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# **From Cronies to Professionals: The Evolution of Family Firms**

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## **Abstract**

We develop a dynamic model where each generation in a family firm can continue operating its inherited production technology or it could hire a professional to do the same. Though the professional is more qualified, his interests are not aligned with the interests of the family. In the context of an overlapping generations framework, we analyze how this tradeoff affects the evolution of the family firm. We find that family firms initially grow in size by accumulating capital and later professionalize their management after reaching a critical size.

Today we take the notion of professional management – the idea that there can be an individual with special skills whose responsibility is to manage – as granted. Corporations, big and small, annually employ millions of professional managers. Business schools, which codify management education, graduate more than 70,000 MBAs and prompt about a quarter of a million to take the GMAT (Graduate Management Admission Test) every year.

Yet, only a hundred years ago, professional management was an alien concept. As no systematic studies of work and organizations existed before Frederick W. Taylor’s 1895 paper, “A Piece Rate System”, no one then could even conceive that management would one day be a profession. History had shown that an individual became a manager largely because of ownership, rank or power. Priests were managers in Mesopotamia around 3000 B.C., viziers and judges were managers in the Middle East around 1750 B.C., bureaucrats were managers in China around 1000 B.C., brahmins were managers in India around 300 B.C.<sup>1</sup> In modern times, after the Industrial Revolution, entrepreneurs became the managers. When that was not possible, they promoted workers from the lower ranks, or used relatives in managerial positions. According to Drucker (1977), “In the society of 1900 the family still served in every single country as the agent of, and organ for, most social tasks . . . Management, as a specific discipline, as a specific kind of work, as a specific function in society and economy, was developed almost entirely, within the past fifty years.”<sup>2</sup>

The development of professional management, however, has been vastly different in the various regions of the world. Developed countries have more professional managers than developing countries; bigger firms hire more professional managers than smaller firms. Interestingly, even in the developed countries, management by family is still an important feature: family businesses account for 40 percent of U.S. GDP and 60 percent of its workforce; 66 percent of German GDP and 75 percent of its workforce; and around 50 percent of Britain’s workforce.<sup>3</sup> Burkart, Panunzi and Shleifer (2003), citing a number of recent studies on this subject, begin their paper unequivocally: “Most firms in the world are controlled by their founders, or by the founders’ families and heirs.”

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<sup>1</sup>Chanakya Kautilya (332-298 B.C.), a feared minister to King Chandragupta Maurya, formalized Indian public administration in his treatise *Arthashastra*.

<sup>2</sup>See also Wren (1979).

<sup>3</sup>*The Economist*, October 5, 1996.

The purpose of this paper is to construct a dynamic model to analyze how the trade-off between hiring an insider with aligned interests (a family member or crony) and hiring a more productive outsider with non-aligned interests (a professional) affects the evolution of firm management. This paper is complementary to our earlier paper, Bhattacharya and Ravikumar (2001), where we assume that the insider manages the firm, but study the evolution of capital from inside ownership to outside ownership. This paper is also complementary to Burkart, Panunzi and Shleifer (2003), who explore cross-sectional implications of the same trade-off in a static model.

The tension between insiders and outsiders in a modern corporation was first recognized by Berle and Means (1932). The agency literature, which formalized some of their insights, began with the papers of Berhold (1971), Ross (1973), Heckerman (1975), Jensen and Meckling (1976) and Mirrlees (1976). In this literature, a person (the principal) hires another person (the agent) to perform some service. The principal knows that the agent has a different objective and he also knows that he cannot perfectly observe some facet of the agent that is relevant to the service (like ability, or effort). The problem is to design an optimal contract given these constraints.

The principal-agent literature assumes that another agent is essential to perform the service. Our paper, on the other hand, drops this assumption – a principal can be his own agent. That is, the twist in our model is the question, should the principal (or equivalently, his crony) work himself, or should he hire a smart agent with an appropriate contract. A distinguishing feature of our paper is that it embeds this twist of the principal-agent framework in an overlapping generation model. This allows us to characterize the evolution of firm management over time from cronies to professionals.

Our model is an overlapping generations version of the family-business model of Bhattacharya and Ravikumar (2001). A younger generation, which lives for two periods, inherits a small business with a constant returns to scale technology. Output is produced using capital and labor – the family’s or a professional manager’s. When the generation has become old, it divides the output between own consumption, bequest to the next generation and, if an agent was hired, wage payments. Each generation is concerned not only with the utility it derives from consumption when it is old, but also with the bequest it leaves to the next generation.

The critical decision faced by the younger generation is whether to operate the family business or to hire a professional. If the generation decides to work itself, there

is no uncertainty with respect to the effort put in or the output that is observed. If a professional is hired as a manager, there is uncertainty with respect to the professional's effort level as well as uncertainty with respect to the generated output. The professional is more productive than the family. The key idea here is that though the professional is more productive, his interests are not aligned with those of the family.

We analyze the case where there is no external financing for the capital input to production. Our key result is the following. Despite the fact that the productivity of the professional manager dominates the productivity of the family, the family chooses to professionalize the management only after the firm reaches a critical size. For the outsider to work hard, his participation constraint (he does not prefer another job) and his incentive compatibility constraint (he has the right incentives to work hard) need to be satisfied. The family will hire a manager and bear these costs only if the benefit from doing so – emanating from the manager's superior ability – exceeds the costs. While the participation constraint acts like a fixed cost, our result holds even when the participation constraint is not binding.

The paper is organized as follows. In the next section, we lay out the optimization problem faced by the younger generation. In Section 2, we analyze the case where external financing is not available. We obtain the sufficient conditions for professionalization, and determine the threshold level of capital at which professionalization takes place. The main results of the paper are presented in this section. Section 3 concludes with a discussion of the limitations of the paper and suggestions for future research.

## 1 The Model

Consider an overlapping generation of families that are altruistic. Time is discrete starting from 0 and is indexed by  $t$ . We will refer to the family in generation  $t$  as family  $t$ . Family  $t$  cares about the next generation; specifically, it leaves positive bequests for family  $t + 1$ . Each family's preferences are described by

$$u(c) + u(b) - e,$$

where  $c$  is the family's consumption,  $b$  is the bequest it leaves for the next generation, and  $e$  is the labor effort put forth by the family. We will assume that  $u(\cdot)$  is increasing

and strictly concave with  $u(0) = 0$  and  $u'(z) \rightarrow \infty$  as  $z \rightarrow 0$ .

The family's effort can take on one of two values: 0 or 1. Each family may produce output,  $y$ , by exerting managerial effort 1 using a technology,  $y = ag(k)$ , where  $k$  is the capital stock at the beginning of the period,  $a > 0$ , and  $g(\cdot)$  is increasing and concave with  $g(0) = 0$ . If the family exerts effort 0 then the family's output is 0.

Instead of exerting effort, the family may hire a professional manager to produce output with a technology characterized by a stochastic marginal product of capital. The manager's effort is either 0 or 1 and is private information. Given the manager's effort, the output may be high or low,  $y_H$  or  $y_L$  respectively. We assume

$$\begin{aligned} y_H &= (a + \delta)g(k), \\ y_L &= ag(k), \end{aligned}$$

where  $\delta > 0$ . Note that the manager's productivity is not less than that of the family even when he exerts 0 effort.

Even though his effort is not observable by the family, it knows the link between the manager's effort and the stochastic output. If the manager's effort is 0 then the output is  $y_L$  with probability  $\theta$  and  $y_H$  with probability  $1 - \theta$ ; if his effort is 1 then the output is  $y_H$  with probability  $\theta$  and  $y_L$  with probability  $1 - \theta$ , where  $\theta > \frac{1}{2}$ . Thus, high output is more likely when the manager's effort is high than when his effort is low. The output is observable by the family as well as by the manager. The manager's preferences are the same as the family's and his outside option is completely described by a utility level  $\underline{v}^m$ .

The timing of events in each period is as follows. The family begins with  $k$  units of capital and it must decide whether to manage on its own or to hire a professional. If it hires a professional manager, then the family promises a compensation package. The manager chooses his level of effort and then the output is realized. After seeing the output, the family delivers the promised compensation and divides the rest optimally between consumption and bequest. If the family manages the firm, then the only decision for the family is the consumption-bequest decision. The bequest is precisely the stock of capital that the next generation begins with. The stock of capital for generation 0 is assumed to be given.

## 1.1 Self versus professional management

Since the family's marginal utility is infinite when its consumption is zero, its optimal effort is 1 if it chooses to manage on its own. Given  $k$  units of capital, the family's problem is then given by

$$\begin{aligned} \max_{c,b} & u(c) + u(b) - 1 \\ \text{subject to} & c + b = ag(k). \end{aligned}$$

Clearly, the optimal choice is  $c = b = \frac{1}{2}ag(k)$ . Thus, the family's utility under self management is

$$\underline{u}^f(k) = 2u\left(\frac{1}{2}ag(k)\right) - 1. \quad (1)$$

Since the manager's effort is not observable, to ensure that the manager puts forth the high effort the family has to design its compensation package such that the manager has the right incentives. Let  $w_H$  be the payment to the manager when a high output is observed and  $w_L$  be the payment when a low output is observed. Since the manager's preferences are the same as the family's, his indirect utility under high effort will be similar to (1). Define the indirect utilities, when the manager puts in high effort as  $v(w_L) \equiv 2u\left(\frac{1}{2}w_L\right) - 1$  and  $v(w_H) \equiv 2u\left(\frac{1}{2}w_H\right) - 1$ . With this notation the indirect utilities when the manager puts in the low effort are given by  $v(w_L) + 1$  and  $v(w_H) + 1$ , respectively. The *incentive compatibility* constraint that induces him to put forth a high effort is given by:

$$\theta v(w_H) + (1 - \theta)v(w_L) \geq (1 - \theta) \{v(w_H) + 1\} + \theta \{v(w_L) + 1\}. \quad (2)$$

In addition to the incentive compatibility constraint, the family has to ensure that its compensation package dominates what the manager can get elsewhere, i.e., the manager's expected utility from the compensation package cannot be less than  $\underline{u}^m$ . This participation constraint is given by

$$\theta v(w_H) + (1 - \theta)v(w_L) \geq \underline{u}^m. \quad (3)$$

We are implicitly assuming here that after having hired the manager, the family would always want him to put in the high effort. We will provide sufficient conditions later for this to be the case.



The family's problem, conditional on inducing the manager to put in the high effort, is to

$$\begin{aligned}
U^f(k) &\equiv \max_{c_H, b_H, c_L, b_L, w_H, w_L} \theta \{u(c_H) + u(b_H)\} + (1 - \theta) \{u(c_L) + u(b_L)\} \\
&\text{subject to (2), (3),} \\
&c_H + b_H = (a + \delta)g(k) - w_H, \text{ and} \\
&c_L + b_L = ag(k) - w_L.
\end{aligned}$$

Recall that the family's effort is 0 when it hires a manager. It is easy to see that the decision rule for the family is as follows. Given  $k$  units of capital, if  $U^f(k) \geq \underline{u}^f(k)$ , then the family would hire the manager. Otherwise, self-management is better.

There is another possible scenario that the family may find itself in: since the manager's productivity is higher than that of the family even when he is not working hard, the family may want to hire him but *not* offer the incentives to work hard. In this case, the incentive compatibility constraint (2) is irrelevant, so the family would set  $w_H = w_L = w$ . Clearly, the family would offer the lowest possible  $w$  such that the manager is induced to participate in the contract, i.e., (3) implies  $v(w) + 1 = \underline{u}^m$ . The family's utility then is  $2(1 - \theta)u\left(\frac{1}{2}(y_H - w)\right) + 2\theta u\left(\frac{1}{2}(y_L - w)\right)$ . For this scenario not to occur, we have to ensure that

$$U^f(k) \geq 2(1 - \theta)u\left(\frac{1}{2}(y_H - w)\right) + 2\theta u\left(\frac{1}{2}(y_L - w)\right). \quad (4)$$

That is, given  $k$  units of capital, the family is better off making the manager work hard than not making him work hard.

## 1.2 Moral hazard and the optimal contract

To determine the optimal compensation package that the family would offer to the manager, it is useful to know the set of feasible  $(w_H, w_L)$  that satisfy (2) and (3). To this end, rewrite the two equations as

$$v(w_H) \geq v(w_L) + \frac{1}{2\theta - 1}, \quad (5)$$

$$v(w_H) \geq \frac{\underline{u}^m}{\theta} - \frac{1 - \theta}{\theta} v(w_L). \quad (6)$$

It is easier to visualize these constraints in the utility space instead of the usual  $(w_L, w_H)$  space. Specifically, consider Figure 1 where  $v(w_H)$  is plotted as a function of  $v(w_L)$ . The origin in Figure 1 is  $(0, 0)$  since the manager can achieve a utility level of 0 by not participating i.e.,  $c = b = e = 0$ . Thus, the range of relevant outside options are  $\underline{v}^m \geq 0$ ; the vertical intercept for (5) is  $\frac{1}{2\theta-1}$  and that for (6) is  $\frac{\underline{v}^m}{\theta}$ . In Figure 1, the manager's utility is increasing as we move northeast and the family's utility is declining.

As illustrated in Figure 1 there are two possible configurations for the constraints. First, consider panel a where  $\frac{\underline{v}^m}{\theta} \leq \frac{1}{2\theta-1}$  i.e., the participation constraint (6) does not bind. In this case, the optimal contract is given by

$$2u\left(\frac{1}{2}w_H\right) = \frac{1}{2\theta-1} \text{ and } w_L = 0. \quad (7)$$

Second,  $\frac{\underline{v}^m}{\theta} > \frac{1}{2\theta-1}$  in which case the optimal contract has to lie in the line segment  $AB$  (see Figure 1, panel b). To determine whether the optimal contract is given by  $A$  or  $B$  or some point in between, we need to know the slope of the family's indifference curves in this space. To this end, it is useful to examine the family's decision in the  $(w_L, w_H)$  space.

Consider Figure 2 where the incentive compatibility and the participation constraints are illustrated in the  $(w_L, w_H)$  space. The slope of the participation constraint (6) is  $-\left(\frac{1-\theta}{\theta}\right)\frac{v'(w_L)}{v'(w_H)}$ . Since the marginal utility is  $\infty$  at 0, the slope of the participation constraint is  $-\infty$  at  $A$  and increasing as we increase  $w_L$ . The slope of the incentive compatibility constraint (5) is  $\frac{v'(w_L)}{v'(w_H)}$ ; thus, the slope is positive and is equal to  $+\infty$  when  $w_L$  is 0.

The family's utility is given by

$$U^f = 2\theta u\left(\frac{1}{2}(y_H - w_H)\right) + 2(1 - \theta)u\left(\frac{1}{2}(y_L - w_L)\right).$$

Thus, the slope of the family's indifference curve is  $-\left(\frac{1-\theta}{\theta}\right)\frac{u'(\frac{1}{2}(y_L - w_L))}{u'(\frac{1}{2}(y_H - w_H))}$ . Clearly, the slope is finite at  $A$ ; so the optimal contract cannot be the compensation  $A$ . If the point of tangency between the indifference curve and the participation constraint is not in the segment  $AB$ , then the optimal contract is the compensation  $B$ ; if not, the optimal contract is the point of tangency. The point of tangency is a solution to the participation constraint (6) and

$$\frac{v'(w_L)}{v'(w_H)} = \frac{u'(\frac{1}{2}(y_L - w_L))}{u'(\frac{1}{2}(y_H - w_H))},$$

or

$$\frac{u'(\frac{1}{2}w_L)}{u'(\frac{1}{2}w_H)} = \frac{u'(\frac{1}{2}(y_L - w_L))}{u'(\frac{1}{2}(y_H - w_H))}. \quad (8)$$

The question now is whether this solution lies in the segment  $AB$ .<sup>4</sup>

The intersection point  $B$  is obviously the solution to (5) and (6), i.e.,

$$v(w_L) = \underline{v}^m - \frac{\theta}{2\theta - 1}; \quad v(w_H) = \underline{v}^m + \frac{1 - \theta}{2\theta - 1}. \quad (9)$$

Without further restrictions on the utility function and the production technology, it is difficult to ascertain whether the optimal contract is in the interior of the segment  $AB$  or at  $B$ . The optimal contract is summarized in the lemma below.

**Lemma 1** *In order to induce the manager to work hard, the family offers him the following  $(w_L, w_H)$  contract: (i) when the participation constraint is not binding, the contract is given by (7), (ii) when the participation constraint is binding, the contract is given by either (9) or the solution to (6) and (8).*

Lemma 1 helps us determine whether it is worthwhile for the family to hire the manager and induce him to put forth a high effort. In the next section, we use Lemma 1 to examine the evolution of the firm from self-management to professional management.

## 2 Evolution of Management

In this section we will restrict attention to specific functional forms. Let  $u(z) = 1 - e^{-z}$ , so  $u(\cdot)$  is increasing and strictly concave with  $u(0) = 0$ . Let  $g(k) = k$ . Since the marginal utility is not  $\infty$  as  $z \rightarrow 0$ , there is no guarantee that the family would ever engage in production. That is, we need to make sure that the family's utility with positive output exceeds its utility with zero output. Under self-management, when the family exerts effort 1 it is easy to see that

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<sup>4</sup>For the CRRA class of preferences, equation (8) simplifies to  $\frac{w_L}{w_H} = \frac{y_L - w_L}{y_H - w_H}$ , so  $\frac{w_L}{w_H} = \frac{y_L}{y_H} = \frac{\alpha}{\alpha + \delta}$ .

$$\underline{u}^f(k) = 2(1 - e^{-\frac{1}{2}y_L}) - 1. \quad (10)$$

When its effort is 0, its utility is 0. To preclude the possibility that the family will exert 0 effort, we want  $2(1 - e^{-\frac{1}{2}y_L}) - 1 \geq 0$ , or  $y_L \geq 2\log(2)$ . For the moment let us assume that the initial capital,  $k_0$ , exceeds  $\frac{2\log(2)}{a}$ , so the linear technology implies that the inequality is satisfied in period 0. We will also assume that  $a > 2$ , so the bequest,  $\frac{1}{2}ak$ , exceeds  $k$  and, hence, the capital stock of generation  $t + 1$  is greater than the capital stock of generation  $t$ . Thus, starting from  $k_0$ , the inequality is always satisfied under self-management.

## 2.1 Case 1: The participation constraint does not bind

Recall that the participation constraint (6) does not bind when  $\underline{v}^m \in [0, \frac{\theta}{2\theta-1}]$ . In this case, the optimal contract when hiring a manager and inducing him to put forth a high effort, according to Lemma 1, is

$$2(1 - e^{-\frac{1}{2}w_H}) = \frac{1}{2\theta - 1} \text{ and } w_L = 0$$

or

$$e^{-\frac{1}{2}w_H} = \frac{4\theta - 3}{4\theta - 2} \text{ and } w_L = 0. \quad (11)$$

Note that the contract makes sense only when  $\theta > \frac{3}{4}$ . When would the family want to enter into such a contract with the manager? The answer to this question, given  $k$  units of capital, depends on the family's utility under the contract,  $U^f(k)$ , versus its utility under self-management,  $\underline{u}^f(k)$ . Now,

$$U^f(k) = 2\theta(1 - \frac{4\theta - 2}{4\theta - 3}e^{-\frac{1}{2}y_H}) + 2(1 - \theta)(1 - e^{-\frac{1}{2}y_L}). \quad (12)$$

As noted earlier, the family would hire the manager when  $U^f(k) \geq \underline{u}^f(k)$ .

Before we examine the above inequality, we want to ensure that the family is better off under this contract than hiring a manager and not inducing him to work hard. We do so in the following lemma.

**Lemma 2** *Assume that the participation constraint does not bind. Define*

$$\widehat{k} \equiv \frac{2}{\delta} \log \left\{ \frac{\theta \frac{4\theta-2}{4\theta-3} - (1-\theta) \frac{2}{2-\underline{v}^m}}{\theta \frac{2}{2-\underline{v}^m} - (1-\theta)} \right\}.$$

If  $k \geq \widehat{k}$  and if the family hires a manager, then it will induce him to work hard.

**Proof.** As noted in the previous section, it suffices to check whether the following condition holds:

$$\theta \left(1 - \frac{4\theta-2}{4\theta-3} e^{-\frac{1}{2}y_H}\right) + (1-\theta)(1 - e^{-\frac{1}{2}y_L}) \geq (1-\theta)(1 - e^{-\frac{1}{2}(y_H-w)}) + \theta(1 - e^{-\frac{1}{2}(y_L-w)}),$$

where  $2(1 - e^{-\frac{1}{2}w}) = \underline{v}^m$  (see the derivation of (4)). Substitute for  $w$  and simplify the above inequality to

$$\theta \frac{2}{2-\underline{v}^m} - (1-\theta) \geq \left\{ \theta \frac{4\theta-2}{4\theta-3} - (1-\theta) \frac{2}{2-\underline{v}^m} \right\} e^{-\frac{1}{2}(y_H-y_L)}$$

or,

$$e^{\frac{1}{2}\delta k} \geq \left\{ \frac{\theta \frac{4\theta-2}{4\theta-3} - (1-\theta) \frac{2}{2-\underline{v}^m}}{\theta \frac{2}{2-\underline{v}^m} - (1-\theta)} \right\}.$$

(For  $\theta > \frac{3}{4}$ , we can show that  $\underline{v}^m < 2$  and that the numerator and the denominator on the right hand side are both positive, so  $\widehat{k}$  is well defined.) The result follows immediately. ■

Note that  $\widehat{k}$  is very large for  $\theta$  close to  $\frac{3}{4}$  and that  $\widehat{k}$  decreases with  $\underline{v}^m$ . Now we are in a position to determine conditions under which the family would hire the manager.

**Proposition 3** *Assume that the participation constraint does not bind and that  $\theta > \frac{3}{4}$  and  $k_0 > \max \left\{ \frac{2 \log(2)}{a}, \widehat{k} \right\}$ . There exists a unique  $k^*$  such that the family would hire the manager and offer him the contract in Lemma 1 when it has  $k \geq k^*$ , and the family would manage the firm itself when it has  $k < k^*$ .*

**Proof.** Using (10) and (12), the inequality  $U^f(k) \geq \underline{u}^f(k)$  may be simplified as

$$\frac{1}{2\theta} + e^{-\frac{1}{2}y_L} \geq \frac{4\theta-2}{4\theta-3} e^{-\frac{1}{2}y_H}.$$

Let  $\gamma \equiv \frac{a+\delta}{a}$ , so  $y_H = \gamma y_L$ . Note that as  $y_L \rightarrow 0$ , the left hand side  $\rightarrow 1 + \frac{1}{2\theta}$  and the right hand side  $\rightarrow \frac{4\theta-2}{4\theta-3}$ . It is easy to show that the right hand side exceeds the

left hand side for  $\theta > \frac{3}{4}$ . For  $y_L \rightarrow \infty$ , the left hand side  $\rightarrow \frac{1}{2\theta}$ , while the right hand side  $\rightarrow 0$ . Thus,  $U^f(k) < \underline{u}^f(k)$  for low  $y_L$  while  $U^f(k) > \underline{u}^f(k)$  for high  $y_L$ . Hence, by continuity,  $\exists k^*$  such that  $U^f(k^*) = \underline{u}^f(k^*)$ . Uniqueness follows from the fact that  $U^f(k) - \underline{u}^f(k)$  is monotonic. The threshold,  $k^*$ , is the solution to

$$\frac{1}{2\theta} + e^{-\frac{1}{2}ak} = \frac{4\theta - 2}{4\theta - 3} e^{-\frac{1}{2}(a+\delta)k}. \quad (13)$$

We need to verify that  $k^*$  exceeds  $\max\left\{\frac{2\log(2)}{a}, \widehat{k}\right\}$ . ■

It is easy to see from (13) that as  $\delta$  increases the threshold where the family would hire the professional manager decreases. The family starts with capital  $k_0$ , produces output by managing the firm itself and accumulates capital (assuming  $a > 2$ ) till it reaches  $k^*$ , and then hires a professional manager and offers him the incentives to put forth a high effort.

## 2.2 Case 2: The participation constraint binds

In this case,  $\underline{v}^m > \frac{\theta}{2\theta-1}$  and the optimal contract lies in  $AB$  (see Figure 2). The family's utility when hiring the professional manager and inducing him to work hard is now given by

$$U^f(k) = 2\theta(1 - e^{-\frac{1}{2}(y_H - w_H)}) + 2(1 - \theta)(1 - e^{-\frac{1}{2}(y_L - w_L)}). \quad (14)$$

The family's utility under self-management is the same as in Case 1 (see (10)). To determine the stock of capital at which  $U^f(k) \geq \underline{u}^f(k)$ , we need to know the optimal  $(w_H, w_L)$ . It is easy to see from Figure 2 that the shape of the family's indifference curves pin down where the optimal contract is in the segment  $AB$ . Equation (8) in the previous section describes the points where the slope of the indifference curve is equal to the slope of the participation constraint. For the exponential utility this reduces to  $w_H - w_L = \frac{1}{2}(y_H - y_L)$  or

$$w_H - w_L = \frac{1}{2}\delta k. \quad (15)$$

In the  $(w_L, w_H)$  space, this tangency condition is nothing but the 45-degree line with intercept  $\frac{1}{2}\delta k$ . The intersection between this line and the participation constraint tells us where the optimal contract is in the segment  $AB$ . The participation constraint for the exponential utility is

$$\theta e^{-\frac{1}{2}w_H} + (1 - \theta)e^{-\frac{1}{2}w_L} \leq \frac{1 - \underline{v}^m}{2}. \quad (16)$$

Denote the solution to (15) and (16) as the ordered pair  $(\underline{w}_L, \underline{w}_H) \equiv \underline{w}$ .

Now consider the intersection of the participation constraint and the incentive compatibility constraint in Figure 2. The incentive compatibility constraint for the exponential utility is given by

$$e^{-\frac{1}{2}w_L} - e^{-\frac{1}{2}w_H} \geq \frac{1}{4\theta - 2}. \quad (17)$$

Let  $B$ , the solution to (16) and (17), be described by  $(\bar{w}_L, \bar{w}_H) \equiv \bar{w}$ . Let  $\bar{k}$  be given by  $\bar{w}_H - \bar{w}_L = \frac{1}{2}\delta\bar{k}$ . Similarly, the point  $A$  is given by  $w_L = 0$  and  $\theta e^{-\frac{1}{2}w_H} + 1 - \theta = \frac{1 - \underline{v}^m}{2}$ . Let the associated capital according to (15) be  $\bar{\bar{k}}$ . Then, we have the following result.

**Lemma 4** *Assume that the participation constraint binds. If  $k \in (0, \bar{k}]$ , then the optimal contract is  $\bar{w}$ . If  $k \in (\bar{k}, \bar{\bar{k}})$ , then the optimal contract is  $\underline{w}$ . If  $k \geq \bar{\bar{k}}$ , then the optimal contract is given by  $w_L = 0$  and  $\theta e^{-\frac{1}{2}w_H} + 1 - \theta = \frac{1 - \underline{v}^m}{2}$ .*

**Proof.** See Figure 2. ■

According to the above lemma, unlike Case 1, the contract changes with the level of capital when the participation constraint binds. For low levels of capital, the gap between wage in the high state and wage in the low state is small. For higher levels of capital this gap increases, finally resulting in 0 wage for the low state. It remains to be verified whether the contract in Lemma 4, given the level of capital, is better than the one where the family hires the manager but does not induce him to put forth the high effort.

We will next use Lemma 4 to determine the threshold level of capital when the participation constraint binds.

**Proposition 5** *Assume that the participation constraint binds. There exists a unique  $k^*$  above which the family would hire the manager and offer him the contract in Lemma 4 and below which the family would manage the firm itself.*

**Proof.** Existence and uniqueness of  $k^*$  is proven along the same lines as Proposition 3. ■

### 3 Concluding Remarks

This paper models a family business as a production technology that is bequeathed from an older generation to a younger generation. The younger generation can continue operating its inherited production technology or it could hire a more able professional to do the same. If the generation decides to work itself, there is no uncertainty with respect to the effort put in or the output that is observed. If a professional is hired as a manager, there is uncertainty with respect to the professional's effort level as well as uncertainty with respect to the generated output. The professional's effort level is private information. Our main result, when there is no external financing, is the following. We find that, although the professional is more productive than the insider, the professional is hired only after the business reaches a certain critical size.

Pollak (1985) laid out the transaction cost approach to families and households. According to him, the advantages of family governance are right incentives (claims on family resources), monitoring (physical proximity), altruism (love), and loyalty, whereas the disadvantages of family governance are possibilities of family conflict, slack discipline, lack of skill, and size limitation. Both our paper as well as the paper by Burkart, Panunzi and Shleifer (2003) formally model the trade-off between some of the above advantages and disadvantages of the family as a firm. A legitimate goal for future research could be an attempt to model all the above advantages and disadvantages of the family firm, thus providing a comprehensive framework for interpreting the voluminous empirical literature consisting of surveys and case studies on family firms.

Another goal for future research is to model the interaction between the family's decision to obtain outside capital and the family's decision to hire outside labor. It is our belief that the critical size at which a family firm professionalizes its management is smaller and is reached sooner if capital markets are more developed. The basis for our belief rests on two observations. The first observation is casual empiricism. It seems that countries with well-developed capital markets are also countries with a larger proportion of professional managers. The second observation comes from an intuition in our companion paper, Bhattacharya and Ravikumar (2001), where we assumed inside labor, but studied the evolution of capital from inside capital to outside capital. We found in that paper that if the terms of trade offered by capital markets to a family for its business becomes more attractive, the family business reinvests



more, grows faster, and cashes out sooner at a smaller size. Our intuition suggests that the same should happen to professionalization of managers; the family would want to hire more productive professional managers sooner so that the firm could avail of this attractive exit option sooner. A formal model with external financing would allow us to verify our intuition.

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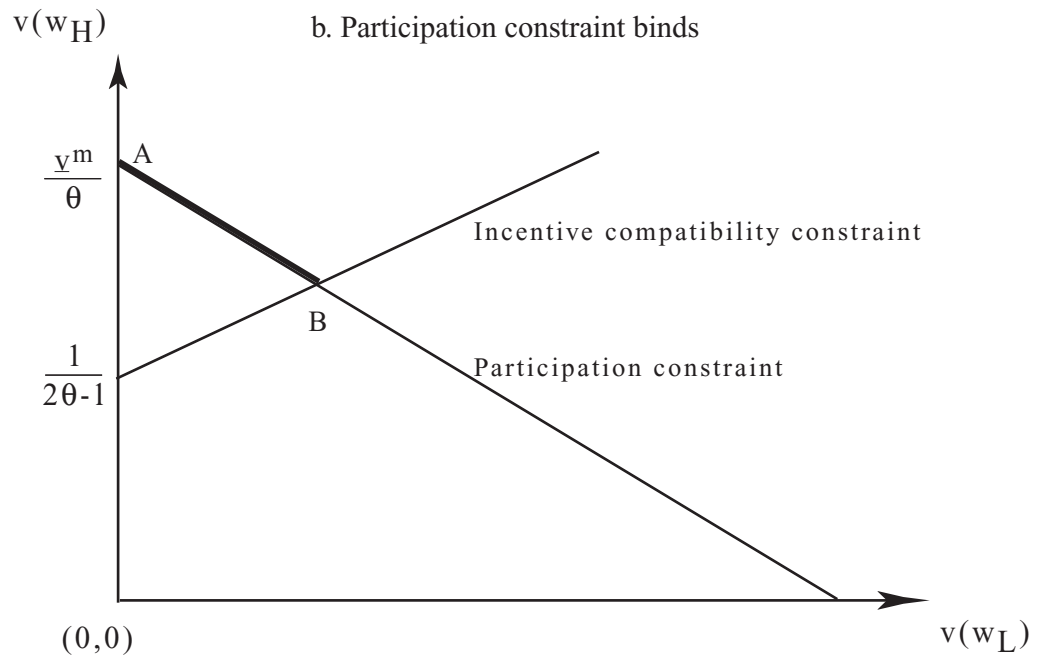
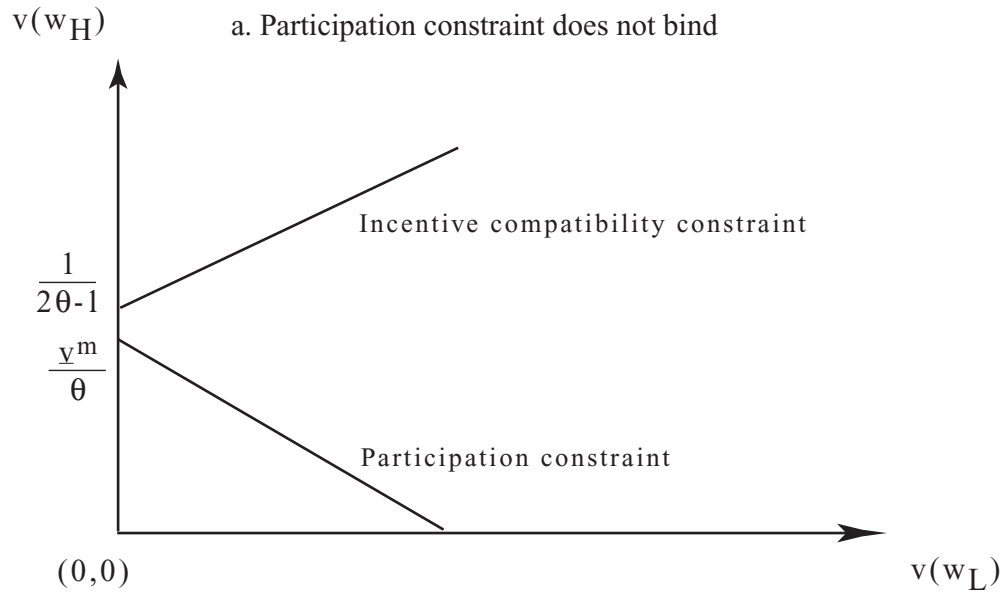


Figure 1. Incentive compatibility and participation constraints in utility space

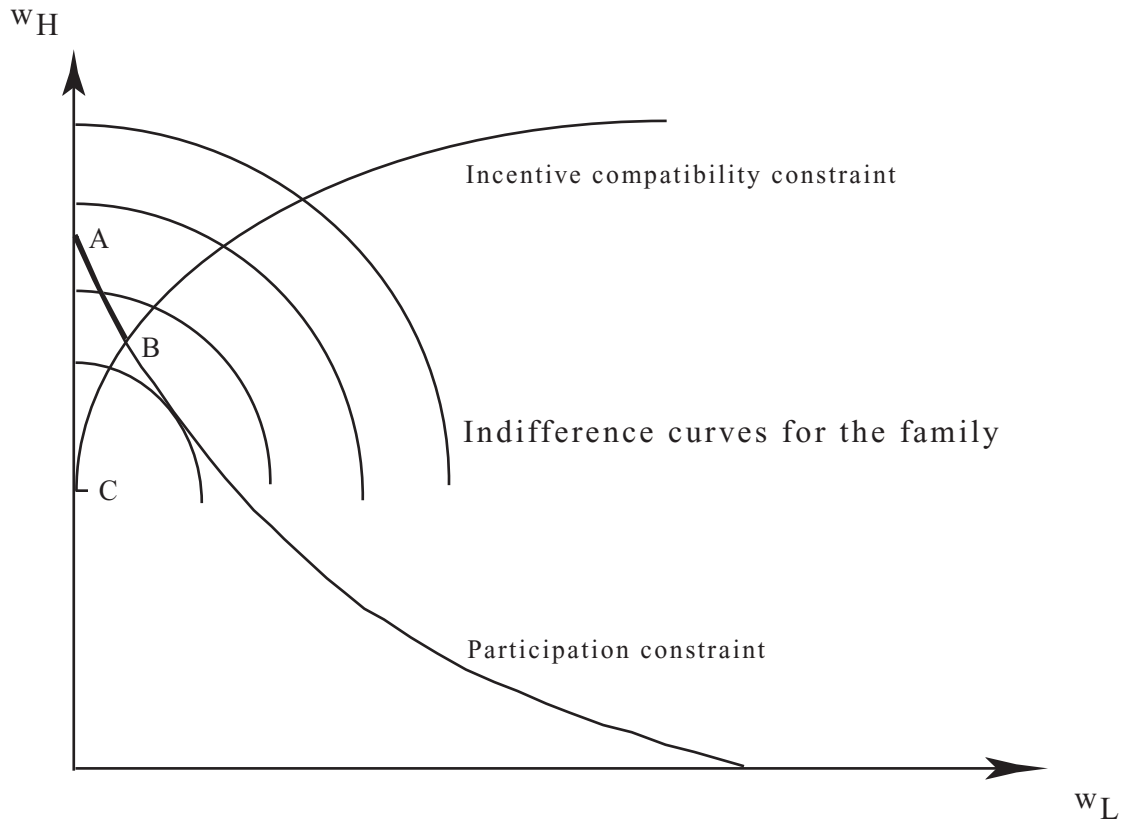


Figure 2. The optimal contract in compensation space when the participation constraint is binding