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### FAMILY FIRMS

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Family Firms  
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## ABSTRACT

We present a model of succession in a firm controlled and managed by its founder. The founder decides between hiring a professional manager or leaving management to his heir, as well as on how much, if any, of the shares to float on the stock exchange. We assume that a professional is a better manager than the heir, and describe how the founder's decision is shaped by the legal environment. Specifically, we show that, in legal regimes that successfully limit the expropriation of minority shareholders, the widely held professionally managed corporation emerges as the equilibrium outcome. In legal regimes with intermediate protection, management is delegated to a professional, but the family stays on as large shareholders to monitor the manager. In legal regimes with the weakest protection, the founder designates his heir to manage and ownership remains inside the family. This theory of separation of ownership from management includes the Anglo-Saxon and the Continental European patterns of corporate governance as special cases, and generates additional empirical predictions consistent with cross-country evidence.

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## **I. Introduction**

Most firms in the world are controlled by their founders, or by the founders' families and heirs. Such family ownership is nearly universal among privately held firms, but also dominant among publicly traded firms. In Western Europe, South and East Asia, Middle East, Latin America, and Africa, the vast majority of publicly traded firms are family controlled (La Porta et al. 1999, Claessens et al. 2000, European Corporate Governance Network 2001, Faccio and Lang 2002). But even in the United States and the U.K., some of the largest publicly traded firms, such as Wal-Mart Stores and Ford Motor, are controlled by families.

A crucial issue in the discussion of family firms from the perspective of corporate governance and finance is succession. For nearly every entrepreneurial firm that does not fail, there comes a moment when the founder no longer wishes to manage it. This can happen from the very beginning, when founders seek professional managers to run their firms, as is the case in high technology startups in the United States. Alternatively, succession takes place later in a founder's life, when he retires or cuts his workload. The new manager can be either a professional or the founder's heir. If a professional is hired, the founder also needs to decide whether to stay on and monitor him, or to sell out. Unless the founder appoints his heir or the professional manager buys the company outright, ownership and management become separated.

The patterns of separation of ownership and management vary across countries. In the United States, founders often hire professional managers early on. By the time the founder retires, he and his family retain only marginal ownership. In such Berle and Means (1932) corporations, professional managers exercise nearly full control. In Western Europe, significant ownership typically stays with the family after the founder retires. His children either hire a

professional manager, as in BMW or FIAT, or run the firm themselves, as in Peugeot. In emerging markets, both management and ownership tend to stay with the family when the founder retires. When a professional manager is badly needed, he occasionally marries into the family.

In this paper, we attempt to understand theoretically these different patterns of separation of ownership and management. The principal benefit of hiring a professional is that he is likely to be a better manager. The principal cost is that now the professional manager, rather than the founder, controls the company and so can expropriate investors or, in more polite language, consume the “private benefits of control” (Jensen and Meckling 1976, Grossman and Hart 1988). We argue that a crucial factor shaping the attractiveness of delegated management is the degree of legal protection of outside shareholders from expropriation (or tunneling) by the insiders. Earlier research shows that legal protection of outside shareholders varies sharply across countries, and that this variation predicts the differences in financial development and ownership structures (La Porta et al. 1997, 1998, 2000, Johnson et al. 2000). In this paper, we examine the costs and benefits of delegating management from this perspective. This allows us, in particular, to examine the costs and benefits of keeping the succession of management inside the family.

We present a model of a founder looking for a manager to succeed him. We assume that there is no superior manager available with sufficient resources to buy the firm outright. When such a manager (or a company) is available, the firm is simply sold to them – as often happens. Absent an outright buyer, the founder chooses among three options. He can sell out completely in the stock market and create a widely held firm run by a professional manager. He can hire a professional manager but stay on as a large shareholder to monitor him. He can also keep the firm inside the family by either staying on as a less than ideal manager or passing management to

a family member, who is generally not as talented as a professional manager. The founder makes this decision to maximize the value of the firm, which initially he owns completely.

We study the trade-off between superior management by the professional outsider and his discretion to expropriate shareholders. If the founder stays on as a large shareholder and monitors, he can control expropriation to some extent. In our framework, both the law and the monitoring reduce managerial expropriation. We show that, when legal protection of outside investors is very good, there is no need for monitoring in equilibrium, and the best arrangement is a widely held professionally-managed firm. When legal protection of outside investors is moderate, the benefits of professional managers are still high enough for the entrepreneur to surrender control, but it pays for him or his family to remain as large shareholders and monitor the manager. Finally, with sufficiently weak shareholder protection, the founder's ability to control expropriation is too limited and he does not delegate management. In this situation, management stays with his family even when someone else can run the firm better. In general, this analysis leads to a prediction of a negative relationship between investor protection and ownership concentration, consistent with a range of empirical evidence.

We consider two versions of the model, one in which the large shareholder – when he detects expropriation – forces the manager to stop it and pay dividends, and another in which he and the manager just share the spoils. In the first version, as in Shleifer and Vishny (1986), the large shareholder provides a public good to the minority shareholders by monitoring or jawboning. In the second version, monitoring is no longer a public good, the benefits of which are shared by all shareholders. To the contrary, there is a perverse incentive for monitoring, namely to share the loot. The basic results we describe hold in both specifications, but the second version also yields the empirically accurate prediction of a positive premium paid for a

controlling block of shares.

At a theoretical level, the model combines in one unified framework the twin conflicts essential to understanding corporate governance: that between the manager and the outside shareholders, and that between the large shareholder and the minority shareholders. By doing so, the model sheds light on the different patterns of ownership and management among countries. It shows, for example, why Anglo-Saxon patterns of corporate governance, with widely-held firms and traditional conflicts between professional managers and dispersed shareholders (Berle and Means 1932), are likely to be a feature of countries with very good legal protection of minority shareholders. It explains why “family” firms, in which the founder’s family is a significant shareholder, or even the manager, over several generations are such an enduring phenomenon in countries with less effective legal protection of shareholders (La Porta et al. 1999, Claessens et al. 2000). Indeed, it explains how, in such countries, the twin conflicts between the manager and the large shareholder and between the two of them combined and the minority shareholders, coexist. The model is moreover consistent with the growing body of evidence that family management is generally inferior to professional management (Morck et al. 2000, Perez-Gonzales 2001). The basic trade-off between the benefits of delegated management, and the costs of giving up control – especially when legal protection is poor – appears consistent with a great deal of data.

Our paper joins a growing theoretical literature on corporate governance in the regimes of poor investor protection. Bebchuk (1999) shows that poor legal protection renders dispersed ownership structure unstable, because it allows extraction of significant private benefits. La Porta et al. (2002) and Himmelberg et al. (2001) study theoretically and empirically the determination of ownership structure when firms raise funds to finance investment. Burkart and

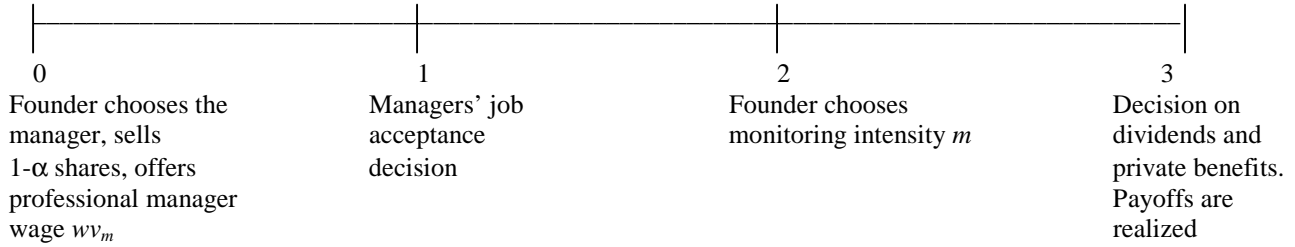
Panunzi (2001) and Shleifer and Wolfenzon (2002) analyze the impact of legal shareholder protection on the optimal ownership structure. Shleifer and Wolfenzon (2002) consider owner-managers and examine the relationship between legal protection and inside equity. Burkart and Panunzi (2001) assume that the professional manager and the large shareholder are distinct parties and analyze the relationship between the law and outside ownership concentration. By making the separation of ownership and management a choice variable, the present model extends and generalizes these two papers.

The paper is organized as follows. Section 2 outlines the model. Section 3 examines the founder's decision to hire a professional manager and to float shares when he cannot extract private benefits. Section 4 analyses the case with collusion between founder and professional manager and derives implications for share value, block premium, and agency costs of separating ownership and management. Section 5 concludes. Mathematical proofs are in the appendix.

## **II. The model**

Figure 1 presents the model's timeline. We consider a firm initially fully owned by its founder. At date 0, the founder decides whether to appoint a professional manager to run the firm or keep management in the family. Simultaneously, he decides what fraction  $1-\alpha$  of the shares to sell to dispersed shareholders. The family keeps the remaining fraction  $\alpha$ . All shareholders are risk-neutral. If management stays in the family, there is no separation of ownership and management. If the founder appoints a professional manager, ownership and management are separated. In this case, the founder may also offer a wage and the professional manager accepts or rejects the offer to run the company at date 1.

**Figure 1**



At date 3, the firm generates revenues that depend on the identity of the manager. If control remains inside the family, total revenues generated are  $v_F$ . If a professional manager runs the firm, total revenues are  $v_M$ . The professional has an outside option that gives him utility  $c$ . For simplicity, the outside option of the founder or the family is normalized to zero.

**Assumption 1:**  $v_M - c > v_F$

There are two interpretations of the model. Under the first, the choice is between the founder himself, who is becoming outdated or reluctant to manage, and a professional outsider. Under the second, the founder definitely retires from management, and chooses as his successor either a professional manager or his heir. In both interpretations, retaining management inside the family reduces the profitability of the firm relative to hiring a professional.<sup>1</sup>

Assumption 1 is consistent with recent study by Morck, Stangeland, and Yeung (2000) of corporate control of Canadian firms. They find that heir-controlled firms have lower returns on sales and assets than comparable firms. Furthermore, firms with founder control have earnings

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<sup>1</sup> In this model, we abstract from the possibility that appointing a child as the CEO may be an additional private benefit to the founder. Introducing this feature would not change our results.



that are lower than those of widely held firms but higher than those in heir-controlled firms. Perez-Gonzales (2001) provides evidence on firm performance following inherited control by studying 162 family transitions in the United States. In 38% of these cases, family members inherit the CEO position. These family CEOs are promoted to the post an average of 9 years earlier than professional managers and are detrimental to firm performance- the return on assets falls by 16% within two years of transition and 25% compared with unrelated CEOs.

In this model, if the founder is the best manager himself, there is no reason for him ever to sell equity. He stays on as the manager, keeps 100% of the firm, and there are no agency problems or conflicts. This assumption distinguishes the model from the papers of La Porta et al. (2002), Shleifer and Wolfenzon (2002), and Himmelberg et al. (2001), where equity is raised to finance investment projects, and therefore the size of the firm is endogenous.

The problems arise when the founder is no longer the best manager. He must then choose between hiring a more qualified outsider to manage, or alternatively staying on or (equivalently) naming a mediocre son as a successor. Importantly, we assume that the competent professional outsider has neither the resources nor the external funds to just buy the firm himself. As we show below, the outsiders' inability to raise external funds is consistent with the assumptions of the model, since to buy the firm, he has to pay for the private benefits accruing to the founder, which he cannot pledge to investors. Unless the superior manager is himself rich, he has to work for the family. Hiring a professional gives rise to a separation of ownership from management.

At date 2, shareholders can monitor the professional manager and thereby deprive him of at least some private benefits. The monitoring technology is discussed below.

At date 3, the revenues can either be paid out to all shareholders proportionally to their

ownership stakes or diverted to generate private benefits. In countries with weakest shareholder protection, such private benefits take the form of outright theft. More commonly, they take the form of transactions with related parties, expropriation of corporate opportunities, transfer pricing, excessive salaries and perquisites, and so on (see Johnson et al. 2000).

Whoever manages the firm chooses the level of expropriation, subject to being monitored and partially impeded by the law. The non-contractible expropriation decision is modeled as the choice of  $\phi \in [0,1]$  such that security benefits (dividends) are  $(1-\phi)v_i$  and private benefits are  $\phi v_i$ ,  $i = M, F$ . Expropriation of shareholders is limited by the law. To model legal shareholder protection, we assume that the law sets an upper bound  $\bar{\phi} \in [0,1]$  on the fraction of revenues that can be (at no cost) diverted by the party in control.<sup>2</sup> Stronger legal protection corresponds to lower values of  $\bar{\phi}$ .

The law is not the only determinant of the fraction of resources diverted for private benefits. The other is monitoring, which occurs when a professional manager is hired. Although in principle all shareholders can monitor the manager, the free-rider problem prevents small shareholders from choosing to incur the cost. In equilibrium only the large shareholder monitors to reduce the fraction of resources appropriated by the manager.<sup>3</sup> Recall that the legal upper bound on private benefits of control is  $\bar{\phi}v_M$ . Following Pagano and Röell (1998), we assume that the large shareholder can at a cost  $k \frac{m^2}{2}$  reduce private benefit extraction by  $mv_M$  where

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<sup>2</sup> The amount  $\bar{\phi}v_i$  is the legal upper bound that can be extracted as private benefits of control, irrespective of the form in which those benefits are enjoyed. In particular, wages in excess of market value are already incorporated in  $\bar{\phi}v_i$ .

<sup>3</sup> We assume that there is no reason for the founder to sell his shares to another large shareholder who would monitor, since, if anything, the founder would have a comparative advantage at monitoring because of his knowledge.

$m \in [0,1]$  and  $k > 0$ .

Private monitoring and the law are alternative mechanisms for reducing expropriation of shareholders. When  $k$  is strictly positive, monitoring is costly for the founder whereas reliance on the law is free. The public benefits of the law may not be free from the viewpoint of society, but they are to the founder. The interaction between these two mechanisms of policing the manager shapes the equilibrium governance structure.

Importantly, we assume that corporate and other law governing investor protection matters, and that firms cannot opt into more protective legal regimes by contract. This assumption is consistent with the evidence that legal rules governing investor protection in different countries have significant consequences for financial development (La Porta et al. 1997, 1998, 2000). In this model, if a founder could effectively opt into a more protective legal regime, he would do so since in equilibrium he pays for all the private benefits of control out of his own pocket.

If a professional manager is hired, the question arises whether a monitoring founder can enjoy (part of) the private benefits. We consider both the cases of collusion and no collusion between the professional manager and the founder. Excluding the founder from the spoils of extraction is tantamount to assuming that his interests and those of the small shareholders are perfectly congruent. This case is most appropriate when the legal duties of the large shareholder, perhaps as a board member, bar him from complicity with the manager in expropriating shareholders. In contrast, when the founder and the professional manager can share the private benefits, they may collude at the expense of minority shareholders. This assumption might be more suitable for weaker legal regimes. The second assumption complicates the model, in that rent-seeking monitoring, intended to capture some of the private benefits rather than serve all

shareholders, becomes attractive. We solve the model under the first assumption in the next section, and under the second in section IV.

### **III. Owner-Manager or Professional Manager**

We analyze the founder's decision whether to hire a professional manager in steps. We begin by considering the founder's maximization problem for the cases of non-separation and separation of ownership and management. In each case, we solve the model by backward induction, going from the date 3 expropriation decision, to the founder's date 2 monitoring intensity, to the manager's date 1 job acceptance choice. We then can determine the optimal number of shares that the founder retains in cases of separation and non-separation. Having done that, we can compare the entrepreneur's welfare for different legal environments, i.e., different values of  $\bar{\phi}$ , which enables us to infer under what circumstances he chooses to separate ownership from management.

#### **A) No Separation of Ownership and Management**

Due to the simplicity of the model, the case of no separation does not yield precise predictions, notably for the ownership structure. At date 3 the founder decides how to allocate the revenues subject to the limits set by the law. By law, he cannot divert more than  $\bar{\phi}v$  of the revenues as private benefits. Unless he owns all the shares, in which case he is indifferent between any  $\phi \in [0, \bar{\phi}]$ , he extracts the legal upper bound  $\bar{\phi}$ . Absent a professional manager, there is neither date 2 monitoring nor a date 1 job acceptance decision. Hence, we move directly

to the founder's date 0 decision as to which fraction of shares to sell to outside investors. He maximizes the sum of his date 3 block value  $\alpha(1-\bar{\phi})v_F + \bar{\phi}v_F$  and of the proceeds from selling  $1-\alpha$  shares at date 0. We refer to this payoff as the founder's welfare  $V^{NS}$ . Since private benefit extraction is efficient and since the founder is by assumption neither financially constrained nor risk averse, the optimal ownership structure is indeterminate when ownership and management are separated.

**Lemma 1:** For any  $\bar{\phi} \in [0,1]$ ,  $V^{NS}(\alpha^*) = v_F$  and  $\alpha^* \in [0,1]$ .

The founder's welfare is equal to the total revenues under his management. Even though private benefit extraction decreases with the quality of the law, the founder's welfare is independent of the legal environment. Since the extraction of private benefits is efficient, each diverted dollar reduces the security benefits by a dollar. The sum of security and private benefits and hence the founder's welfare is constant.

## **B) Separation of ownership and management**

What happens when ownership and management are separated? On the one hand, the professional manager prefers to divert corporate revenues as private benefits to himself rather than pay them out as dividends to the shareholders. While the law constrains diversion, the founder can further limit private benefit extraction through monitoring. On the other hand, this possibility may induce opportunistic behavior by the founder even when he does not share in the private benefits. Once the professional manager has accepted to run the firm and revenues are

realized, the founder has an incentive to reduce the professional manager's private benefits by monitoring more. Anticipating high levels of monitoring, the professional manager may reject the offer to run the firm. That is, the founder may over-monitor in the sense of the ex post optimal monitoring level exceeding the ex ante optimal amount (Pagano and Roell 1998). To induce the manager to accept running the firm, the founder has to commit himself not to monitor excessively. He can do so by dispersing (some of) the shares to small investors because the actual monitoring intensity is determined by the size of the founder's equity stake (Burkart, Gromb, and Panunzi 1997). In addition (or instead), the founder may offer the professional manager monetary incentives to convince him to run the firm.

We solve the game by backward induction, beginning with the date 3 resource allocation decision. Total revenues under the professional manager are  $v_M$ . The law stipulates that  $(1 - \bar{\phi})v_M$  must be paid out either to shareholders as dividends or to the professional manager as salary. What fraction of the remaining  $\bar{\phi}v_M$  is actually diverted depends on monitoring. The founder monitoring with intensity  $m$  can control the use of an additional fraction  $m$  (or at most  $\bar{\phi}$ ) of  $v_M$ . Being excluded from sharing private benefits, the founder forces the professional manager to disgorge all of them as dividends. The professional manager then has discretion over  $\max\{0, (\bar{\phi} - m)v_M\}$  in resources. He strictly prefers to extract them as private benefits, unless he is the sole shareholder.

Since private benefit extraction is efficient, there are no gains to shareholders from using monetary incentives to resolve the conflict over resource allocation. To induce the manager to abstain from extracting an additional dollar, shareholders have to offer him this dollar as a transfer. Monetary incentives, henceforth called the wage, can, however, play a role in inducing

the manager to accept the job of running the firm. Let  $wv_M$  denote the wage paid to the professional manager when he accepts the job offer from the founder.<sup>4</sup>

At date 2, the founder chooses the monitoring intensity. For a given block  $\alpha$  and for a given wage rate  $w$ , the founder maximizes  $\alpha(1 - w - \bar{\phi} + m)v_M - k\frac{m^2}{2}$ .<sup>5</sup> He receives a fraction  $\alpha$  of the security benefits net of the wage bill less his monitoring costs. Since the law already shields  $(1 - \bar{\phi})v_M$  of the revenues from private benefit extraction, the founder never monitors more than  $\bar{\phi}$ . Hence,  $m = \min\left\{\bar{\phi}, \alpha\frac{v_M}{k}\right\}$  and weakly increases with the block size.

At date 1, the manager accepts to run the firm if the sum of the wage and the private benefits exceeds his outside utility  $c$ .<sup>6</sup> The condition  $(w + \bar{\phi} - m)v_M \geq c$  can be rewritten as

$$m \leq \bar{m} = w + \bar{\phi} - \frac{c}{v_M}.$$

High levels of monitoring and strict legal rules reduce the professional manager's private benefits and may thus discourage him from running the firm. Offering him a higher wage can sway him to accept the job. Higher ownership concentration and better legal protection make it more difficult to satisfy the professional manager's participation constraint, whereas higher wages make it easier. This is the basic trade-off when ownership and management are separated.

At date 0, the founder chooses the ownership structure and the wage to maximize his welfare  $V^s = [1 - w - \bar{\phi} + m]v_M - k\frac{m^2}{2}$  subject to the manager's participation constraint.

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<sup>4</sup> The subsequent analysis implicitly assumes that  $\bar{\phi} + w < 1$ , which holds in equilibrium.

<sup>5</sup> The range  $m \in [0, 1]$  implies that  $k \geq v_M$ .

<sup>6</sup> An alternative interpretation of the model is one where the manager has to exert an effort to generate revenues  $v_M$  and  $c$  is the disutility of the effort.

If the founder were to choose an ownership structure such that  $\bar{\phi} < \alpha \frac{v_M}{k}$ , the professional manager would be left with zero private benefits. Consequently, the founder would have to offer a wage  $w=c$  to induce the professional manager to accept the job. Leaving some private benefits to the professional manager in exchange for a lower wage saves on monitoring costs. Hence, the founder always chooses an ownership structure such that  $\bar{\phi} > \alpha \frac{v_M}{k}$  and  $m = \alpha \frac{v_M}{k}$ .

Inserting the monitoring level  $m = \alpha \frac{v_M}{k}$  into the founder's welfare yields  $V^S = (1 - w - \bar{\phi} + \frac{\alpha v_M}{k})v_M - \frac{(\alpha v_M)^2}{2k}$  with  $dV^S / d\alpha = (1 - \alpha)v_M^2 / k \geq 0$  and  $dV^S / dw = -v_M < 0$ .

The founder's welfare increases with ownership concentration and decreases with the wage, provided that the professional manager's participation constraint is satisfied.

A binding participation constraint is obviously in the interest of the founder as any managerial rent comes at his expense. Sometimes, however, the founder cannot avoid leaving some rents to the professional manager. More precisely, there are parameter values for which the participation constraint  $(w + \bar{\phi} - m)v_M \geq c$  does not bind despite a fully concentrated ownership structure and a zero wage. This occurs when  $\bar{\phi} > v_M / k + c / v_M$ . We want to allow for the possibility of legal regimes in which the professional manager can extract a rent.

**Assumption 2:**  $\frac{v_M}{k} + \frac{c}{v_M} < 1$

Since  $\bar{\phi} \leq 1$ , Assumption 2 is a necessary condition for  $\bar{\phi} > v_M / k + c / v_M$  to hold.



**Lemma 2**

$$\text{i) For } \bar{\phi} \leq \frac{c}{v_M}, \quad \alpha^* = 0, \quad w^* = c/v_M - \bar{\phi}, \quad m^* = 0, \quad \text{and}$$

$$V^S(\alpha^*, w^*, \bar{\phi}) = v_M - c.$$

$$\text{ii) For } \frac{c}{v_M} < \bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}, \quad \alpha^* = \frac{k}{v_M} \left( \bar{\phi} - \frac{c}{v_M} \right), \quad w^* = 0, \quad m^* = \bar{\phi} - \frac{c}{v_M},$$

$$V^S(\alpha^*, w^*, \bar{\phi}) = v_M - c - \frac{k}{2} \left( \bar{\phi} - \frac{c}{v_M} \right)^2.$$

$$\text{iii) For } \bar{\phi} > \frac{c}{v_M} + \frac{v_M}{k}, \quad \alpha^* = 1, \quad w^* = 0, \quad m^* = \frac{v_M}{k}, \quad \text{and}$$

$$V^S(\alpha^*, w^*, \bar{\phi}) = v_M(1 - \bar{\phi}) + \frac{v_M^2}{2k}.$$

When legal protection is strong (case i), then, even in the absence of monitoring, private benefits are insufficient to induce the professional manager to run the firm. Consequently, ownership is completely dispersed and the professional manager is offered a wage equal to the difference between his outside utility and the private benefits. The founder's resulting welfare  $V^S(\alpha^*, w^*, \bar{\phi})$  is at its first best level ( $v_M - c$ ) and does not depend on the quality of legal rules.

When legal protection is moderate (case ii), expected private benefits exceed the outside utility  $c$ . As a result, the founder has to monitor the professional manager to limit the size of his rent. Setting the wage equal to zero minimizes the monitoring intensity that keeps the professional manager's participation constraint binding. Since monitoring is costly, this dominates all other combinations of positive wage and monitoring level that also leave no rent to the professional manager. A positive wage and concentrated ownership do not co-exist in

equilibrium. Due to the monitoring costs, the founder's welfare  $V^S(\alpha^*, w^*, \bar{\phi})$  is below its first best level. Moreover,  $V^S(\alpha^*, w^*, \bar{\phi})$  decreases in both  $\bar{\phi}$  and  $k$ : less legal protection entails a higher optimal level of monitoring, and a higher  $k$  makes monitoring more expensive.

When legal protection is poor (case iii) the founder cannot avoid leaving a rent to the professional manager. Offering a zero wage and retaining all shares to implement a monitoring level  $m = v_M / k$  is all that the founder can do. The resulting rent to the professional manager is equal to  $R = (\bar{\phi} - \frac{v_M}{k})v_M - c$ . The founder's welfare  $V^S(\alpha^*, w^*, \bar{\phi})$  is equal to the first best  $(v_M - c)$  less monitoring costs and managerial rent. As in the range with moderate legal protection,  $V^S(\alpha^*, w^*, \bar{\phi})$  decreases in both  $\bar{\phi}$  and  $k$ .

We now turn to the final step of determining the conditions under which the founder chooses to hire a professional manager. The answer follows from comparing the founder's welfare under no separation  $V^{NS}$  (Lemma 1) to that under separation  $V^S$  (Lemma 2). The next two Propositions describe the overall equilibrium outcomes.

### **Proposition 1**

*When legal shareholder protection is strong ( $\bar{\phi} \leq c / v_M$ ), ownership and management are separated, and ownership is fully dispersed.*

When legal rules are very protective, the separation of ownership and management only brings benefits by allowing the founder to capitalize on the superior ability of the professional manager. The strong legal protection also solves at no cost to the founder the agency conflict over the allocation of revenues. More precisely, the law restricts private benefit extraction below

the professional manager's outside utility. Letting this manager divert corporate resources is part of his compensation package, which needs to be supplemented by a wage. In this case, selling all the equity and hiring a professional manager is the optimal choice for the founder.

In this model, a legal system with strong protection of outside shareholders, i.e., with  $\bar{\phi} \leq \frac{c}{v_M}$ , achieves the first best level of social efficiency. The best manager is hired to run the firm, and no resources are wasted on monitoring. This conclusion is driven by the fact that, in this model, law enforcement is free – at least from the viewpoint of the founder. If better legal protection imposes higher enforcement on the society, we would have to compare the social costs of private monitoring with the social costs of law enforcement.<sup>7</sup>

Once investor protection falls below the threshold of Proposition 1, so  $\bar{\phi} > c/v_M$ , the professional manager can expect to appropriate corporate resources in excess of his outside utility. As a consequence, monitoring is needed to limit the size of his rent. In this case, the separation of ownership and management involves a trade-off: on the one hand, the firm is run by a more qualified manager; on the other hand, the founder has to incur monitoring costs (and possibly leave a rent to the professional manager). Denote by  $\bar{\phi}^* \in (c/v_M, 1)$  the unique value of  $\bar{\phi}$  such that  $V^S(\alpha^*, w^*, \bar{\phi}) = V^{NS}$ . This value exists if  $v_M^2/2k < v_F$ .

## Proposition 2

*i) If  $v_M^2/2k < v_F$  holds, ownership and management are separated and the founder retains a block when legal protection is moderate  $\bar{\phi} \in (c/v_M, \bar{\phi}^*]$ . When legal protection is poor*

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<sup>7</sup> The private and social calculations would be further complicated when there are private costs of compliance with legal rules. For example, the costs of complying with better accounting and disclosure standards might be higher.

$\bar{\phi} > \bar{\phi}^*$ , there is no separation of ownership and management.

ii) If  $v_M^2 / 2k \geq v_F$ , ownership and management are always separated, and the founder retains a block when legal protection is moderate or poor.

When ownership and management are separated, the founder's welfare  $V^S$  decreases with  $\bar{\phi}$ , because weaker legal protection entails higher monitoring costs and (possibly) an increasing managerial rent. Accordingly,  $V^S$  reaches its minimum when the law does not provide any protection ( $\bar{\phi}=1$ ). In this case, all dividend payments are exclusively due to monitoring, fully concentrated ownership is optimal, and  $V^S = v_M^2 / 2k$ . In contrast, when ownership and management are not separated, the founder's welfare is  $v_F$  and independent of the quality of legal protection. Hence, there exists a unique threshold value  $\bar{\phi}^*$  below which monitoring costs and managerial rent are less than the gain in managerial efficiency ( $v_M - c - v_F$ ). Conversely, for  $\bar{\phi} > \bar{\phi}^*$  the forgone efficiency loss associated with keeping control in the family is smaller than the agency costs of separating ownership and management. If, however, the discrepancy between the managerial abilities of the professional and that of the founder (or his heir) is very large, keeping management in the family is inferior irrespective of the quality of the law. This holds when the revenues under family control are smaller than the dividends rescued from managerial expropriation by monitoring only, i.e., when  $v_M^2 / 2k \geq v_F$ . In this case the founder or family simply retains an ownership stake whose size depends on legal protection.

The model has a clear implication for how the law shapes ownership structure:

### **Proposition 3**

*For  $\alpha \in (0,1)$ , more concentrated ownership structures go together with weaker legal protection, i.e.,  $d\alpha/d\bar{\phi} \geq 0$ .*

The founder's objective under separation of ownership and management is to pay the professional manager no more than his outside utility. Both legal protection and monitoring restrict the professional manager's ability to extract private benefits. Since the law limits extraction at no cost, the founder resorts to monitoring only to the extent that the law leaves the manager a payoff in excess of his outside utility. To restore a binding participation constraint on the professional manager, the founder has to monitor more as legal protection deteriorates. Thus, for  $\bar{\phi} \in (c/v_M, c/v_M + v_M/k]$  legal protection and ownership concentration are inversely related under separation of ownership and management.<sup>8</sup>

Propositions 2 and 3 make strong empirical predictions, namely that family ownership should be common around the world, and relatively more common in countries with poor investor protection. Recent empirical work is consistent with these predictions. Family control is the dominant form of corporate ownership around the world. Looking at the 20 largest firms in 27 wealthy economies, La Porta et al. (1999) find that families or individuals control 30% in number and 25% in value of the top 20 firms in each country. These numbers are much higher for smaller firms. Family transitions are a frequent and important occurrence: only about one third of family controlled firms are run by their founders, the rest by descendants or by families

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<sup>8</sup> The (inverse) relationship between ownership concentration and legal protection depends crucially on the absence of wealth constraints of the founder and the assumed monitoring technology. In particular, the positive relationship between optimal monitoring intensity and ownership concentration relies on the assumption that the incentive to monitor depends on the ownership stake but is independent of legal protection. By contrast, when legal protection has a direct impact on the (marginal) return from monitoring the relationship between the quality of the law and ownership concentration is not monotone (Burkart and Panunzi 2001).

that came to own them later. In addition, LLSV (1999) show that widely held firms are more common in countries with good shareholder protection- 34% versus 16% in the countries with a low level of protection. Moreover, ownership patterns tend to be relatively stable. In short, when expropriation is a concern, firms remain family controlled.

Claessens, Djankov and Lang (2000) find that with the exception of Japan, more than 50% of all publicly traded firms in nine East Asian countries are controlled by families and that the top 15 families control significant shares of country wealth.<sup>9</sup> East Asian countries outside Japan are indeed known for particularly poor protection of outside investors. Faccio and Lang (2002) find higher incidence of family firms in countries with inferior shareholder protection in a large sample of West European corporations. The European Corporate Governance Network (2001) documents the prevalence of concentrated corporate ownership in OECD countries.

Propositions 1 and 2 analyze the legal circumstances under which professional managers of a given quality are hired. Alternatively, one can consider the managerial efficiency gain necessary to have separation of ownership and management in a regime with weak legal protection.

### **Corollary 1**

*The separation of ownership and management requires higher managerial skills in regimes with poorer legal shareholder protection.*

The founder's welfare under separation  $V^S$  increases with both the professional

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<sup>9</sup> In Taiwan, the top 15 families control 20.1% of listed corporate assets; in Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand, the top 15 families control more than 25% of listed corporate assets.

manager's ability (higher  $v_M - c$  values) and the quality of the law (lower  $\bar{\phi}$  values). In contrast, the founder's welfare under no separation  $V^{NS}$  is independent of  $\bar{\phi}$ . *Ceteris paribus*, the switch from keeping family control to hiring a professional manager requires a more able professional manager when legal protection is less effective: Such legal regimes are associated with higher agency costs of separation of management and control. To make hiring a professional manager nonetheless worthwhile, the efficiency gain must be larger.

The section has analyzed how legal rules affect the trade-off between the benefits and costs of separating ownership and management. The model predicts three different patterns of ownership and management: separation with dispersed ownership, separation with block ownership, and no separation. Some implications of our basic model do, however, clash with the empirical evidence. In particular, the model implies that the founder's block trades at a discount when ownership and management are separated. This prediction is inconsistent with the empirical evidence on block premia, which are both positive and higher in countries with weaker protection of outside shareholders (Zingales 1994, Nenova 2001, Dyck and Zingales 2002). The reason for this result in our model is that all shareholders benefit in proportion of their shareholding from monitoring, but only the founder bears the cost. The negative block premium follows from the assumption that the founder cannot extract any private benefits, thereby ensuring that monitoring is a public good. We relax this assumption in the next section and allow the founder to benefit privately from his monitoring activity.

A final theoretical point needs to be made before we move on. In the model, we have assumed that ownership structure remains stable once the manager has accepted to run the company. If the founder had the opportunity and incentive to retrade ex-post, he may want to increase his stake and extract a higher fraction of private benefits from the manager. This, in

turn, would affect the decision of the manager to accept the offer to run the company. For the model in this section, we can prove that, so long as trade is not anonymous, the purchase of an additional fraction of shares is not profitable for the founder. Because shareholders free ride on the entire value improvement implied by the founder's final holding,<sup>10</sup> the founder does not make a profit on the additional shares acquired in the retrading stage. Moreover, the increase in the monitoring costs due to the larger final holding exceeds the increase in the value of the shares owned initially by the founder. Things are more complicated when trade is anonymous (DeMarzo and Urosevic 2001), or when the founder shares some of the private benefits of control with the manager, as in the next section. In these instances, we need to make the assumption that there is no retrading, or alternatively that the manager's wage can be conditioned on the founder's final equity stake.

#### **IV. Transferable private benefits of control**

In the previous section, the founder could not by assumption extract any private benefits unless he managed the firm himself. The founder's interest and those of the minority shareholders are perfectly congruent when a professional manager runs the firm. In this section we consider the other extreme, where the private benefits are perfectly transferable, thereby aligning the founder's interest in expropriation with that of the professional manager. The possibility of sharing the spoils with the professional manager provides an additional rationale for monitoring. Besides protecting the founder against the threat of managerial expropriation, monitoring also secures him a (larger) share of the private benefits, thereby making it a rent-

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<sup>10</sup> A proof of a similar result is contained in Burkart, Gromb, Panunzi (1997) and Pagano and Roell (1998).



seeking activity.

Below we repeat the analytical steps of the previous section and establish that the existence of the three patterns of separation of ownership and management extends to the case of transferable private benefits. We then explore the implications of the model for the relationship between legal protection, share value, block premium, and the agency costs of separating ownership and management. Transferable private benefits only matter in the presence of a professional manager, leaving the founder's welfare in the case of no separation unchanged (Lemma 1). We therefore move directly to the case of separation of ownership and management.

At date 3, the law imposes that  $(1-\bar{\phi})v_M$  be paid out either as dividends to all shareholders or as the wage to the professional manager. The founder and the professional manager bargain over how to allocate the remaining  $\bar{\phi}v_M$ . The outside options in the bargaining depend on monitoring. If the founder monitors with intensity  $m$ , his outside option is  $\min\{\alpha m v_M, \alpha \bar{\phi} v_M\}$  and that of the professional manager is  $\max\{0, (\bar{\phi} - m)v_M\}$ . The surplus to be shared between the two parties amounts to  $\min\{(1-\alpha)m v_M, (1-\alpha)\bar{\phi} v_M\}$ , the revenues that would accrue to the minority shareholders if no agreement is reached. Under the assumption of equal bargaining power, the founder receives in the bargaining a payment equal to  $\min\left\{\frac{1+\alpha}{2}\bar{\phi}v_M, m\frac{1+\alpha}{2}v_M\right\}$  and the manager gets  $\max\left\{\frac{1-\alpha}{2}v_M, \left(\bar{\phi}-m\frac{1+\alpha}{2}\right)v_M\right\}$ . Since these payoffs exceed their outside options, the founder and the manager always agree to set  $\phi = \bar{\phi}$ .<sup>11</sup>

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<sup>11</sup> The question arises again whether there are any gains from using monetary incentives to induce the manager to abstain from extracting private benefits. At first glance this seems possible, since the manager receives only half of the surplus. While the use of such a compensation scheme is in the minority shareholders' interest, the founder prefers ex post to extract private benefits. Since such extraction is efficient, the founder is ex ante indifferent. All that matters is to keep the manager's participation constraint binding, i.e., to leave him no rents.

At date 2, the founder chooses the monitoring intensity to maximize  $[\alpha(1-w-\bar{\phi}) + \frac{1+\alpha}{2}m]v_M - k\frac{m^2}{2}$ . Since the law already protects  $(1-\bar{\phi})v_M$  of the revenues from extraction, there is no gain in monitoring more than  $\bar{\phi}$ . The founder therefore chooses  $m = \min\left\{\bar{\phi}, \frac{1+\alpha}{2k}v_M\right\}$ . If  $\bar{\phi} > (1+\alpha)v_M/2k$  holds, monitoring does not depend on the block size and is purely driven by the prospect of extracting a part of the private benefits. Otherwise ( $\bar{\phi} \leq (1+\alpha)v_M/2k$ ), monitoring is a function of both private benefits and the ownership stake.

Indeed, decomposing the first order condition into  $\alpha(v_M/k) + [(1-\alpha)/2](v_M/k)$  reveals the two motives for monitoring. The first term reflects monitoring in the absence of collusion aimed at preventing managerial expropriation of the founder's stake  $\alpha$ . The second term captures the additional monitoring that the founder undertakes to appropriate some of the private benefits. While monitoring increases as before with the block size  $\alpha$ , the second term implies that monitoring is positive even when the founder retains no shares, i.e.,  $m(0) > 0$ . This implies that the founder cannot withdraw from the firm. To remove this purely mechanical feature of the model, we impose the following assumption:

**Assumption 3:** *If the founder retains less than  $\underline{\alpha} > 0$ , he abstains from monitoring.*

Assumption 3 simply means that, to monitor effectively, the founder must have some power over the manager, and for that he needs a minimum ownership stake. This stake may enable him to sit on the board, to have enough shares to convene an extraordinary shareholder meeting, to have standing in litigation, or to exercise power in other ways. When the stake of the

founder is below the threshold  $\underline{\alpha}$ , he has no power *vis-à-vis* the manager. Put differently, owning a stake below  $\underline{\alpha}$  and dispersing the shares among small investors enables the founder to commit not to interfere through monitoring in the running of the firm.<sup>12</sup>

When  $\alpha \geq \underline{\alpha}$ , the founder monitors in part to avoid expropriation by the professional manager, but he does so only to help himself. Indeed, from the minority shareholders' perspective, monitoring is a pure rent-seeking activity. The founder and the professional manager agree to set  $\phi = \bar{\phi}$  irrespective of the monitoring intensity  $m$ .<sup>13</sup> This result illustrates an important difference between legal shareholder protection and monitoring: while the law protects all the shareholders, monitoring in this model is a form of self-protection by the founder that has either positive or negative externalities for other investors.

At date 1, the professional manager accepts to run the firm if the wage and his share of the private benefits exceed the outside utility. The condition  $(w + \bar{\phi} - m(1 + \alpha)/2)v_M \geq c$  can be rewritten as

$$m \leq \bar{m} \equiv \min \left\{ \bar{\phi}, \frac{(\bar{\phi} + w)v_M - c}{\frac{1 + \alpha}{2}v_M} \right\}$$

The maximum level of monitoring compatible with the professional manager's participation constraint decreases with the founder's stake. A larger block increases the founder's outside option in the bargaining, thereby reducing the share of private benefits that the

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<sup>12</sup> In the absence of collusion, fully dispersed ownership ( $\alpha = 0$ ) ensures no monitoring ( $m(0) = 0$ ). Introducing a threshold  $\underline{\alpha}$  in Section III would have complicated the analysis without adding any insight.

<sup>13</sup> If one introduces a dead-weight loss associated with private benefit extraction, monitoring also benefits minority shareholders because the founder internalizes part of the inefficiency and hence reduces the level of diversion (Burkart and Panunzi (2001)).

professional manager obtains. Nonetheless, as  $(1+\alpha)/2 \leq 1$ , the threshold  $\bar{m}$  is higher for a given wage  $w$  and legal protection  $\bar{\phi}$  when founder and professional manager collude than in the absence of collusion. Withholding  $(1-\alpha)mv_M$  from the minority shareholders makes it more likely that the professional manager's participation constraint is satisfied.

At date 0, the founder chooses the ownership structure  $\alpha$  and wage  $w$  to maximize his welfare

$$V^S = (1 - \bar{\phi} - w)v_M + \frac{1 + \alpha}{2}mv_M - k\frac{m^2}{2}.$$

As monitoring weakly increases with the block size, the founder's welfare increases in  $\alpha$  and decreases in  $w$ . As in the absence of collusion, the optimal ownership structure is as concentrated as possible and the optimal wage as low as possible provided that the manager's participation constraint is satisfied. To simplify the analysis, we impose an upper bound on  $\underline{\alpha}$ .

**Assumption 4:**  $\underline{\alpha} \leq \frac{2kc}{v_M^2} - 1$

The threshold  $\underline{\alpha} > 0$ <sup>14</sup> (Assumption 3) and Assumption 4 imply that the equilibrium monitoring intensity  $m^*$  is given by the first order condition  $m = (1 + \alpha^*)v_M / 2k$ . In the absence of the threshold  $\underline{\alpha} > 0$  or of its upper bound, monitoring intensity for small  $\bar{\phi}$  values would be determined by the legal threshold ( $m^* = \bar{\phi}$ ), leaving the ownership structure indeterminate in that range of  $\bar{\phi}$  values. Nonetheless, all our subsequent results on founder welfare, share value, and

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<sup>14</sup> As  $\underline{\alpha} > 0$ , Assumption 4 implies that  $v_M / 2k \leq c / v_M$ .

separation of ownership and management are robust with respect to relaxing Assumptions 3 and

4.

**Lemma 3**

i) For  $\bar{\phi} \leq \frac{c}{v_M}$ ,  $\alpha < \underline{\alpha}$ ,  $w^* = \frac{c}{v_M} - \bar{\phi}$ ,  $m^* = 0$ , and  $V^S(\alpha^*, w^*, \bar{\phi}) = v_M - c$

ii) For  $\frac{c}{v_M} < \bar{\phi} \leq \frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{8k} v_M$ ,  $\alpha < \underline{\alpha}$ ,  $w^* = 0$ ,  $m^* = 0$ , and

$$V^S = (1 - \bar{\phi})v_M$$

iii) For  $\frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{8k} v_M < \bar{\phi} \leq \frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{4k} v_M$ ,  $\alpha^* = \underline{\alpha}$ ,

$$w^* = \frac{c}{v_M} - \bar{\phi} + \frac{(1+\underline{\alpha})^2}{4k} v_M, \quad m^* = \frac{1+\underline{\alpha}}{2k} v_M, \quad \text{and } V^S = v_M - c - \frac{(1+\underline{\alpha})^2}{8k} (v_M)^2$$

iv) For  $\frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{4k} v_M < \bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}$ ,  $\alpha^* = \frac{2}{v_M} \sqrt{k(\bar{\phi}v_M - c)} - 1$ ,

$$w^* = 0, \quad m^* = \sqrt{\frac{\bar{\phi}v_M - c}{k}}, \quad \text{and } V^S(\alpha^*, w^*, \bar{\phi}) = v_M - c - \frac{\bar{\phi}v_M - c}{2}.$$

v) For  $\bar{\phi} > \frac{c}{v_M} + \frac{v_M}{k}$ ,  $\alpha^* = 1$ ,  $w^* = 0$ ,  $m^* = \frac{v_M}{k}$ , and

$$V^S(\alpha^*, w^*, \bar{\phi}) = v_M(1 - \bar{\phi}) + \frac{v_M^2}{2k}$$

Lemma 3 replicates Lemma 2 with an added twist due to collusion and the discontinuity

in the feasible monitoring level.<sup>15</sup> In particular, region i) coincides with region i) in Lemma 2 and region v) with region iii) of Lemma 2.

The differences between transferable and non-transferable private benefits appear in the intermediate range of legal protection. In region iv), weak legal protection permits private benefits to an extent that sharing them between the founder and the manager is compatible with the participation constraint and a zero wage. Indeed, to avoid leaving a rent to the manager, the founder has to retain  $\alpha > \underline{\alpha}$  and monitor accordingly. In contrast, in regions ii) and iii), where the law is more protective, a zero wage, sharing of private benefits, and satisfying the manager's participation constraint are not compatible with each other. Because of the discontinuity in monitoring, the founder faces a trade-off between under- and over-monitoring. More precisely, the founder has the option to either not monitor or to monitor at least  $m = (1 + \underline{\alpha})v_M / 2k$ . While abstaining from monitoring concedes a rent to the professional manager, monitoring with intensity  $m = (1 + \underline{\alpha})v_M / 2k$  requires a positive wage to satisfy the participation constraint. In region ii), the sum of the wage and the monitoring cost when  $m = (1 + \underline{\alpha})v_M / 2k$  exceeds the rent that the professional manager can extract. Hence, it is optimal to fully disperse ownership and to leave the manager with a rent of  $R = \bar{\phi}v_M - c$ . The reverse holds in region iii): over-monitoring and compensating the professional manager with a wage to satisfy the participation constraint is less costly to the founder. Consequently, the optimal ownership concentration jumps to  $\alpha^* = \underline{\alpha}$ .

Another implication of Lemma 3 is that the founder cannot gain from selling the entire company to a penniless professional manager who would raise funds in the capital market. From

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<sup>15</sup> Irrespective of Assumptions 3 and 4, the equilibrium outcome with collusion is more complicated than Lemma 2. In the absence of Assumptions 3 and 4, the complication is due to the fact that monitoring may be determined by the law ( $m^* = \bar{\phi}$ ) rather than by the first order condition.

the discussion of the no separation case, it follows that the professional manager could raise at most  $(1 - \bar{\phi})v_M$  in the market. Moreover, he will never pay more than  $v_M - c$ . Simple inspection shows that the founder's welfare  $V^S$  is always at least as large as the minimum of  $(1 - \bar{\phi})v_M$  and  $v_M - c$ . Hence selling the entire company to a penniless manager is weakly dominated by selling (some) stock in the market and hiring a professional manager.

The feature of Lemma 3 that is both crucial for the subsequent results and robust to relaxing Assumptions 3 and 4 is that the agency cost of separation of ownership and management rises as investor protections become weaker. When  $\bar{\phi}$  increases, the professional manager can appropriate a larger fraction of the revenues. This in turn implies either more monitoring or a larger rent. Since the founder ultimately bears the agency cost, his welfare weakly decreases with  $\bar{\phi}$ .

The final step in analyzing the founder's decision to hire a professional manager (and to float part of the equity) is the comparison of Lemma 1 with Lemma 3. Since Lemma 2 and 3 coincide for  $\bar{\phi} \leq c/v_M$ , Proposition 1 continues to hold. When legal protection is good ( $\bar{\phi} \leq c/v_M$ ), ownership and management are separated and ownership is fully dispersed. When legal protection is less strong ( $\bar{\phi} > c/v_M$ ), the founder's welfare  $V^S$  under separation and collusion (weakly) decreases with  $\bar{\phi}$ . Consequently, Proposition 2 also continues to hold. If the discrepancy between the competence of the professional manager and that of the founder is very large ( $v_M^2/2k \geq v_F$ ), separation is superior for any  $\bar{\phi} \in (c/v_M, 1]$ . Otherwise ( $v_M^2/2k < v_F$ ), there exists a unique threshold  $\bar{\phi}^{***} \in (c/v_M, 1]$  above which the agency cost exceeds the loss in managerial efficiency, and keeping management in the family is optimal. The threshold  $\bar{\phi}^{***}$

again denotes the  $\bar{\phi}$  value where  $V^S(\alpha^*, w^*, \bar{\phi}) = V^{NS}$  holds. As we show below, it is smaller than the threshold  $\bar{\phi}^*$  derived in the previous section. The only qualitative difference from the case with non-transferable private benefits is that separation and concentrated ownership may or may not be an equilibrium outcome. That is, the threshold value  $\bar{\phi}^{**}$  at which the founder switches to no separation may entail a concentrated or a dispersed ownership structure under separation, i.e., both  $\alpha^*(\bar{\phi}^{**}) > \underline{\alpha}$  and  $\alpha^*(\bar{\phi}^{**}) = 0$  are possible.

From the founder's perspective, legal protection and monitoring are substitutes: both restrict the professional manager's ability to extract private benefits. While monitoring is costly, better legal protection comes at no cost to the founder. This has two implications. First, as legal protection improves, the level of monitoring falls, which in turn entails a less concentrated ownership structure. Proposition 3 thus also holds with transferable private benefits: legal protection and ownership concentration are inversely related under separation of ownership and management. Second, weaker legal protection raises the agency cost of separation. Hence, hiring a professional manager in regimes with weaker legal rules requires higher managerial skills (Corollary 1).

The quality of the law also affects share value, defined as the total amount of dividends paid out to all shareholders at the final date.

**Proposition 4**

*Share value increases as legal shareholder protection improves.*

From the minority shareholders' perspective, monitoring is not a substitute for legal protection when private benefits are transferable. *Ex post*, both the founder and the manager



prefer to extract private benefits. As a rent-seeking activity, monitoring merely determines how the two split these private benefits. In contrast, the law prescribes that no less than  $(1 - \bar{\phi})v_M$  is used for dividends and wage payments. Hence, the expected share value is equal to  $S = (1 - \phi - w)v_M$ . For  $\bar{\phi} > \frac{c}{v_M}$ , better legal protection unambiguously increases share value because the reduction in private benefits exceeds the wage increase. Nonetheless, the minority shareholders are indifferent with respect to the quality of the legal rules because they always get what they pay for. Because the minority shareholders anticipate at date 0 that the founder and the manager will divert the fraction  $\bar{\phi}$  of revenues, the founder's proceeds from selling  $(1 - \alpha)$  shares are equal to  $(1 - \alpha)S$ .

Proposition 4 also holds when the founder or his family keeps control over the firm. Since the founder sets  $\phi = \bar{\phi}$  at date 3 (unless  $\alpha = 1$ ), better laws boost share value because a larger fraction of the proceeds has to be paid out as dividends.

La Porta et al. (2002) examine the valuation of companies (relative to their assets) in different countries, with different levels of shareholder protection. They find that companies in countries with above the world median measures of shareholder protection have Tobin's q's about 20% higher than do comparable companies in countries with below world median shareholder protection. The positive association between investor protection and the valuation of corporate assets survives a variety of controls for industry, ownership structure, and growth opportunities. Claessens et al. (2002) find similar evidence of higher valuation of companies in more protective legal regimes using data from East Asia.

The positive relationship between share value and legal protection also has implications for the value of the controlling block.

## **Corollary 2**

*Total block premium  $V^S - S$  increases as legal shareholder protection falls.*

When  $\alpha^* \in (\underline{\alpha}, 1)$ , the founder responds to lower investor protection by monitoring more. Hence, his welfare is reduced by these extra monitoring costs (and possibly by the rent paid to the manager). In contrast, monitoring has no positive impact on share value, and the law is the only safeguard of dividends. As a result, changes in the quality of the law have a larger impact on share value than on the founder's welfare. Corollary 2 also holds when management and ownership are not separated. Since the founder does not monitor in this case, his welfare is independent of the law, while share value decreases with the quality of the law.

A number of recent empirical studies examine the valuation of block premia in different jurisdictions. For example, Zingales (1994) presents evidence of very significant premium on the high voting rights shares trading on the Milan stock exchange. Nenova (2001) explicitly compares the value of a corporate voting right across legal jurisdictions in a sample of 661 dual-class firms from 18 countries. She presents striking evidence that control is more highly valued in countries with inferior protection of minority shareholders, consistent with Corollary 2.

In contrast to minority shareholders whose wealth is independent of the law, the founder's welfare  $V^S$  increases with the quality of the law when ownership and management are separated. The possibility of colluding with the manager also affects the founder's welfare.

## **Proposition 5**

*Collusion between the founder and the manager increases the agency costs of separating ownership and management.*

In equilibrium, the agency cost of separating ownership from management is the sum of the monitoring cost and the managerial rent. Compared to the case with non-transferable private benefits, the equilibrium level of monitoring is higher when private benefits are transferable. This is so for two reasons. First, the rent-seeking motive induces the founder to monitor more for a given  $\alpha$  and  $\bar{\phi}$ . Higher levels of monitoring allow the founder to appropriate a larger share of the private benefits. From an ex ante perspective, however, the founder bears the cost of such wasteful monitoring himself. Second, the professional manager receives a larger payoff for a given monitoring intensity  $m$ . Rather than increasing the dividends for all shareholders by  $mv_M$ , the founder and the professional manager withhold the minority shareholders' share  $(1-\alpha)mv_M$  and split it among themselves. Consequently, collusion requires higher monitoring levels in order to avoid leaving a rent to the professional manager. When private benefits are transferable, the impossibility of fine-tuning monitoring (under-monitoring) also allows the manager to obtain a positive rent in the range  $\bar{\phi} \in [c/v_M, c/v_M + (1+\alpha)^2 v_M / 8k]$ . The rent in very poor legal regimes ( $\bar{\phi} > c/v_M + v_M / k$ ) is identical with non-transferable and transferable private benefits, as the two cases coincide once ownership is fully concentrated ( $\alpha = 1$ ).

The present model formalizes legal shareholder protection as a limit on the share of corporate resources that the party in control can divert as private benefits. The law can protect shareholders in other ways as well. One possibility suggested by Proposition 5 is that legal rules can hinder or prevent collusion between the founder and the manager. Examples of such legal rules are equal treatment provisions and fiduciary duties. In fact, Proposition 5 provides a rationale for such rules. They reduce the agency costs of separation of ownership from

management, thereby increasing the founder's welfare.<sup>16</sup>

Collusion influences the founder's welfare when ownership and management are separated as well as his decision whether to hire a professional manager.

### **Corollary 3**

*Collusion between the founder and the manager is detrimental to the hiring of a professional manager, i.e.  $\bar{\phi}^{**} \leq \bar{\phi}^*$ .*

When ownership and control are separated, the founder's welfare is lower with transferable than with non-transferable private benefits. In contrast, collusion has no impact on his welfare when control is kept in the family. Hiring a professional manager is therefore comparatively less attractive when private benefits are transferable.

## **VI. Conclusion: the separation of ownership from management**

It is often claimed that there are two paradigms of corporate governance: the Anglo-Saxon paradigm centered on the conflict between the shareholders and the manager, and the rest of the world paradigm where the conflict is between large and small shareholders. We show that the two paradigms are special cases of a single model of managerial succession, in which the founder must simultaneously decide whether to hire an outside professional manager (as opposed to keeping management in the family) and how much of the shares to float. We argue that this

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<sup>16</sup> By contrast, minority shareholder wealth is neither affected by the quality of the law nor by collusion, except for unanticipated changes thereof. Then purchasing shares at date 0, they pay no more than the date 3 share value.

decision is to some extent shaped by the degree of legal protection of minority shareholders, and derive implications for optimal succession and ownership structures from this premise.

We show that in the regimes of the strongest legal protection of minority shareholders, the optimal solution for the founder is to hire the best professional manager and sell off the entire firm in the stock market. This gives rise to the Anglo-Saxon model, in which the law is the principal constraint on managerial discretion and the agency conflict is between the manager and small minority shareholders. With intermediate protection of minority shareholders, the founder still hires a professional manager, but the law is not strong enough to control managerial discretion, and the founder or his children must stay on as large shareholders to monitor the manager. This gives rise to the twin problems of a conflict between the manager and the controlling shareholders, but also between the two of them and minority outside investors. When the protection of minority shareholders is the weakest, the agency problems are too severe to allow for separation of ownership and management. The founding family must stay on and run the firm; they can only afford to cede control to a professional manager if they make him a member of the family. The separation of ownership and management is thus an indication of a superior corporate governance environment. The lack of such separation, and the prevalence of family firms, are evidence of financial underdevelopment.

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## Appendix

### Proof of Lemma 2

For  $\bar{\phi} > \frac{c}{v_M} + \frac{v_M}{k}$  the professional manager's participation constraint

$(w + \bar{\phi} - \alpha v_M / k) v_M \geq c$  is slack for any admissible pair  $(\alpha, w)$ . Since  $dV^S / d\alpha > 0$  and

$dV^S / dw < 0$ ,  $\alpha^* = 1$  and  $w^* = 0$  is the solution. Thus, for  $\bar{\phi} > \frac{c}{v_M} + \frac{v_M}{k}$   $m(\alpha = 1) = v_M / k$ ,

$V^S(\alpha^*, w^*, \bar{\phi}) = (1 - \bar{\phi})v_M + \frac{v_M^2}{2k}$ , and the professional manager receives a rent

$$R = \left(\bar{\phi} - \frac{v_M}{k}\right)v_M - c \text{ (part iii).}$$

For  $\bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}$  the professional manager's participation constraint binds. Rearranging

this binding constraint to  $\alpha = (w + \bar{\phi} - \frac{c}{v_M}) \frac{k}{v_M}$  and substituting  $\alpha$  in the objective function

yields  $V^S = v_M - c - \frac{k}{2} \left( w + \bar{\phi} - \frac{c}{v_M} \right)^2$  which decreases with  $w$ . Consequently, the founder sets

$w$  at the lowest value compatible with  $w \geq 0$  and  $\alpha \geq 0$ . Hence,  $w = \max \left\{ 0, \frac{c}{v_M} - \bar{\phi} \right\}$ , and there

are two cases: For  $\bar{\phi} \leq \frac{c}{v_M}$ ,  $\alpha^* = 0$ ,  $w^* = \frac{c}{v_M} - \bar{\phi}$ ,  $m^* = 0$ , and  $V^S(\alpha^*, w^*, \bar{\phi}) = v_M - c$  (part i).

For  $\frac{c}{v_M} + \frac{v_M}{k} \geq \bar{\phi} > \frac{c}{v_M}$ ,  $\alpha^* = k \left( \frac{\bar{\phi}}{v_M} - \frac{c}{(v_M)^2} \right)$ ,  $w^* = 0$ ,  $m^* = \bar{\phi} - \frac{c}{v_M}$ , and

$$V^S(\alpha^*, w^*, \bar{\phi}) = v_M - c - \frac{k}{2} \left( \bar{\phi} - \frac{c}{v_M} \right)^2 \text{ (part ii).}$$

## Proof of Proposition 2

For  $\frac{c}{v_M} + \frac{v_M}{k} \geq \bar{\phi} > \frac{c}{v_M}$   $V^S(\alpha^*, w^*, \bar{\phi}) = v_M - c - \frac{k}{2} \left( \bar{\phi} - \frac{c}{v_M} \right)^2$  and

$dV^S / d\bar{\phi} = -k \left( \bar{\phi} - c/v_M \right) < 0$ , while for  $\bar{\phi} > \frac{c}{v_M} + \frac{v_M}{k}$   $V^S(\alpha^*, w^*, \bar{\phi}) = (1 - \bar{\phi})v_M + \frac{v_M^2}{2k}$  and

$dV^S / d\bar{\phi} = -v_M < 0$ . Moreover, the two expressions for  $V^S$  coincide when  $\bar{\phi} = \frac{c}{v_M} + \frac{v_M}{k}$ . Hence,

$V^S$  decreases with  $\bar{\phi}$  and is continuous in  $\bar{\phi}$  for  $\bar{\phi} > \frac{c}{v_M}$ . Since  $V^{NS}$  is independent of  $\bar{\phi}$

(Lemma 1), there exists a unique  $\bar{\phi}^* \in (c/v_M, 1)$  where  $V^{NS} = V^S$  provided that  $V^{NS} > V^S(\bar{\phi} = 1)$

i.e.,  $v_F > v_M^2 / 2k$ .

## Proof of Corollary 1

As  $V^{NS}$  is independent of  $\bar{\phi}$ , it suffices to show that for  $\bar{\phi} > \frac{c}{v_M}$   $dV^S / dv_M > 0$  and

$dV^S / d\bar{\phi} < 0$ . The latter is shown in the proof of Proposition 2. For  $\bar{\phi} > \frac{c}{v_M} + \frac{v_M}{k}$

$dV^S / dv_M = (1 - \bar{\phi}) + v_M / k > 0$ . For  $\frac{c}{v_M} + \frac{v_M}{k} \geq \bar{\phi} > \frac{c}{v_M}$

$dV^S / dv_M = 1 - k \left( \bar{\phi} - \frac{c}{v_M} \right) \frac{c}{(v_M)^2} \geq 1 - k \left[ \frac{c}{v_M} + \frac{v_M}{k} - \frac{c}{v_M} \right] \frac{c}{v_M^2} = 1 - \frac{c}{v_M} > 0$  as  $\bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}$ .

### Proof of Lemma 3

For  $\bar{\phi} > \frac{c}{v_M} + \frac{v_M}{k}$  the monitoring intensity is given by  $m = \frac{1+\alpha}{2k} v_M \leq \frac{v_M}{k} < \bar{\phi}$ , and the

professional manager's participation constraint  $(w + \bar{\phi} - \frac{1+\alpha}{2} m) v_M \geq c$  is slack for any

admissible pair  $(\alpha, w)$ . Hence, as in Lemma 2,  $\alpha^* = 1$ ,  $w^* = 0$ ,  $m^* = v_M / k$ , and

$$V^S(\alpha^*, w^*, \bar{\phi}) = (1 - \bar{\phi}) v_M + \frac{v_M^2}{2k} \text{ (part v).}$$

Consider now the range  $\bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}$ . Suppose for the time being that the monitoring

intensity is given by the FOC  $m = \frac{1+\alpha}{2k} v_M$ . That is, abstract from the discontinuity in monitoring

and from the possibility that  $\frac{1+\alpha}{2k} v_M > \bar{\phi}$ . Then the participation constraint must be binding.

Rearranging the constraint to  $w = \frac{c}{v_M} - \bar{\phi} + \frac{m(1+\alpha)}{2}$  and substituting  $w$  in the founder's

objective function yields  $V^S = v_M - c - k \frac{m^2}{2}$  which decreases with  $m$ . Thus, the founder

chooses the lowest monitoring intensity compatible with  $m \geq 0$  and  $w \geq 0$ . For  $\bar{\phi} \leq \frac{c}{v_M}$ ,  $m = 0$ ,

that is,  $\alpha < \underline{\alpha}$ , and  $w = \frac{c}{v_M} - \bar{\phi}$ . Otherwise,  $w = 0$  is optimal. The corresponding optimal

ownership concentration  $\alpha = \frac{2}{v_M} \sqrt{k(\bar{\phi} v_M - c)} - 1$  and monitoring intensity  $m = \sqrt{\frac{\bar{\phi} v_M - c}{k}}$  obtain

from using the FOC  $m = \frac{1+\alpha}{2k} v_M$  in the professional manager's participation constraint.

These are the solutions to the founder's maximization problem only if they satisfy the

conditions that the monitoring intensity is both given by the FOC, i.e.,  $m^* \leq \bar{\phi}$ , and feasible, i.e.,

$m^* \notin \left(0, \frac{1+\alpha}{2k} v_M\right)$ . Zero monitoring trivially satisfies both conditions and  $\alpha^* < \underline{\alpha}$  and

$w^* = \frac{c}{v_M} - \bar{\phi}$  is indeed the solution for  $\bar{\phi} \leq \frac{c}{v_M}$ . The founder's welfare is  $V^S(\alpha^*, w^*, \bar{\phi}) = v_M - c$

(part i).

For  $\frac{c}{v_M} < \bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}$ , the first condition ( $m^* \leq \bar{\phi}$ ) is equivalent to  $\sqrt{\frac{\bar{\phi} v_M - c}{k}} \leq \bar{\phi}$  which

is always satisfied because, by Assumption 4,  $\frac{v_M}{2k} \leq \frac{c}{v_M}$ . Given  $m = \sqrt{\frac{\bar{\phi} v_M - c}{k}}$ , the second

condition ( $m^* \geq \frac{1+\alpha}{2k} v_M$ ) is equivalent to  $\bar{\phi} \geq \frac{c}{v_M} + \frac{(1+\alpha)^2}{4k} v_M$ . Therefore,  $w^* = 0$ ,

$\alpha^* = \frac{2}{v_M} \sqrt{k(\bar{\phi} v_M - c)} - 1$ , and  $m^* = \sqrt{\frac{\bar{\phi} v_M - c}{k}}$  is the solution only for

$\frac{c}{v_M} + \frac{(1+\alpha)^2}{4k} v_M < \bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}$ . The founder's resulting welfare is

$V^S(\alpha^*, w^*, \bar{\phi}) = v_M - c - \frac{\bar{\phi} v_M - c}{2}$  (part iv).

For  $\frac{c}{v_M} < \bar{\phi} \leq \frac{c}{v_M} + \frac{(1+\alpha)^2}{4k} v_M$ , the only two possible optimal levels of monitoring are

$m = 0$  and  $m = \frac{1+\alpha}{2k} v_M$ . (Note that  $1+\alpha \leq \frac{2kc}{v_M^2}$  (Assumption 4) implies that

$\frac{1+\alpha}{2k} v_M \leq \frac{2kc}{2kv_M^2} v_M = \frac{c}{v_M} < \bar{\phi}$ .) If  $m = 0$  (that is,  $\alpha < \underline{\alpha}$ ),  $w = 0$  and  $V^S = (1-\bar{\phi})v_M$ . If

$m = \frac{1+\alpha}{2k} v_M$  (i.e.,  $\alpha = \underline{\alpha}$ ), the participation constraint implies  $w = \frac{c}{v_M} - \bar{\phi} + \frac{(1+\alpha)^2}{4k} v_M$ , and

$V^S = v_M - c - \frac{(1+\underline{\alpha})^2}{8k} v_M^2$ . Simple calculations show that  $v_M - c - \frac{(1+\underline{\alpha})^2}{8k} v_M^2 > (1-\bar{\phi})v_M$  holds

for  $\bar{\phi} > \frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{8k} v_M$ . Thus, for  $\frac{c}{v_M} < \bar{\phi} \leq \frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{8k} v_M$ ,  $\alpha^* < \underline{\alpha}$ ,  $w^* = 0$ ,  $m^* = 0$ , and

$V^S(\alpha^*, w^*, \bar{\phi}) = (1-\bar{\phi})v_M$  (part ii), while for  $\frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{8k} v_M < \bar{\phi} \leq \frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{4k} v_M$ ,  $\alpha^* = \underline{\alpha}$ ,

$w^* = \frac{c}{v_M} - \bar{\phi} + \frac{(1+\underline{\alpha})^2}{4k} v_M$ ,  $m^* = \frac{1+\underline{\alpha}}{2k} v_M$ , and  $V^S(\alpha^*, w^*, \bar{\phi}) = v_M - c - \frac{(1+\underline{\alpha})^2}{8k} v_M^2$  (part iii).

#### Proof of Proposition 4

Over the five regions of Lemma 3 share value  $S = (1-\bar{\phi}-w^*)v_M$  (weakly) decreases with  $\bar{\phi}$  as the subsequent derivations of the explicit expression of  $S$  in each region show.

For  $\bar{\phi} \leq \frac{c}{v_M}$   $S = (1-\bar{\phi}-w^*)v_M = v_M - c$  holds.

For  $\frac{c}{v_M} < \bar{\phi} \leq \frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{8k} v_M$   $S = (1-\bar{\phi})v_M$  which decreases with  $\bar{\phi}$  and is equal

$S = v_M - c$  at the lower bound of the interval, i.e., for  $\bar{\phi} = \frac{c}{v_M}$ , and equal to

$S = v_M - c - \frac{(1+\underline{\alpha})^2}{8k} v_M^2$  at the upper bound, i.e., for  $\bar{\phi} = \frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{8k} v_M$ .

For  $\frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{8k} v_M < \bar{\phi} \leq \frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{4k} v_M$   $S = v_M - c - \frac{(1+\underline{\alpha})^2}{4k} v_M^2$  holds.

For  $\frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{4k} v_M < \bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}$   $S = (1-\bar{\phi})v_M$  which decreases with  $\bar{\phi}$  and is equal

to  $S = v_M - c - \frac{(1+\underline{\alpha})^2}{4k} v_M^2$  at the lower bound of the interval, i.e., for  $\bar{\phi} = \frac{c}{v_M} + \frac{(1+\underline{\alpha})^2}{4k} v_M$  and

equal to  $S = v_M - c - \frac{v_M^2}{k}$  at the upper bound, i.e., for  $\bar{\phi} = \frac{c}{v_M} + \frac{v_M}{k}$ .

For  $\bar{\phi} > \frac{c}{v_M} + \frac{v_M}{k}$   $S = (1 - \bar{\phi})v_M$  which decreases with  $\bar{\phi}$  and is equal to  $S = v_M - c - \frac{v_M^2}{k}$

at the lower bound of the interval, i.e., for  $\bar{\phi} = \frac{c}{v_M} + \frac{v_M}{k}$ .

### Proof of Corollary 2

The block premium is meaningful only in the range where  $1 > \alpha^* > 0$ , i.e. in regions iii)

and iv) of Lemma 3. For  $\frac{c}{v_M} + \frac{(1+\alpha)^2}{8k}v_M < \bar{\phi} \leq \frac{c}{v_M} + \frac{(1+\alpha)^2}{4k}v_M$   $\alpha^* = \underline{\alpha}$  and

$V^S(\alpha^*, w^*, \bar{\phi}) - S = \frac{(1+\alpha)^2}{8k}v_M^2$ . For  $\frac{c}{v_M} + \frac{(1+\alpha)^2}{4k}v_M < \bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}$   $\alpha^* = \frac{2}{v_M}\sqrt{k(\bar{\phi}v_M - c)} - 1$

and  $V^S(\alpha^*, w^*, \bar{\phi}) - S = \frac{\bar{\phi}v_M - c}{2}$  which increases with  $\bar{\phi}$  and is equal to

$V^S(\alpha^*, w^*, \bar{\phi}) - S = \frac{(1+\alpha)^2}{8k}v_M^2$  at the lower bound of the interval, i.e., for  $\bar{\phi} = \frac{c}{v_M} + \frac{(1+\alpha)^2}{4k}v_M$ .

### Proof of Proposition 5

Denote by  $V^{S_{NC}}$  the founder's welfare in the absence of collusion (Lemma 2) and by

$V^{S_C}$  his welfare with collusion (Lemma 3). For  $\frac{c}{v_M} < \bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}$   $V^{S_{NC}} \geq V^{S_C}$  as the subsequent

comparisons show, while  $V^{S_{NC}}$  and  $V^{S_C}$  coincide for  $\bar{\phi} \leq \frac{c}{v_M}$  and for  $\bar{\phi} > \frac{c}{v_M} + \frac{v_M}{k}$ , i.e., in

regions i) and v) of Lemma 3.

For  $\frac{c}{v_M} < \bar{\phi} \leq \frac{c}{v_M} + \frac{(1+\alpha)^2 v_M}{8k}$ ,  $V^{SNC} \geq V^{SC}$  is equivalent to  $c + \frac{k}{2} \left( \bar{\phi} - \frac{c}{v_M} \right)^2 \leq \bar{\phi} v_M$ .

Rearranging this inequality we obtain  $\frac{k}{2v_M} \left( \bar{\phi} - \frac{c}{v_M} \right)^2 \leq \left( \bar{\phi} - \frac{c}{v_M} \right)$  which can be rewritten as

$\bar{\phi} \leq \frac{c}{v_M} + 2 \frac{v_M}{k}$ . This condition is always satisfied for  $\bar{\phi} \leq \frac{c}{v_M} + \frac{(1+\alpha)^2 v_M}{8k}$ .

For  $\frac{c}{v_M} + \frac{(1+\alpha)^2 v_M}{8k} < \bar{\phi} \leq \frac{c}{v_M} + \frac{(1+\alpha)^2 v_M}{4k}$ ,  $V^{SNC} \geq V^{SC}$  is equivalent to

$\frac{k}{2} \left( \bar{\phi} - \frac{c}{v_M} \right)^2 \leq \frac{(1+\alpha)^2}{8k} v_M^2$ . Since the LHS increases with  $\bar{\phi}$  it is sufficient to check the inequality

is satisfied at the upper bound of the interval. Substituting  $\bar{\phi} = \frac{c}{v_M} + \frac{(1+\alpha)^2 v_M}{4k}$  into the

inequality and rearranging yields  $\frac{(1+\alpha)}{2} \leq 1$  which always holds.

For  $\frac{c}{v_M} + \frac{(1+\alpha)^2 v_M}{4k} < \bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}$ ,  $V^{SNC} \geq V^{SC}$  is equivalent to

$\frac{k}{2} \left( \bar{\phi} - \frac{c}{v_M} \right)^2 \leq \frac{\bar{\phi} v_M - c}{2}$ . Rearranging this inequality we obtain  $k \left( \bar{\phi} - \frac{c}{v_M} \right)^2 \leq v_M \left( \bar{\phi} - \frac{c}{v_M} \right)$

which can be rewritten as  $\bar{\phi} - \frac{c}{v_M} \leq \frac{v_M}{k}$ . This condition is always satisfied for  $\bar{\phi} \leq \frac{c}{v_M} + \frac{v_M}{k}$ .