table>
<thead>
<tr>
<th></th>
<th>Non-corporate (1)</th>
<th>Difference (2)</th>
<th>Corporate (1)+(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample 1992-1998</td>
<td>0.040**</td>
<td>-0.015**</td>
<td>0.025**</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.007)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Sample 1992-1996</td>
<td>0.034**</td>
<td>-0.025**</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.009)</td>
<td>(0.007)</td>
</tr>
</tbody>
</table>

Standard error are in parenthesis, * and ** indicate coefficient is statistically significant under 10% and 5%, respectively.