Optimal ownership structure and monitoring in entrepreneurial firms

Abstract

We model the agency problem existing in an entrepreneurial firm between its founder and an outside investor and characterize the optimal corporate governance in this environment. The analysis describes the relationship between two mechanisms: the level of monitoring exerted by the outside investor (short-run) and the corporate ownership structure designed by the founder (long-run). The proposed framework delivers testable implications regarding entrepreneurial firms' ownership structures, stressing the role played by the private benefits of control, monitoring costs, the founder's impatience rate and the level of investor protection.

Key words: corporate governance, ownership structure, agency problem, monitoring

JEL: G24, G32, G34, G38, L26

1. Introduction

This article presents a simple agency model of the corporate governance of entrepreneurial firms that provides a rationale for their ownership structure as an optimal decision. The proposed framework identifies the conditions under which this structure will be either concentrated in favor of a controlling investor —the company founder— or balanced as between him and a minority outside investor.

Our analysis suggests that the ownership structure is ultimately the result of efforts by the founder to address a horizontal agency problem, that is, a

potential wealth transfer to himself from the outside investor. Thus, the size of the latter's ownership interest, denoted α, constitutes the key long-run corporate governance choice made by the founder to align the interests of the outside investor with his own. We will show that this mechanism works by means of two counteracting channels: (i) a direct *dividend-alignment* channel and (ii) an indirect *monitoring-alignment* channel.

We will also demonstrate that the optimal combination of these two channels depends on the benefits and costs associated with each one and shapes the ownership structure. In particular, we will identify four elements that are relevant to that structure's level of concentration: (i) the monitoring costs, (ii) the founder's rate of impatience, (iii) the severity of a potential agency problem, and (iv) the level of legal protection for outside investors.

The previous literature on optimal corporate ownership structures has focused on the explanatory power of elements such as: (i) the agency problem between shareholders and management (Burkart and Panunzi, 2006; Acharya and Volpin, 2010; Bolton and von Thadden, 1998, Burkart, et al., 1997), (ii) the initial owner's incentives to either keep the firm private or go public (Pagano and Röell, 1998; Zingales, 1995), (iii) the revenue-maximizing procedure the owner should use to sell the firm to outside investors (Mello and Parsons, 1998; Stoughton and Zechner, 1998), (iv) the degree of investors' legal protection (Burkart et al., 2014; Burkart and Panunzi, 2006; Shleifer and Wolfenzon, 2002; Almeida and Wolfenzon, 2006), and (v) the structure of voting rights and takeovers (Grossmand and Hart, 1988; Bennedsen and Wolfenzon, 2000; Bebchuck, 1999; Burkart et al., 1998).

This literature has not, however, studied the influence of monitoring on the optimal corporate ownership structure in the context of a horizontal agency problem. Thus, the monitoring-alignment channel identified in the present paper has yet to be characterized. The analyses that perhaps come closest to ours are Pagano and Röell (1998) and Burkart and Panunzi (2006), both of which

consider monitoring, but do so in a framework more suitable to a study of the formation of dispersed shareholding structures typically found in Anglo-Saxon countries. The present article, by contrast, investigates an ownership structure formed by a strong controlling shareholder/founder and a single large and active outside investor. Our model thus accounts more satisfactorily for the creation of highly concentrated ownership structures found in either family-owned or closely-held companies.

The rest of this paper proceeds as follows. Section 2 presents an agency model in the context of an entrepreneurial firm, Section 3 characterizes the optimal corporate governance design, and Section 4 discusses the main properties of this design and its predictions for real-world corporate ownership structures. The necessary proofs are all given in an appendix.

2. The model

Consider the following agency relationship between the founder (*he*) and the outside investor (*she*) of an entrepreneurial firm, which is played out in a game of two periods.

In period 1, the founder chooses the ownership stake $\alpha \in \left[0, \frac{1}{2}\right)$ he wants to sell to the outside investor. If α is strictly positive, the founder and the outside investor are the controlling investor and the minority investor, respectively.

Period 2 consists of four stages. In stage 1, the outside investor chooses a level of monitoring denoted $g \in [0,1]$, to be exerted through the board of directors. The variable g is the probability that the outside investor detects, at a monitoring cost $kg^2/2$, the investment decision the founder will take in the next stage. In stage 2, the founder selects an investment project $a \in \{m, s\}$, which can be detectable through monitoring but is not directly verifiable by the outside investor. Project m brings the founder private benefits of control $B > 0$ but zero cash flow while project s generates a cash flow $y > 0$ with probability

$p > 0$ (and therefore no cash flow with the remaining probability) but zero private benefits. In stage 3, the outside investor's monitoring process correctly detects with probability g which of the two projects the founder has chosen. If the process reveals that the project chosen was s, the game moves directly to the next stage. But if m was selected, the founder loses all private benefits, though these are not recovered by his counterpart. The outside investor sues the founder, who must then pay a fine with an expected value of $\phi > 0$ to the financial regulator.[1] Finally, in stage 4 cash flow and benefits are produced, the former being verified and distributed as dividends between the two owners.

We assume that the founder is impatient, which induces him to apply a discount factor to the cash flows he will receive in period 2 and liquidate part of his interest α to the minority investor in period 1. This factor is given by $\frac{1}{1+\rho}$ where $\rho \in (0, 1)$ is the founder's impatience rate. We also adopt the following assumptions: (A1) there is universal risk-neutrality, (A2) all the investors have limited liability, (A3) outside options are normalized to zero, (A4) $B < py$, (A5) $k > \frac{2\rho(B+\phi)^2}{(1+\rho)(2B-py)}$ and (A6) all bargaining power in relation to the sale of α is in the hands of the founder.

3. The results

To characterize the optimal corporate governance design (g^*, α^*), we apply the backward induction principle. Accordingly, we begin by characterizing the equilibrium of period 2, i.e., assuming that α is exogenous.

3.1. Exogenous ownership

Since in the short-run ownership structure is given, the outside investor's best response will be the optimal monitoring $g(\alpha)$ that induces the founder to

[1] Thus, ϕ is the product of the fine itself and a positive probability of the founder being declared guilty.

choose $a = s$.[2] To find this function, she solves the following program:

$$\max_{g} \alpha p y - \frac{k g^2}{2} \tag{1}$$

subject to

$$(1-\alpha)\, p y \geq (1-g)B - g\phi \tag{2}$$

$$0 \leq g \leq 1, \tag{3}$$

where (2) is the incentive-compatibility constraint and (3) is a feasibility constraint. Note that condition (2) imposes that it is in the founder's best interest to choose action s, which is guaranteed when his expected utility for this choice is equal to or greater than that of choosing project m. Also note that the right-hand side of the incentive-compatibility constraint implies that in choosing m, the founder enjoys a private benefit of control as long as monitoring fails, which occurs with probability $1 - g$. Otherwise, he must pay the fine ϕ.

Let us now define

$$h(\alpha) \equiv \frac{B - (1-\alpha)\, p y}{B + \phi} \tag{4}$$

and

$$\underline{\alpha} \equiv \frac{p y - B}{p y}. \tag{5}$$

Proposition 1. *For a given ownership structure, the optimal monitoring level is*

$$g(\alpha) = \begin{cases} 0 & \text{if } \alpha \leq \underline{\alpha} \\ h(\alpha) & \text{if } \alpha > \underline{\alpha} \end{cases}. \tag{6}$$

Thus, the minority investor's best-response function implies that the relationship between g and α is *non-linear*. If her stake is too low, she will not monitor

[2] It can be shown that assumption (A4) ensures that s is indeed the best project from the outside investor's standpoint.

the controlling investor at all. This is so because, as the incentive-compatibility constraint indicates, when the dividend share $1-\alpha$ held by the controlling investor is large enough, this corporate governance device is sufficiently powerful to align him with the minority investor's interests and monitoring is therefore unnecessary.

If, on the other hand, the minority stake is sufficiently high, monitoring will be non-zero given that $h(\alpha) > 0$ when $\alpha > \underline{\alpha}$. Also, there is a positive relationship between the optimal monitoring level and stake α because $\frac{\partial h(\alpha)}{\partial \alpha} > 0$. This is the case given that as the minority investor's stake increases, the left-hand side of (2) decreases and thus the incentive-compatibility constraint is less likely to be satisfied. To counterbalance this, the right-hand-side of constraint (2) must decrease, which can only be achieved by increasing the monitoring level g.

3.2. Endogenous ownership

To find the optimal long-run corporate governance design, we solve the complete game taking into account the best-response function described above. The founder chooses α by solving the program

$$\max_{\alpha} \frac{(1-\alpha)\,py}{1+\rho} + \left(\alpha py - \frac{kg^2}{2}\right) \tag{7}$$

subject to

$$g(\alpha) = \max\{0, h(\alpha)\} \tag{8}$$

$$0 \leq \alpha < \frac{1}{2}. \tag{9}$$

The first term in the objective function (7) is the present value of the expected dividends the founder will receive in period 2 on his stake $1-\alpha$. The second term is the revenues he collects from selling the remainder α in period 1. Since the founder has all the bargaining power, these revenues are consistent with a take-it-or-leave-it offer and have two components: (i) a selling price proportional to the share α of the company's expected cash flows, and (ii) a discount on the

selling price due to the monitoring costs the outside investor will incur in the future.[3]

Condition (8) is the outside investor's best response in terms of monitoring while condition (9) is a feasibility constraint that bounds the minority stake.

Let us now define[4]

$$\overline{\alpha} \equiv \underline{\alpha} + \frac{\rho}{1+\rho}\frac{(B+\phi)^2}{kpy}, \tag{10}$$

and the founder's expected payoff evaluated in corporate governance designs $(0, \underline{\alpha})$ and $(h(\overline{\alpha}), \overline{\alpha})$, respectively, as

$$V(0, \underline{\alpha}) \equiv \frac{py(1+\rho\underline{\alpha})}{1+\rho}, \tag{11}$$

and

$$V(h(\overline{\alpha}), \overline{\alpha}) \equiv \frac{py(1+\rho\overline{\alpha})}{1+\rho} - \frac{k(h(\overline{\alpha}))^2}{2}. \tag{12}$$

Proposition 2. *When the ownership structure is endogenous, the optimal corporate governance is described by*

(i) Solution I: If $V(0, \underline{\alpha}) > V(h(\overline{\alpha}), \overline{\alpha})$*, the optimal monitoring level is* $g^* = 0$ *and the optimal minority investor's stake is* $\alpha^* = \underline{\alpha}$*.*

(ii) Solution II: If $V(0, \underline{\alpha}) \leq V(h(\overline{\alpha}), \overline{\alpha})$*, the optimal monitoring level is* $g^* = h(\overline{\alpha})$ *and the optimal minority investor's stake is* $\alpha^* = \overline{\alpha}$*.*

From definitions (11) and (12) and the fact that $\overline{\alpha} > \underline{\alpha}$, it follows that analytically comparing $V(0, \underline{\alpha})$ and $V(h(\overline{\alpha}), \overline{\alpha})$ will not yield an unambiguous result. To characterize the definitive optimal corporate governance solution we must therefore resort to numerical simulations. The results of the simulations (not reported here) indicate that the founder's payoff is larger with solution II than with solution I, which suggests that the parameters of the model are in general consistent with a positive optimal level of monitoring. Thus, in our discussion of the main properties of the optimal corporate governance design we will confine

[3] Recall that by assumption (A3), outside options are normalized to zero.

[4] Note that assumption (A5) guarantees that $\overline{\alpha}$ and $\underline{\alpha}$ are less than 1/2.

ourselves to solution II.

Corollary 1. *Consider the optimal corporate governance design characterized by solution* $(h(\overline{\alpha}), \overline{\alpha})$.

1. *The optimal monitoring level is: (i) increasing with* B, ρ *and* ϕ, *and (ii) decreasing with* k.

2. *The optimal outside investor's stake is: (i) decreasing (increasing) with* B *if* B *is sufficiently low (high), (ii) increasing with* ρ *and* ϕ, *and (iii) decreasing with* k.

4. Discussion

According to the above corollary, the ownership structure will be either more or less concentrated as the horizontal agency problem becomes more severe, depending on the level of private benefits. We interpret this non-linear relationship between α^* and B in light of the trade-off the founder faces when designing the optimal long-run ownership structure of an entrepreneurial firm. When the agency problem worsens because B increases, project m is more appealing and hence, it is more difficult for the incentive-compatibility constraint (2) to be satisfied. Thus, to respond to this phenomenon and restore the correct incentives, corporate governance design has two mechanisms that work on α^* in opposite directions.

On the one hand, there is the *dividend-alignment* channel, which operates directly on α^* through the left-hand side of (2). Under this effect alone, it is optimal for the founder to *decrease* α^* in order to increase his share $1 - \alpha^*$ of future dividends, which makes (2) more likely to be satisfied.[5]

On the other hand, there is the alternative *monitoring-alignment* channel, which operates *indirectly* on α^* through the right-hand side of (2). Considering

[5] Evidence of this incentive effect through dividends has been reported by Claessens et al. (2002) and La Porta et al. (2002).

only this channel, it is optimal for the outside investor to increase her monitoring level g^* (see part 1-(i) of Corollary 1), which in this case requires by equation (4) that the founder *increase* α^* given that h is an increasing function of α.

Corollary 1 then indicates that when the moral hazard problem is sufficiently severe (i.e., $B > \frac{(1+\rho)k}{2\rho} - \phi$), the optimal corporate governance design should marginally prefer monitoring to dividends for aligning the objectives of the two owners. Consequently, our analysis predicts that in industries with large private benefits, such as those with more intangible assets and large free cash flows (Dyck and Zingales, 2004), we should observe, *ceteris paribus*, a negative correlation between private benefits and the level of ownership concentration in the hands of the founder.

Our corollary also establishes that monitoring will be weaker (lower g^*) and the ownership structure more concentrated (lower α^*) the more costly is the monitoring for the outside investor (larger k). This result suggests that if the degree of independence of the auditing process from the controlling investor is low or a board of directors' audit committee is not mandatory, we should observe, *ceteris paribus*, that the minority investor has a smaller ownership stake and will therefore display less activism.

Furthermore, our results indicate that the monitoring level will be higher and the ownership structure less concentrated if the founder is more impatient (larger ρ). If we conjecture that there exists an inverse relationship between the degree of impatience and personal wealth, the latter finding implies that we should observe, other things being equal, a positive correlation between the ownership concentration of entrepreneurial firms and the wealth of their founders.[6]

As regards the legal protection of investors, part 1 of the corollary indicates

[6] Wealth diversification arguments do not apply in the model as we have assumed universal risk-neutrality.

that monitoring will increase if the expected fine ϕ increases, which suggests that the two corporate governance instruments are *complements*. As a consequence, part 2 of the corollary establishes that the outside investor's stake will be larger if investor rights are better protected. This implies that other things being equal, economies with strong legal protection of investors will exhibit corporate ownership structures that are less concentrated in the hands of controlling shareholders, which is consistent with evidence from around the world (La Porta et al., 1999; Claessens et al., 2000; European Corporate Governance Network, 1997).

We conclude with an observation regarding the applicability of our analysis. While it should be useful for examining the ownership structure of firms operating in the early stages of an investment, it will not, as it stands, be of much help in studying the formation over time of the dispersed shareholding structures of large corporations. For that, the proposed model will have to be extended to allow not only an active outside investor but also a large number of passive investors who may free-ride on the former. This will be the next step in the authors' research agenda.

5. Appendix

Proof of Proposition 1. The program described by equations (1)-(3) is equivalent to

$$\min_{g} \frac{kg^2}{2}$$

subject to

$$\max\left\{0, \frac{B-(1-\alpha)\,py}{B+\phi}\right\} \leq g \leq 1,$$

whose solution is

$$g(\alpha) = \max\left\{0, \frac{B-(1-\alpha)\,py}{B+\phi}\right\}.$$

Using the definitions of $h(\alpha)$ and $\underline{\alpha}$, it is easily shown that the above expression can be rewritten as (6). □

Proof of Proposition 2. The program described by equations (7)-(9) is equivalent to

$$\max_{\alpha} \frac{\rho}{1+\rho}\alpha p y - \frac{kg^2}{2} \tag{13}$$

subject to

$$g(\alpha) = \max\{0, h(\alpha)\} \tag{14}$$

$$0 \leq \alpha < \frac{1}{2}. \tag{15}$$

In accordance with (6), we analyze two cases.

Case 1: $\alpha \leq \underline{\alpha}$. Since $g(\alpha) = 0$, program (13)-(15) becomes

$$\max_{\alpha} \frac{\rho}{1+\rho}\alpha p y$$

subject to

$$0 \leq \alpha \leq \underline{\alpha},$$

whose trivial solution is $\alpha^* = \underline{\alpha}$.

Case 2: $\alpha > \underline{\alpha}$. Program (13)-(15) becomes

$$\max_{\alpha} \frac{\rho}{1+\rho}\alpha p y - \frac{kg^2}{2}$$

subject to

$$g(\alpha) = h(\alpha)$$

$$\underline{\alpha} < \alpha < \frac{1}{2}.$$

Upon substituting $g(\alpha)$ into the objective function and taking the first- and second-order conditions, we get as a solution

$$\begin{aligned} \alpha^* &= \underline{\alpha} + \frac{\rho}{1+\rho}\frac{(B+\phi)^2}{kpy} \\ &\equiv \overline{\alpha}. \end{aligned}$$

Thus, optimal monitoring is

$$g^* = h(\overline{\alpha}).$$

To obtain the definitive characterization of the optimal corporate governance design, we must compare these two possible solutions in terms of the founder's expected payoff from the complete game. That is, after evaluating expression (7) for solutions $(0, \underline{\alpha})$ and $(h(\overline{\alpha}), \overline{\alpha})$, we choose the solution yielding a larger expected payoff. □

Proof of Corollary 1. Using (4), (5), and (10) we rewrite optimal monitoring as

$$h(\overline{\alpha}) = \frac{B - \left(1 - \left(\frac{py-B}{py} + \frac{\rho(B+\phi)^2}{(1+\rho)kpy}\right)\right) py}{B+\phi}.$$

From this expression we can then verify that

$$\frac{\partial h(\overline{\alpha})}{\partial B} = \frac{\rho}{(1+\rho)k} > 0,$$

$$\frac{\partial h(\overline{\alpha})}{\partial \rho} = \frac{1}{(1+\rho)^2}\frac{B+\phi}{k} > 0,$$

$$\frac{\partial h(\overline{\alpha})}{\partial \phi} = \frac{\rho}{(1+\rho)k} > 0,$$

and

$$\frac{\partial h(\overline{\alpha})}{\partial k} = -\frac{\rho}{1+\rho}\frac{B+\phi}{k^2} < 0,$$

which completes the first part of the corollary.

For the second part, we first substitute (5) into (10), which yields

$$\overline{\alpha} = \frac{py - B}{py} + \frac{\rho}{1+\rho}\frac{(B+\phi)^2}{kpy}. \tag{16}$$

From this expression it follows that

$$\frac{\partial \overline{\alpha}}{\partial B} = -\frac{1}{py} + \frac{2\rho(B+\phi)}{(1+\rho)kpy}.$$

Since the first term of this expression is negative and the second one is positive, the final sign of this derivative is indeterminate. It is easily verified that if $B < \frac{(1+\rho)k}{2\rho} - \phi$, $\frac{\partial \overline{\alpha}}{\partial B}$ is negative, otherwise it is positive.

From (16) it can also be verified that

$$\frac{\partial \overline{\alpha}}{\partial \rho} = \frac{(B+\phi)^2}{kpy\,(1+\rho)^2} > 0.$$

Finally, direct inspection of (16) indicates that $\frac{\partial \overline{\alpha}}{\partial \phi} > 0$ and $\frac{\partial \overline{\alpha}}{\partial k} < 0$. □

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