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Information and Incomplete Investor Protection

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Information and Incomplete Investor Protection

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Abstract

Poor legal protection of shareholders is an often cited impediment to the efficient financing of businesses in developing and transition economies. In the presence of informational asymmetry between entrepreneurs and investors, however, higher levels of legal enforcement of fiduciary duty may be associated with the selection of poorer projects on the part of the entrepreneur. Hence improved interim auditing capabilities, or mandatory disclosure of the firm's earnings, may be more important than giving investors an advantage over managers in court.

1 Introduction

Investing in a firm is a dubious prospect under the best of circumstances. As German banker Carl Fürstenberg (1850–1933) is so memorably reported to have said,

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> Die Aktionäre sind dumm und frech; dumm, weil sie Aktien kaufen, und frech, weil sie auch noch Dividende erwarten.

That is, shareholders are stupid and impertinent. Stupid because they buy shares, i.e., invest in projects they will have no real control over, impertinent because they nevertheless demand dividends.

Buying stock in a corporation in a Western nation is already an investment that comes with, essentially, no guarantee of any kind whatsoever of receiving anything in return. How much more dismal, then, must not the incentives for outsiders to invest in a business be in the rest of the world—in developing and transition economies—where formal legal protection of investors is typically even poorer than in the West. Even under the best of circumstances, the stockholder-manager relationship is a prototypical incomplete contract. This observation has led to a recent literature focusing on the role of the law in facilitating the funding of firms. (See, e.g., La Porta *et al* [6], La Porta, Lopez-de-Silanes, and Shleifer [5], and Shleifer and Vishny [10]. For a survey of recent research on corporate governance more generally, see Becht, Bolton, and Röell [1].)

In this paper, we follow Müller and Wärneryd [7] and Castillo and Skaperdas [3] in modelling the relationship between investors and insiders in the firm as a costly conflict, but add informational asymmetry. Formally, the model is then of a common-value contest with asymmetric information, as studied more generally in Wärneryd [14]. That is, unlike authors such as, e.g., Shleifer and Wolfenzon [11], who assume there is an exogenously given probability of managerial diversion being detected and punished, we let the share that the manager can retain of the generated value of the firm be a function of costly safeguarding or appropriative efforts on the parts of both manager and investor.

We distinguish between legal measures that counteract the expropriation of the investor by the manager-entrepreneur directly, i.e., the level of enforcement of the manager's fiduciary duty, and legal measures that counteract the

information symmetry directly by making the firm more transparent to the investor. We show that enforcing fiduciary duty more strictly in a situation with low transparency may lead the manager to select poor projects, in the sense of projects that are stochastically dominated by other feasible projects.

Our perspective is therefore related to that of, e.g., Burkart, Gromb, and Panunzi [2], who have noted that too much monitoring, for example by a large blockholder, dulls the incentives of managers to exert effort or make relation-specific investments that increase the value of the firm. Here we show that even if the entrepreneur can costlessly select a high probability of success, if there is informational asymmetry and he can expect to keep too little of the returns he will prefer to select a low probability of success. This is because a low probability of success increases the informational advantage of the entrepreneur vis--vis the investor.

2 Managerial Diversion and Fiduciary Duty

A risk neutral entrepreneur, E, can, if he obtains funds $k > 0$, undertake a project that yields a value of the firm of $y > 0$ with probability π and zero with probability $1 - \pi$. The value of the firm y and investment cost k are assumed to be exogenously given, but the entrepreneur can select the probability π of success freely.

A risk neutral investor, I, supplies the capital. Whether the project is a success or failure is observed only by E. If the project is a success, what the entrepreneur manages to retain is determined by the *safeguarding expenditures* of both parties and the degree of investor protection enforced by the law.

Specifically, if I spends x_I on safeguarding, and E spends x_E, then the share of the generated value of the firm that I will be able to extract from

the firm is

$$p_I(x_I, x_E) := \begin{cases} \theta x_I/(\theta x_I + (1-\theta)x_E) & \text{if } \theta x_I + (1-\theta)x_E > 0, \\ 0 & \text{otherwise,} \end{cases}$$

where $0 < \theta < 1$ is a parameter that measures the advantage given the investor by the degree of effectiveness of legal protection. That is, if we have $\theta > .5$, the entrepreneur is disadvantaged relative to the investor, and if $\theta < .5$, the investor is disadvantaged.[1] If the investor spends nothing, we assume the entire value of the firm remains with the entrepreneur. As it turns out, this can never happen in equilibrium.

The parameter θ may be thought of as measuring the strength of a legal presumption in favor of the investor, should the investor decide to take the entrepreneur to court. Note, however, that given that both parties know the probability of the investor prevailing in court, no court proceedings need actually take place—the parties could simply share the value of the firm in such a fashion that the investor ends up with his expected value.

The safeguarding expenditures of the entrepreneur should be thought of as effort spent on hiding managerial self-dealing, outright theft, and other diversions of company funds in violation of fiduciary duty—but not attempts to hide the value of the firm through accounting and other measures, specifically. The corresponding safeguarding expenditure of the investor should be thought of as, e.g., legal expenses incurred in trying to hold the entrepreneur to his duty of loyalty—but not efforts to uncover the generated value, specifically. The parameter θ then measures the relative costliness to the investor of getting a court to uphold the fiduciary duty of the manager.

We make the distinction between appropriation effort and efforts directed at revealing the value of the firm because we want to separate the effects of legal protection in the sense of enforcement of ficuciary duty, on the one

[1] The symmetric version of this *contest success function*, i.e., where $\theta = .5$, is the contest model most commonly encountered in the literature. (See, e.g., Tullock [13], Nitzan [8], Hirshleifer [4], or Rajan and Zingales [9].) It has been axiomatized by Skaperdas [12].

hand, and those of informational asymmetry, on the other. The degree of informational asymmetry is, of course, also to some extent a function of legal provisions, and ultimately we want to distinguish legal measures that allow shareholders to sue managers for misconduct from those that increase the transparency of the firm.

The time line of the game is as follows.

1. E selects the observable probability π of project success, and offers the project to I.
2. I accepts or rejects the project. If I has accepted, he pays k.
3. If I has accepted, the value of the firm is realized and observed by E. In one scenario we shall consider the value is also observed by I, and E knows if this has happened.
4. The parties make their safeguarding expenditures and receive payoffs according to the contest success function p_I.

3 Contest Equilibrium

We solve the game backwards from the end, focusing first on equilibrium at the contest stage.

3.1 Informed Investor

Suppose the value of the firm is y, and both parties are informed about this. The entrepreneur then wishes to select $x_E^s(y)$ so as to maximize

$$v_E^s := (1 - p_I(x_I^s(y), x_E^s(y)))y - x_E^s(y),$$

given the safeguarding expenditure $x_I^s(y)$ of the investor.

We note that it cannot happen in equilibrium that one or both parties expend zero if the value of the firm is positive. For suppose one party expends

zero. Then the other party will win with probability one in return for an arbitrarily small expenditure.

Hence the entrepreneur's best reply function is

$$x_E^s(y) = \frac{\sqrt{\theta(1-\theta)x_I^s(y)y} - \theta x_I^s(y)}{1-\theta}.$$

Similarly, the investor's best reply function is

$$x_I^s(y) = \frac{\sqrt{\theta(1-\theta)x_E^s(y)y} - (1-\theta)x_E^s(y)}{\theta}.$$

In the unique equilibrium, we therefore have that

$$x_E^s(y) = x_I^s(y) = \theta(1-\theta)y,$$

and, naturally,

$$x_E^s(0) = x_I^s(0) = 0.$$

The investor's expected equilibrium utility is therefore

$$u_I^s := \theta^2 \pi y$$

and that of the entrepreneur is

$$u_E^s := (1-\theta)^2 \pi y.$$

3.2 Uninformed Investor

Consider next the case when the investor is uninformed, and only the entrepreneur knows the realized value of the firm.

Since the entrepreneur knows whether the value is y or zero, he rationally spends zero on appropriative activities if the value is zero. Hence we must have $x_E^a(0) = 0$. If the value is y, E wishes to select $x_E^a(y)$ so as to maximize

$$v_E^a := (1-p_I)y - x_E^a(y).$$

Consider the first partial derivative of v_E^a with respect to $x_E^a(y)$,

$$\frac{\partial v_E^a}{\partial x_E^a} = \frac{\theta(1-\theta)x_I^a}{(\theta x_I^a + (1-\theta)x_E^a(y))^2} - 1.$$

This derivative is negative for all $x_E^a(y) > 0$ if we have $x_I^a > (1-\theta)y/\theta$, and hence in this situation the entrepreneur's best reply is $x_E^a(y) = 0$. Otherwise, the entrepreneur's best reply is

$$x_E^a(y) = \frac{\sqrt{\theta(1-\theta)x_I^a y} - \theta x_I^a}{1-\theta}.$$

I, knowing only the prior distribution of the value, wishes to select his appropriation expenditure x_I^a so as to maximize

$$v_I^a := (1-\pi)\cdot 0 + \pi p_I y - x_I^a,$$

for which the first order condition, given a positive $x_E^a(y)$, is

$$\frac{\theta(1-\theta)x_E^a(y)}{(\theta x_I^a + (1-\theta)x_E^a(y))^2}\pi y = 1.$$

At an equilibrium where the entrepreneur expends a positive amount at y, equilibrium appropriation expenditures are therefore

$$x_E^a(0) = 0,$$

$$x_E^a(y) = \frac{\theta(1-\theta)\pi}{(1-(1-\pi)\theta)^2}y,$$

and

$$x_I^a = \frac{\theta(1-\theta)\pi^2}{(1-(1-\pi)\theta)^2}y.$$

Since we have $x_I^a < (1-\theta)y/\theta$, this is the only equilibrium that can exist.

Note that if both parties were uninformed about the value of the firm, they would each spend $\theta(1-\theta)\pi y$ in expectation in equilibrium. But because of the entrepreneur's informational advantage, the investor must try to avoid a phenomenon analogous to the winner's curse of auction theory. Instead

of valuing the firm at its *ex ante* expectation, the investor must adjust his expenditure downward.

In equilibrium, the investor's *ex ante* utility is

$$u_I^a := v_I^a = \frac{\theta^2\pi^3}{(1-(1-\pi)\theta)^2}y.$$

The entrepreneur's *ex ante* utility is

$$u_E^a := \pi v_E^a = \frac{(1-\theta)^2\pi}{(1-(1-\pi)\theta)^2}y.$$

From the point of view of efficiency, conflict expenditures should be as small as possible, since the contest itself concerns only the allocation of the expected value of πy among the two risk neutral participants. Note that both parties spend the same amount in expectation in equilibrium. Since we have $x_I^a < \theta(1-\theta)\pi y$ for $\pi < 1$, this means that asymmetric information increases efficiency relative to situations in which either both parties are informed or both are uninformed. Furthermore, giving either party an advantage by letting $\theta \neq .5$ also decreases equilibrium expenditure. Both of these effects are examples of how asymmetries of various kinds more generally lower conflict costs in contests.

4 Project Selection

Although on the face of it, so far, the informational asymmetry between investor and entrepreneur would seem to be beneficial from the point of view of efficiency, we still need to take one more step back toward the beginning of the game and consider the selection of project by the entrepreneur. This turns out to complicate the picture.

Suppose the entrepreneur is free to select projects with respect to the probability π of success, subject to the investor's participation constraint $u_I \geq k$. Which projects would the entrepreneur prefer to offer to investors, and how does this depend on the level of legal investor protection?

For simplicity we assume π can be set costlessly at any value in $[0, 1]$. Assuming that higher values of π come at greater cost would simply serve to reinforce our conclusions about the effects of informational asymmetry.

4.1 Informed Investor

When the investor is informed, the entrepreneur's *ex ante* utility is

$$u_E^s = (1-\theta)^2 \pi y.$$

Since this payoff is strictly increasing in π, E would trivially select a project with $\pi = 1$, regardless of the value of θ.

Hence the efficient value of θ, from a constitutional perspective, would be one which minimizes the conflict expenditures, which equal $2\theta(1-\theta)$. If the entrepreneur's reservation utility is zero, a minimum is achieved by setting $\theta = 1$, corresponding to perfect investor protection.

4.2 Uninformed Investor

When the investor is uninformed, depending on the value of θ, the entrepreneur's expected utility u_E^a may be nonmonotonic in π, since we have that

$$\frac{\partial u_E^a}{\partial \pi} = \frac{(1-\theta)^2(1-\theta-\pi\theta)y}{(1-(1-\pi)\theta)^3}.$$

Assuming an interior solution, and forgetting about the investor's participation constraint (which of course also depends on y and k), u_E^a is maximized with respect to π at

$$\pi = \frac{1-\theta}{\theta},$$

which is strictly decreasing in θ. Hence if the entrepreneur's choice of project were entirely unconstrained, he would choose poor projects, in the sense of projects unlikely to be successful, when the degree of investor protection is high. But if we have $\theta \leq .5$, so that the parties are evenly matched or

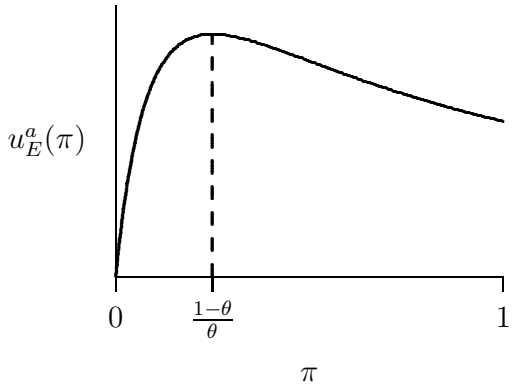

Figure 1: The entrepreneur's optimal choice of project.

the entrepreneur advantaged from a legal point of view, the entrepreneur optimally selects projects with $\pi = 1$. In this case the entrepreneur does not have to compensate a legal disadvantage by an informational advantage. Figure 1 illustrates the entrepreneur's optimal choice of probability of success.

The intuition for this is the following. The entrepreneur only expends something on appropriation when a positive value has in fact been realized. The investor in selecting his appropriative expenditure discounts for the informational advantage of the entrepreneur, which improves with π. Hence there is a tradeoff from the point of view of the entrepreneur—a higher π increases the *ex ante* gross expectation of the project, but also the appropriative expenditure of the investor. Furthermore, the higher is θ, the more costly it becomes for the entrepreneur to counter the appropriative expenditure of the investor.

Consider the expected sum of utilities

$$w := u_I^a + u_E^a = \frac{1 - 2\theta + (1 + \pi^2)\theta^2}{(1 - (1 - \pi)\theta)^2}\pi y.$$

If the entrepreneur sets

$$\pi = \begin{cases} 1 & \text{if } \theta < 1/2 \\ (1-\theta)/\theta & \text{otherwise,} \end{cases}$$

the sum of utilities reduces to

$$w = \begin{cases} (1 - 2\theta + 2\theta^2)y & \text{if } \theta < 1/2 \\ (1-\theta)y/(2\theta) & \text{otherwise.} \end{cases}$$

This function is everywhere strictly decreasing in θ. Hence from an efficiency point of view we would then want θ to be as low as possible, subject to the investor's participation constraint. That is, if the entrepreneur selects projects optimally, the optimal degree of enforcement of fiduciary duty is the lowest level compatible with the investor's participation.

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