Inheritance Law and Investment in Family Firms

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Abstract

We investigate whether inheritance law constrains investment in family firms. Using a model of succession in family firms where the law may constrain the entrepreneur to give a minimal stake to non-controlling heirs, we show that the size of this stake reduces investment in family firms, by reducing the firm's ability to pledge future income streams to external financiers. We bring this prediction to the data, by collecting information about inheritance law in 62 countries. Wherever present, these laws effectively constrain the stake that can be given to the controlling and non-controlling heirs. Using a purpose-built indicator of the permissiveness of inheritance law together with measures of investor protection and data for 10,245 firms from 32 countries over the 1990-2006 interval, we find that stricter inheritance law is associated with lower investment in family firms, while it leaves investment unaffected in non-family firms, and that this result survives several robustness checks. Moreover, as predicted by the model, inheritance laws affects investment only in family firms that experience a succession.

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Almost by definition, the development of family firm is tied to the dynastic history of its controlling family, and can be critically affected – for better or worse – by the way in which control over the firm is handed over from one generation to the next. So far, the literature has highlighted two main problems that may emerge in the intergenerational transmission of family firms. First, the heir may not be as talented as the founder or as a market professional, which may constrain the firm's growth and profitability compared to non-family firms, as argued by Burkart, Panunzi and Shleifer (2003) and Caselli and Gennaioli (2005). Second, infighting among family members may paralyze decision-making or lead to underperformance: for instance, Bertrand, Johnson, Schoar and Samphantharak (2005) document with reference to Thai family firms that control by a larger number of male siblings is associated with lower performance.[1]

In this paper, we concentrate on another reason why succession may slow down a family firm's growth and investment or even lead to its liquidation: the rights that inheritance norms confer to non-controlling heirs over the founder's estate reduce the firm's ability to pledge future income streams to external financiers, and thereby constrains its ability to fund investment. The larger the portion of the founder's assets to be assigned to non-controlling heirs, the lower the fraction left to the heir designated to remain at the helm of the firm. Absent any friction in capital markets, a lower wealth of the controlling heir would not affect the family firm' ability to borrow and invest. But in the presence of capital market imperfections, it may hinder the firm's investment. This effect of inheritance law is empirically testable, as the heirs' legal rights over family assets differ widely around the world. In most countries with a common law tradition, there are no restrictions on the fraction

[1] Bertrand and Schoar (2006) note that conflict in the wake of succession is particularly frequent when several siblings are involved in the family firm: "cooperation between siblings can be difficult to achieve, despite parental will. Even if strong ties originally exist between family members, daily interactions within the context of the family business may lead to brutal infighting. Indeed, there are many examples of families (and their businesses) ripped apart from such infighting." (p. 79-80). The negative performance effects of family conflicts on business performance are also documented in the business literature on family firms (see for instance Davis and Harveston, 2001).

of assets that can be bequeathed to any heir. In civil law countries, instead, such legal restrictions generally exist, but vary considerably from country to country.

The contribution of this paper is threefold. First, we present a model to explain how inheritance law and financing constraints should be expected to interact and affect the growth and investment of family firms. Second, we measure the extent to which inheritance law constrains the intergenerational transmission of wealth within families around the world. Third, we take the model's main prediction to the firm-level data on investment and growth for a panel of countries.

In the baseline version of our model, we consider a firm that the founder bequeaths to his children, entrusting control to one of them. The controlling shareholder can divert a fraction of the cash flow as private benefits at the expense of other shareholders and financiers, to an extent determined by the degree of investor protection. The investment that the firm can undertake depends positively on investor protection, as more external finance is available when the threat of expropriation is reduced, and on controlling shareholder's wealth, as in Holmstrom and Tirole (1997). By reducing the controlling heir's wealth, inheritance law can adversely affect the firm's ability to invest. We show that, when legal investor protection is very strong, the firm can finance the first-best level of investment, irrespective of inheritance law restrictions. But, as legal investor protection worsens, inheritance law reduces the investment level because the resources paid out to non-controlling heirs cannot be compensated by external finance.

We also explore the extent to which these predictions are robust to several extensions of the model. First, we show that the presence of an inheritance tax has the effect of scaling down the level of investment of the family firms. The adverse effect of the inheritance tax on the investment is higher the weaker investor protection. In the baseline model, we assume that the firm's assets can be partially liquidated at no cost. In another extension, we show that our

conclusions survive under the assumption of inefficient partial liquidation. In this setup, the non controlling heir will be given a financial claim over the family firm's cash flow rather than cash. The larger the stake of the non controlling heir, the lower the firm's ability to raise funds on capital markets. Thus, as before, a less permissive inheritance law reduces the family firm's investment. The only additional insight is that in this case, if investor protection is very weak, the value of the financial claim of the non controlling heir may fall below the minimal threshold set by inheritance law. In other words, the value of a minority stake when expropriation by the controlling party is very high may be insufficient to ensure that the non controlling heir receives the share of family wealth set by the law. Then the family will be forced to liquidate the entire firm, even though this decision does not maximize total family wealth. Inefficient partial liquidation adds a new type of inefficiency. We also explore how inheritance constraints affect the transition from a family to a non-family firm status. Assuming that retaining the firm in the family also yields non-monetary benefits of control, and that family firms differ from non-family ones only for the presence of the inheritance constraint, we show that the stringency of the inheritance constraint makes the family less likely to retain control over the firm. Moreover, transition to non-family firm status should be less likely when investor protection is so strong that the inheritance constraint has no impact on family firms.

Our next step is to assess whether the evidence is consistent with the main prediction of the model: that family firms' investment and growth is negatively affected by the extent to which inheritance law limits the wealth that can be bequeathed to a single heir (whereas this does not hold for non-family firms), and that this effect is stronger where investor protection is weaker. To perform this empirical test, we first collected data on inheritance law for 62 countries, mainly via questionnaires sent to law firms that are part of the Lex Mundi project. We measure the "permissiveness of the inheritance law" of each country as the maximum share of a testator's estate that can be bequeathed to a single child, depending on the presence

or absence of a spouse and the total number of children. It should be noticed that this maximum share binds the testator's actions, as it cannot be exceeded via inter-vivos donations. The interdiction of donation in breach of heirs' rights is often explicitly stated by the law, which allows the injured party to challenge such donations in court.[2] Inheritance laws are also binding in a different way: the median number of children is always larger than 1 and hence the testator has to always face the decision on who becomes the controlling heir and the stake to be transferred.

We then test the effect of this variable on the investment and growth of family firms, using a sample of 10,245 (family and non-family) firms from 32 countries for the 1990-2006 interval. To avoid endogeneity problems that may exist between firm characteristics and investment policies, we use an empirical methodology similar to that used by Rajan and Zingales (1998), suitably adapted to take into account that our data are at a different level of aggregation (firm-level as opposed to industry-level) and that we are interested in the effect that inheritance law and investor protection (as opposed to financial development) have on firm investment. We regress the investment rate of each firm (averaged over the time interval of our sample) on an indicator of financial dependence (as defined by Rajan and Zingales, 1998), interacted with our measure of the permissiveness of the inheritance law, with various alternative measures of investor protection, and with the product of these two variables, controlling for country and industry fixed effects.

We find that, while the interaction between financial dependence and investor protection is significantly positive for both family and non-family firms, the interaction between financial dependence and the permissiveness of the inheritance law has a positive and

[2] In many countries, such as Argentina, Brazil, France, Finland, Greece, Italy, Portugal, Spain and Sweden, the law explicitly states that a gift made between ascendants and descendants or spouses is interpreted as an advance payment of inheritance, and cannot deprive heirs of their rights, who can challenge the donation in court. In Germany, if a heir is deprived of his/her inheritance may contest such a donation only under certain conditions and within specified deadlines.

significant coefficient only for family firms, as predicted by the model: the stringency of the inheritance law acts as a drag only on the investment and growth of family firms. Moreover, the interaction term between all three variables (financial dependence, inheritance law permissiveness and investor protection) generally has a positive coefficient for family firms alone, again as predicted by the model: the stringency of the inheritance law is more detrimental for the performance of family firms in countries where investor protection is weaker. Consistent with our model, we find that the impact of inheritance laws on investment is present for family firms that experience succession during the sample period, in line with the idea that the effect of these laws reflects the constraints that they place on the intergenerational transfer of control.

The rest of the paper is organized as follows. In Section 1, we present the baseline model, derive its predictions on how inheritance law affects the firm's investment and the family's liquidation decision for different degrees of investor protection. Section 2 contains a number of extensions of the baseline model, partly to explore the robustness of its main predictions and partly to provide other interesting predictions. In Section 3, we present the data. In Section 4, we explain our empirical strategy and report our estimates. Section 5 concludes, summarizing the results and drawing regulatory implications.

1. The model

We consider a firm that is initially owned by its founder, who has two prospective heirs, denoted as 1 and 2.[3] The firm is the combination of physical assets, whose scrap value is normalized to 1, and entrepreneurial "know-how": to fix ideas, imagine that the firm is formed by a bakery and a unique pastry recipe. The founder's wealth is entirely invested in

[3] We take the number of children as given, that is, not determined by rational considerations by the founder.

the firm's physical assets – the bakery. Only the founder and heir 1 have the know-how to run the firm – nobody else is capable of using the recipe to cook pastries, including heir 2.[4]

All parties have linear utility and no discounting: they simply maximize their final wealth. Since we assume a perfectly competitive capital market, the equilibrium interest rate is zero.

1.1. Baseline model structure

We start by laying out the baseline version of the model, leaving extensions to Section 2. The model's time line is shown in Figure 1.

[Insert Figure 1]

Family succession

We assume that the firm's physical assets can be liquidated on a perfect secondary market (at their scrap value of 1) and are perfectly divisible (so that partial liquidation is feasible and efficient).

At $t = 0$, the founder retires and must choose how much he wants to leave to each of his heirs.[5] As all the family's wealth is invested in the firm's assets, the founder liquidates a fraction x of them and gives the proceeds to heir 2 (who invests it on the financial market at zero rate of return). The remaining fraction $1-x$ of the assets is given to heir 1, who becomes the new manager of the family firm. Equivalently, instead of receiving the proceeds from this partial liquidation, heir 2 may be given a financial claim of value x over time-2 cash flow, such as an equity or debt stake. The two arrangements (partial liquidation or retention of heir 2 within the investor base) are completely equivalent when partial liquidation is efficient. For

[4] If both heirs had the same managerial talent, there would be no trade-off in this model.

[5] If one relaxes the assumption that only heir 1 has the talent to run the company, the firm could be sold as a going concern to an outside manager at a value that exceeds the scrap value of its physical assets. In terms of our example, the founder could not only sell the bakery but also the pastry recipe to an outsider, and distribute the sale proceeds among the two heirs. We explore this extension in Section 2.4.

expositional simplicity, we stick to the first interpretation. We discuss the case of inefficient partial liquidation in Section 2.2.

The founder chooses the split between the heirs, *x*, so as to maximize the sum of their wealth: [6]

$$w_f = w_1 + w_2, \tag{1}$$

The distinctive feature of the model is that the law constrains the founder's ability to allocate the family assets among his heirs. As we shall see in Section 2, in many countries the law sets a lower bound on the share of the estate that each of the founder's children must receive after his death.[7] We capture this legal constraint by a minimum amount of wealth u that the founder must assign to the non-controlling heir, that is, $w_2 = x \geq u$. Recalling that the family's estate is worth 1, u is also the minimum fraction of the founder's estate to be given to heir 2. Henceforth we shall refer to $1-u$ (the maximum fraction that can be bequeathed to the controlling heir) as a measure of the "permissiveness of inheritance law". For instance, a completely permissive legislation is one where this measure is 1, so that the controlling heir can inherit the whole family firm.

Investment technology

At $t = 1$, heir 1 decides how much money to invest and therefore how much external finance to raise on the capital market. The firm's investment I is funded by heir 1's wealth $1-x$ plus external funds that he raises. Investors are given a claim R_I over the firm's cash flow. This

[6] Our objective function ignores the possibility that the founder may have a preference for treating with fairness the two heirs. We discuss this point in Section 2.6.

[7] Generally, inheritance laws refer to the value of assets at $t = 0$ (without incorporating future improvements in value). However, our model would not be significantly affected if the fraction u were defined with reference of the final value of the firm, taking into account the future gains from investment.

claim can be thought of as debt or a non-voting equity. Each unit of capital costs 1, and yields revenue $g > 1$ at $t = 2$, up to a critical level $\bar{I}$.[8] Therefore, the firm's revenue is

$$R = \begin{cases} gI & \text{if } I \le \bar{I}, \\ g\bar{I} & \text{otherwise.} \end{cases} \qquad (2)$$

Clearly, it is inefficient to expand the firm's capital beyond this maximal scale. To focus on the interesting case, the maximal efficient scale is taken to exceed the family's initial wealth, i.e. $\bar{I} > 1$.

Private benefits of control

At $t = 2$ heir 1, being in control, decides on the allocation of revenues. The revenues can either be paid out to shareholders or diverted as private benefits – either via outright theft or more subtly via transactions with related parties, transfer pricing, perquisites consumption or excessive salaries. This non-contractible expropriation decision is modeled as the choice of a fraction $\phi \in [0,1]$ of the revenues, so that private benefits are ϕR and security benefits to all claimholders are $(1-\phi)R$.

Expropriation of outside investors is limited by the law, which sets an upper bound $\bar{\phi} \in [0,1]$ on the revenues that can be diverted by heir 1. Therefore, $1-\bar{\phi}$ measures the minimum fraction of the firm's cash flow that the law guarantees to be disgorged in favor of investors: accordingly, it will be referred to as the degree of "investor protection" afforded by the law. The assumption that the legal degree of investor protection affects external finance to firms agrees with a large body of evidence (see Beck and Levine, 2005, and Malmendier, 2007, for two recent surveys).

[8] The assumption of a linear production function with an upper bound on investment is made only for simplicity. Our results would be qualitatively unchanged if the production function featured decreasing marginal returns.

1.2. Effect of inheritance law on family firm investment

We analyze the founder's problem by solving the model by backward induction: we start from the expropriation decision at $t = 2$ to obtain the investment level I at $t = 2$, and from this we determine the optimal fraction x of the firm's assets liquidated at $t = 0$. This yields the founder's welfare when control is kept inside the family, and the effect of the inheritance constraint on investment for different degrees of investor protection $\bar{\phi}$.[9]

At date 2, heir 1 decides how to allocate the revenues. The law constrains him to divert no more than $\bar{\phi}R$ as private benefits. As diversion is costless, heir 1 extracts the maximum benefit allowed by the law, $\bar{\phi}$. Therefore, the firm's pledgeable income is $(1-\bar{\phi})R = (1-\bar{\phi})gI$.

Since the capital market is perfectly competitive, heir 1 appropriates the entire surplus generated by the investment. Moreover, as each unit of investment generates a profit margin equal to $g-1>0$, heir 1 wants to invest as much as possible (up to $\bar{I}$): investment I is constrained only by the funds that he can raise. The investors' cash flow rights R_I cannot exceed the firm's pledgeable income: $R_I \leq (1-\bar{\phi})gI$. As heir 1 can contributes only $1-x$ to the firm's capital, he must raise $I-(1-x)$ from investors, whose participation constraint therefore is $R_I = I-(1-x)$. The equality sign follows from the assumption that capital markets are perfectly competitive. Investment is maximized when R_I reaches its highest value, which is $(1-\bar{\phi})gI$. Taken together, heir 1's optimal investment choice and the investors' participation constraint imply:

$$(1-\bar{\phi})gI = I-(1-x). \qquad (3)$$

As in Tirole (2006, Chapter 3), one must distinguish two cases:

[9] In Section 2.3 we analyze the decision to sell out the firm by comparing the founder's welfare under family control to its value when the family firm is entirely sold out

(i) Unconstrained investment: if $g(1-\bar{\phi}) \geq 1$, a dollar invested in the firm generates at least a dollar of pledgeable income, so that there is no upper bound on the external funds that can be raised: heir 1 will choose the maximal efficient investment level $\bar{I}$ and will raise $\bar{I} - (1-x)$ externally.

(ii) Finance-constrained investment: if $g(1-\bar{\phi}) < 1$, a dollar invested generates less than a dollar of pledgeable income, so that heir 1's ability to finance investment is determined by the investors' participation constraint, investment is determined by (3): $I = (1-x)/[1-g(1-\bar{\phi})]$, and heir 1 can borrow up to $(1-x)g(1-\bar{\phi})/[1-g(1-\bar{\phi})]$. In other words, for every dollar of his wealth $1-x$ invested in the firm, heir 1 can borrow an additional amount $g(1-\bar{\phi})/[1-g(1-\bar{\phi})]$, which is increasing in the investment's profitability g and in the investor protection $1-\bar{\phi}$. Moreover, the larger the wealth invested by heir 1, the higher his borrowing capacity. Heir 1 will use his entire borrowing capacity only if investment is below the efficient scale $\bar{I}$. Therefore, investment is [10]

$$I = \min\left\{\bar{I}, \frac{1-x}{1-g(1-\bar{\phi})}\right\}. \qquad (4)$$

Equipped with heir 1's optimal investment at *t* = 1, now we turn to the founder's succession decision at *t* = 0 regarding the fraction *x* of assets to be liquidated to pay heir 2, under the inheritance constraint $w_2 = x \geq u$.

Recall that by equation (1) the founder's utility is simply the sum of his children's final wealth $w_1 + w_2$. Since heir 1's utility is his initial wealth, $1-x$, plus the profit from the investment, that is,

[10] When investment is constrained by his borrowing capacity, it is optimal for heir 1 to retain no cash flow right in the family firm. This conclusion may seem in conflict with the assumption that he retains control. In practice, control enhancing devices such as dual class shares may be used by heir 1 to limit the fraction of cash flow rights he needs to own to exert control. We discuss below the case where a minimal equity stake is required to exert control.

$$w_1 = (g-1)\min\left\{\bar{I}, \frac{1-x}{1-g(1-\bar{\phi})}\right\} + (1-x)$$

and heir 2's utility is simply his wealth $w_2 = x$, the founder's utility – and the firm's final value – is

$$w_f = (g-1)\min\left\{\bar{I}, \frac{1-x}{1-g(1-\bar{\phi})}\right\} + 1 \qquad . \qquad (5)$$

Since this expression is weakly decreasing in *x*, the (weakly) dominant strategy for the founder is to set $x = u$, that is, liquidate the smallest amount of the family firm's assets to satisfy the inheritance constraint. We summarize these results in the following proposition:

Proposition 1. *If the firm remain under family control, a fraction u of its assets are liquidated, its investment is* $I = \min\left\{\bar{I}, \frac{1-u}{1-g(1-\bar{\phi})}\right\}$ *and its final value is* $w_f = (g-1)\min\left\{\bar{I}, \frac{1-u}{1-g(1-\bar{\phi})}\right\} + 1.$

This proposition implies that the firm can achieve the efficient level of investment $\bar{I}$ if $1-\bar{\phi} \geq [1-(1-u)/\bar{I}]/g$. The unconstrained region defined by this condition is represented in Figure 2 as the area above the downward sloping line. As shown by the figure, for any given degree of inheritance law permissiveness $1-u$, there is a sufficiently strong degree of investor protection $1-\bar{\phi}$ that the inheritance law imposes no efficiency loss. This is most clearly seen in the limiting case of perfect investor protection, $1-\bar{\phi} = 1$, where the previous condition is always met (recalling that $\bar{I} > 1$ by assumption) and we are above the vertical intercept in Figure 2: absent agency problems between firm and investors, even a controlling heir with a very low amount of wealth can raise externally the funds required to invest at the efficient level.

[Insert Figure 2]

If, instead, investor protection falls short of this level, i.e. $1-\bar{\phi} < [1-(1-u)/\bar{I}]/g$, the inheritance law constrains the controlling heir to a suboptimal level of investment: weak investor protection prevents him from fully offsetting his low wealth with more external funding, and thus achieve the efficient investment level. In this region, which corresponds to the shaded area in Figure 2, the inheritance law matters: the higher $1-u$, the lower is the share of family assets to be liquidated, and the larger are investment and founder's utility. Moreover, in this constrained region, stronger investor protection enhances investment, and its positive effect is larger the more permissive is inheritance law (the larger $1-u$). These results follow from the following derivatives being all positive in this region:

$$\frac{\partial I}{\partial(1-u)} = k, \quad \frac{\partial I}{\partial(1-\bar{\phi})} = (1-u)gk^2, \quad \frac{\partial^2 I}{\partial(1-u)\partial(1-\bar{\phi})} = gk^2, \tag{6}$$

where for brevity we define $k \equiv 1/[1-g(1-\bar{\phi})]$.

But the derivatives in (6) do not tell the entire story, since a small increase in the permissiveness of inheritance law would have no effect on investment in the unconstrained region, where all three derivatives would be zero.

These results are summarized formally in the following proposition:

Proposition 2. *If investor protection is low ($1-\bar{\phi} < [1-(1-u)/\bar{I}]/g$), a marginal increase in the permissiveness of inheritance law $1-u$ increases the investment of family firms. This effect is increasing in the degree of investor protection $1-\bar{\phi}$. If instead investor protection is high ($1-\bar{\phi} \geq [1-(1-u)/\bar{I}]/g$), an increase in the permissiveness of inheritance law $1-u$ has no effect on the investment of family firms.*

As these predictions are to be tested empirically later in the paper, it is worth noticing that they only apply to family firms: for non-family firms, the effect of inheritance law should be zero irrespective of the degree of investor protection. Of course this does not imply that the degree of investor protection *per se* may affect investment also in non-family firms, insofar as for these firms too face agency problems in the capital market – which however are not modelled in this setting.

This is also illustrated in Figure 2, where we consider a relaxation of the inheritance law in two countries (A and B) with different degrees of investor protection. In country A, shareholder protection is so poor that companies are in the constrained regime: the effect of a relaxation in inheritance law on investment is $k \cdot \Delta u$ and increases in the degree of shareholder protection (since k is increasing in $1-\overline{\phi}$). In country B, instead, the change in inheritance law has no effect, because legal protection is so strong that the investment is anyway at the efficient level $\overline{I}$.

2. Extensions

In the baseline model just analyzed, we have made a number of stark simplifying assumptions. In this section, we remove some of them, both to test the robustness of the predictions presented so far and to bring out new and interesting predictions of the model. We also investigate an issue that we have neglected so far, that is, how inheritance law and shareholder protection affect the family's decision to keep control over the company or sell it out altogether at the succession stage.

2.1. Inheritance taxes

So far we assumed that the founder can bequeath his entire wealth, but in practice in many countries the government taxes the founder's estate upon his death. If we denote by τ the tax

rate on the bequest, the wealth transmitted by the founder to his heirs is only a fraction $1-\tau$ of the bequest.[11] The other variable affected by the estate tax is the level of wealth that must be assigned to heir 2, which decreases from u to $u(1-\tau)$.[12]

Going through the same steps as in the previous analysis, it is easy to show that the level of investment is $I = \min\left\{\bar{I}, (1-\tau)(1-u)/[1-g(1-\bar{\phi})]\right\}$. The tax has two effects on the level of investment by family firms: first, it magnifies the region where investment is below the first-best level; second, in the region where investment is constrained, it is decreased by a factor $1-\tau$. It is interesting to note also the effect of the inheritance tax on the effect of the permissiveness of inheritance law, whenever investment is constrained even after the change in inheritance law. The relevant region is now defined by the inequality $1-\bar{\phi} < [1-(1-\tau)(1-u)/\bar{I}]/g$, and therefore is larger than with $\tau = 0$ and increasing in τ. In this range $\Delta I = k' \cdot \Delta u > 0$, where $k' \equiv (1-\tau)/[1-g(1-\bar{\phi})] < k$. As before, in this region a more permissive inheritance law has the effect of boosting investment, but with a lower impact with respect to the case of no inheritance tax. In the unconstrained region, i.e. for $1-\bar{\phi} \geq [1-(1-\tau)(1-u)/\bar{I}]/g$, investment is unaffected by inheritance law, as before.

To sum up, the main empirical predictions emerging from this analysis are that inheritance taxes should reduce the investment of family firms and that the effect of the permissiveness of inheritance tax on investment is dampened relative to the case where the inheritance tax is not present.

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[11] The presence of the inheritance tax may also affect the consumption behavior of the founder. In particular, the effect of a tax is to make the heir's consumption more costly. This may translate into greater consumption by the founder, so that the wealth transmitted to the heir becomes $1-\tau-c$, where c is the extra-consumption by the founder.

[12] If there is extra-consumption by the founder, this term becomes $u(1-\tau-c)$.

2.2 Inefficient partial liquidation

So far we have made the extreme assumption that the firm's assets are perfectly divisible, so that any fraction of them can be sold without reducing their liquidation value. In most circumstances assets are only imperfectly divisible, i.e., a fraction x of the assets may be worth much less than x times their value when undivided. Here we consider the opposite case, assuming that the liquidation value of any fraction $x<1$ of the assets is zero.

Inefficient partial liquidation implies that the founder will never liquidate a fraction of the assets to compensate heir 2. Either he liquidates the assets completely or he keeps all the assets into the family firm. In the latter case, to satisfy the inheritance constraint, heir 2 is given a debt claim R_2 over the firm cash flow.[13] The difference with the benchmark case is that inefficient partial liquidation adds a further constraint to the problem, as it implies that it is inefficient to invest less than the entire asset base, whose value is 1: $I \geq 1$. This additional constraint may reduce the family's welfare, insofar as it forces the founder to inefficiently liquidate the family assets to satisfy the inheritance constraint. So in this modified setting the inheritance constraint, besides reducing the level of investment, as shown in the baseline model, can also force inefficient liquidation, and the more so the weaker legal investor protection.

The only amendment to be made to the timing of actions in the baseline model is at $t = 0$: if the founder turns control over the firm to heir 1, heir 2 is entitled to receive R_2 out of the firm cash flow at $t = 2$. As before, at $t = 2$, heir 1 will extract all the private benefits allowed by legal protection, that is $\bar{\phi} gI$. Anticipating his decision, the investors' participation constraint at $t = 1$ is

$$R_I \geq I - 1,$$

[13] None of our conclusions depend on this assumption. If heir 2 is given an equity stake, all results still hold.

which is binding in equilibrium as capital markets are perfectly competitive. This implies that all the surplus generated by the investment is captured by heir 1, and since each unit of investment generates a positive net present value, he wants to invest as much as possible (up to $\bar{I}$). Heir 1's funding capacity is limited by his ability to pledge income to outside investors: R_I cannot exceed the pledgeable income $(1-\bar{\phi})gI$ minus heir 2's claim, R_2. Formally, $R_I \leq (1-\bar{\phi})gI - R_2$.

Combining this constraint with the investors' participation constraint, we have

$$(1-\bar{\phi})gI - R_2 = I - 1.$$

As in the baseline model, we must distinguish between two cases. If $g(1-\bar{\phi}) \geq 1$ the firm can raise any amount of funding it wishes, so that it will invest $\bar{I}$. Heir 2's inheritance constraint is satisfied whenever $R_2 \geq u$. In this case $w_f = (g-1)\bar{I} + 1$.

As before, when $g(1-\bar{\phi}) < 1$, the firm's external funding capacity is limited, and to maximize investment, the founder must maximize the income pledgeable to outsider investors. Since $R_I \leq (1-\bar{\phi})gI - R_2$, the inheritance constraint is binding: $R_2 = u$. Then the claim that can be given to outside investors is $R_I = (1-\bar{\phi})gI - u$, which together with their participation constraint yields $(1-\bar{\phi})gI = I - (1-u)$.

It is easy to see that the maximum investment in the constrained regime is again given by expression (4), obtained under the assumption of no liquidation costs. The reason is that, heir 2 is just like another outside investor in the family firm. It is as if the family wealth invested in the family were only $1-u$, i.e., heir 1's wealth. Heir 1's capacity to raise external funding is unchanged, and equal to $I-(1-u)$.

However, as partial liquidation is inefficient, the investment level must also satisfy the constraint $I \geq 1$, so that heir 1's borrowing capacity must be at least *u*: he must at least be able to satisfy the participation constraint of the non-controlling heir, who contributes a stake *u* to

the firm. If $I = \bar{I}$ this constraint is not binding since $\bar{I} > 1$, by assumption. But in the constrained regime, the constraint $I \geq 1$ is satisfied only if $1 - \bar{\phi} \geq u / g$. If instead $1 - \bar{\phi} < u / g$, then the firm's pledgeable income would not even be sufficient to repay heir 2 for his contribution to the firm's investment. In this case, the founder must liquidate the company to satisfy the inheritance constraint, so that $w_f = 1$. This is inefficient, since if the company was not liquidated it would have been worth an additional $(g - 1)I$.

In conclusion, the additional insight from the presence of liquidation costs is that, if investor protection is sufficiently weak, the founder is forced to liquidate the firm, since its pledgeable income is insufficient to confer to heir 2 a stake in the family firm whose value satisfies the inheritance constraint.

2.3. Minimal control stake

In Section 1 it was shown that, to maximize investment heir 1 will want to raise the maximal number of cash flow rights to outside investors, hence retaining none for himself. As he still remains in control, this is equivalent to assuming that it is possible to retain control without cash flow rights. In practice, such a complete dichotomy between control and cash flow rights may be impossible to achieve. Suppose that heir 1 must own a minimal equity stake $\underline{\alpha}$ to retain control, so that the maximum pledgeable income is $(1 - \underline{\alpha})(1 - \bar{\phi})gI$.

Then, if $(1 - \underline{\alpha})(1 - \bar{\phi})gI \geq 1$, the firm will invest at the efficient scale $\bar{I}$, whereas if $(1 - \underline{\alpha})(1 - \bar{\phi})gI < 1$ the firm's investment is

$$I = \min\left\{\bar{I}, \frac{1 - u}{1 - (1 - \underline{\alpha}_1)g(1 - \bar{\phi})}\right\}.$$

So assuming that a minimum stake is required for control leaves unaffected the predictions of the baseline model regarding the effect of inheritance law on investment. Indeed, it expands

the parameter region where investment is constrained, since heir 1's need to retain a control stake reduces the fraction of the firm's pledgeable income earmarked to external investors, and therefore the external funds that can be raised from them. By the same token, a larger minimum control stake $\underline{\alpha}$ also reduces the investment that the firm can carry out if it is finance-constrained, as well as the family final wealth w_f. From a different perspective, this suggests that pyramids and multiple class shares – which reduce the minimum fraction of cash slow rights that the controlling shareholders must retain – may help to increase the level of investment in the family firm.

2.4. Sell-out decision

So far only heir 1 was assumed to be able to manage the firm after the founder's demise. In this section we relax this assumption by considering outsiders who have the same managerial ability as heir 1, and therefore may be willing to buy the firm as a going concern. Since the inheritance constraint limits the firm's ability to raise external funds, selling out it to an external acquirer who does not face the same constraint on investment may be more appealing than keeping it within the family. Indeed, if the firm can be sold at its fair value, the sell-out option will always dominate when investment would be constrained under family management. However, a trade-off arises if the firm cannot be sold at its fair value (for instance, because the private equity market is not competitive) or if keeping the firm within the family generates an "amenity potential", that is, a non-pecuniary private benefit of control.[14] Between these two modelling options, we consider the latter, by assuming that if control is kept inside the family, the founder's utility is $w_f = w_1 + w_2 + B$, where B is the

[14] This term was introduced by Demsetz and Lehn (1985). Contrary to the private benefits of control, the amenity potential gives utility to the party in control without reducing profits and therefore the firm's value. For instance, the founder may draw pleasure from having his child manage the family firm. Alternatively, in some industries, such as media or sports, the ownership of firms allows the family to be a member of important political or social networks.

amenity potential. If instead the company is sold out, the founder's utility coincides with the sale proceeds that are distributed to his heirs.

We assume that the market for control is perfectly competitive, so that the price paid for the firm is equal to its (pecuniary) value to the acquirer, who does not face any capital rationing, and therefore can invest up to efficient level $\bar{I}$. So the price obtained from the firm's sale

$$P = (g-1)\bar{I},$$

so that the founder's utility is $w_f = (g-1)\bar{I} + 1$.

If instead the firm is handed over to heir 1, the founder's utility is

$$w_f = \min\left\{(g-1)\bar{I} + 1 + B, \frac{(g-1)(1-u)}{1-g(1-\bar{\phi})} + 1 + B\right\}.$$

Therefore, if the amenity potential is so high as to exceed the competitive price of the firm ($B \geq (g-1)\bar{I}$), then obviously the firm will remain under the family's control. When instead the amenity potential is below the firm's price ($B < (g-1)\bar{I}$), a tradeoff arises: the family will be ready to sacrifice the amenity potential only if keeping the firm under family control would severely limit its investment. This happens if investor protection is sufficiently poor, that is,

$$1-\bar{\phi} \leq \frac{1}{g} - \frac{(g-1)(1-u)}{(g-1)\bar{I} - B}.$$

This expression also shows that, a stricter inheritance law (higher *u*) widens the interval where selling out occurs, *ceteris paribus*. These results are relevant for our empirical analysis, as they predict that the family firm status is itself affected by both investor protection and inheritance law: in a country with either weaker investor protection or stricter inheritance law (or both), we should observe fewer firms under family control. Since this is precisely the parameter region where investment is predicted to be more severely constrained, this sample

selection should bias the evidence against finding an effect of both investor protection and inheritance law on family firm investment.

2.5. Shared control

So far, a key assumption has been that the founder can confer control over the firm only to a single heir. What would happen if heirs can share control? To answer this question, consider that control has two possible dimensions: (i) ability to extract private benefits and (ii) power to decide how much the firm should borrow and invest.

Suppose first that shared control refers only to ability to extract private benefits, so that heir 2 might be entitled to grab a fraction of these benefits. This assumes that either heir 2 has an informational advantage over outside investors that allows him to verify private benefits extraction, or that heir 1 is altruistic vis-à-vis heir 2 and therefore willingly accepts to share the private benefits of control with him. Since private benefits have no deadweight cost, the two heirs will agree to extract the maximum benefit $(1-\overline{\phi})gI$. This will leave the firm's borrowing and investment capacity unaffected, and simply confer a rent to heir 2, in excess of his legal entitlement *u*. This argument rests on the premise that the wealth *u* to which heir 2 is entitled by the law refers solely to the cash flow generated by the firm, and not to the unverifiable private benefits that he may obtain.

A more extreme interpretation of shared control is that the two heirs manage to joint decide over the investment undertaken by the firm. This implies that heir 2 accepts to leave his stake *u* invested in the firm and to pledge the corresponding cash flow to outside investors, so as to maximize the firm's investment. Of course, this presupposes that heir 2 can be confident to share in the private benefits of control so as to (at least) recover his investment *u*. If this arrangement can be set in place, the financially constrained level of investment will rise

from $(1-u)/[1-g(1-\bar{\phi})]$ to $1/[1-g(1-\bar{\phi})]$, and inheritance law will have no effect on the choice of investment.

Therefore, in this extreme version, shared control completely offsets the effect of inheritance law: the empirical prediction is that, if this form of shared control is widespread in family firms, one should expect to find no effect of inheritance law on family firm investment. This does not rule that shared control may have efficiency costs due to deadlocks and disagreements between the two heirs, and thereby curtail family firm investment below its efficient level. However, this investment shortfall will not be systematically related to inheritance law.

2.6. Fairness in bequest allocation

Another assumption of the model is that the founder is only interested in the sum of his heir's wealth, and not in its distribution. Indeed, the inheritance distribution computed in the benchmark model is inequitable: heir 2 gets a share $u \leq 1/2$ of the estate, while heir 1 gets no less than $1-u$ (which is what he gets when the firm has zero borrowing ability). Therefore, if the founder cares for the fairness of the inheritance allocation, his bequest x to heir 2 will exceed the minimum share u prescribed by the law. In the limit, a perfectly egalitarian split of the estate will require him to set heir 2's stake at $x = g\phi/[2g\phi-(g-1)] > 1/2$, if the firm is in the financially constrained region ($g(1-\bar{\phi}) > 1$): heir 2 must get more than half of the cash flow rights, since he is not going to enjoy the private benefits of control.

Naturally, the more egalitarian is the founder, the greater is the efficiency cost that the family must bear in terms of forgone investment: intuitively, the egalitarianism of the founder is equivalent to a more stringent inheritance law constraint. This result highlights a potentially important caveat about the empirical relevance of our model's predictions: if in most countries social norms dictate a greater degree of fairness in inheritance than is required

by the local law, then family firms investment will reflect differences in the national social norms rather than in national laws. However, our empirical predictions will still apply to the extent that these social norms have some correlation with inheritance law. This would not be surprising since typically the law is initially generated by social custom, as highlighted by the history of both Roman and Common law.

3. The data

In our empirical test of the model's prediction about firm investment we bring together two types of data: (i) measures of country-level institutional characteristics, which include novel indicators about the permissiveness of inheritance law, and measures of investor protection drawn from existing studies; and (ii) firm-level data for investment (capital expenditure), sales, total assets, market-to-book ratios, ownership structure (cash flow rights of the blockholder and, wherever possible, voting rights) for a sample of companies from 32 different countries.

3.1. Inheritance law and investor protection data

To measure the permissiveness of inheritance law around the world, we gathered information for 62 countries about the maximum share of the estate that can be bequeathed to a single child by a valid will. The data were collected via questionnaires to law firms belonging to the Lex Mundi association and in some cases via other sources, such as direct access to legal sources.[15] The resulting measure is displayed in the first five columns of Table

[15] We stress that the indicator refers to the maximum share that can be left to a single child conditional on writing a valid will, and not to the amount that a child would receive by a parent who dies intestate.

1. In each country, this measure varies depending on the presence of a surviving spouse and of the total number of children.[16]

[Insert Table 1]

Table 1 clearly shows that the degree of permissiveness of inheritance law is greater in common law countries than in civil law ones: in most common law counties, there is complete freedom to leave one's estate to a single child, irrespective of the presence of a spouse and of the number of siblings.[17] In contrast, in civil law countries the law constrains the maximum share that can be left to a single child, the more so if the child concurs with a surviving spouse and/or with other siblings. For instance in Italy, a person with a spouse and two children can freely allocate only one fourth of his total wealth. This implies that he cannot give more than 50% of the family's wealth to one child. The figure goes down to 41.7% with three children, and decreases monotonically to 33.3% with six children (not reported in the table for brevity). These tighter bounds may not be unrealistic considering the increasing occurrence of multiple marriages and the implied number of children. In column (8) we show the median number of children of entrepreneurs (defined as self-employed or business owners) who are at least 50-years-old and belong to the third or fourth income quartile. While this data is only available for 13 countries it clearly shows that the median number of children is never less than 2 (with the exception of

[16] For some countries, the inheritance law is so complex that in computing the measure reported in Table 1 we had to make more specific assumptions about the case under consideration and/or disregard some clauses in the law that could not be captured with our simple indicator. Specifically: (i) for Bangladesh, Jordan, Kuwait and Saudi Arabia, we assume that heirs are all male children, as in that country male heirs receive twice as much as females; (ii) in Canada, we disregarded the case of Quebec, where 50% of the estate must go to the spouse of the deceased; (iii) for India, where the applicable law depends on the religion of the deceased, we focus on the laws applying to non-Muslim citizens; (iv) for Slovakia, we assume that children are over 18 years of age (stricter rules apply for children below that age); (v) for Sweden, we disregard that the surviving spouse is entitled to € 17,750; (vi) in the United States, many states entitle the surviving spouse to an "elective share" which is generally 30% but in some states can be up to 50%, but we disregarded this norm since it can be circumvented by setting up a trust. Moreover, we disregarded the more restrictive laws of the state of Louisiana.

[17] However, it should be noticed that even in these countries social norms may *de facto* prevent a testator from neglecting altogether one or more of his/her children and his/her spouse. These social norms inspired to a minimal standard of equity among potential heirs are sometimes buttressed by judicial practice in some common law countries: for instance, in New Zealand a child or a spouse who has been neglected in the deceased will has some judicial remedies to redress the situation and obtain a share of the estate. However, there are no general and clear guidelines regarding the circumstances in which such judicial remedies can be successfully used.

Sweden where it is 3 children). This confirms that in countries where inheritance laws impose constraints on the testator's will, they will binding for most entrepreneurs, in the sense that they will have to take a decision on which child will get control and the control stake must differ across different inheritance law environments.

That civil law countries have a more restrictive inheritance law is confirmed by the figures in Panels A and B of Table 2: on average, in civil law countries the largest share that can be left to a child in the presence of a surviving spouse is 60% if there are two siblings and 54% if there are three, while in common law countries the corresponding figure is 96% in both cases. However, Tables 1 and 2 also document that there is considerable variation in the figures for civil law countries: for instance, the range of variation is from 33.3% to 100% for the case of two children and a spouse, and from 25% to 100% for the case of three children and a spouse. In other words, not all civil law countries are equally restrictive.

[Insert Table 2]

The presence of some dispersion in this indicator within civil law countries is quite important if empirically this variable is to play a distinct role from that of a mere indicator of the country's legal origin, and therefore from measures of shareholder protection, which are known to correlate highly with the legal origin, particularly with the divide between common law and civil law countries: see La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 1998). Even more encouraging in this respect is that the correlation between the inheritance law indicators of Table 1 and measures of investor protection is far less than perfect, as shown by Panel C of Table 2. For the case with 2 children and a surviving spouse, the inheritance indicator's correlation with investor protection measures ranges from 0.37 for the anti-director rights measure by La Porta et al. (1998) and 0.53 for the self-dealing index by Djankov et al.

(2008) to 0.14 (and not significant) for the legality index proposed by defined by Berkowitz et al. (2003).[18]

3.2. Firm-level data

In our estimation, we rely on data for publicly listed companies from 32 different countries, drawn from the set of 16,925 publicly-listed companies in the Worldscope data base over the period 1990-2006. We apply two screens: first, we only keep firms for which we can find 6 years of financial and accounting data and, second, we remove companies belonging to the financial industry. These two screens reduce the sample size to 11,518 companies. We then search for the ownership structure of these firms, which forces us to drop other 1,273 firms, and yields a final sample of 10,245 firms.

Ownership information is drawn from various sources. We supplement the rather sparse data available in Worldscope with hand-collected data drawn from individual company websites as of 2007,[19] and for European firms only, with data from the ownership file of AMADEUS for 2002. We also check our ownership data against those used by Faccio and Lang (2002) for European firms and with those used by Claessens et al. (2000) for East Asian firms (from Japan, Philippines, South Korea, Taiwan and Thailand). Finally, where all these sources proved ineffective, we have contacted individual firms directly to obtain ownership data as of 2006 or 2007. We retain observations for companies that exit due to "death", "delisting" or "merger", so that the sample is not affected by survivorship bias.

[18] The Legality index is a weighted average of the legal index variables by La Porta et al. (1997, 1998).

[19] We researched the company's history to get information on whether the firm's founding family is still present in the ownership structure and then gathering information on the stake of the family, either from the "company history" page or the "investors' relations" page of the relevant company's web site. If the main shareholder of a company is a foundation or a private firm, we try to get information on its beneficial owners or controlling family by looking at the respective web sites. If the foundation or private firm is clearly controlled by a group of people with the same last name, these are considered as the family controlling the company.

A company is defined as a non-family firm if (i) Worldscope ownership information indicates that no individual blockholder is present, and (ii) the company's web site does not indicate that a family blockholder is involved in the ownership structure. In our baseline definition, family firms are those where more than 10% of the cash flow rights are owned by a single family, although later we test the robustness of our results to alternative definitions.

For family firms, we obtain further information on (i) whether the family blockholder is involved in the firm's active management (defined as either the CEO being a family member or the family being present in the firm's Board of Directors), and (ii) whether there has been a succession in the firm during the 1985-2006 interval. We define succession as control being handed over to offspring or close relatives of the entrepreneur from the previous generation. Such data is obtained by consulting the "company history" segment of the company's website or, failing this, by contacting the firm. Since it is reasonable to expect that any impact arising from succession should be felt after the transfer of control takes place, we start looking for successions also before 1990, which is the start year of our financial and accounting sample. Out of 3,670 family firms, 1,280 firms are found to have experienced a succession over the 21 year period from 1985 to 2006. This sample includes family firms where the family CEO passed control to another family member (1,085 firms) and family firms where the family CEO passed control to an outside manager (195 firms). We can also ascertain that 1,735 firms did not have any succession during the 1985 to 2006 interval.[20] We could not ascertain succession for 655 family firms.

Table A1 shows that in the Worldscope data set under this definition the breakdown between family and non-family firms is fairly consistent with the existing literature.[21] Family firms are more prevalent in civil law countries and less so in common law countries. For

[20] This sample also contains firms that had a succession before 1985.

[21] Companies from the United States are omitted from the sample, since our identifying assumption is U.S. listed firms are financially unconstrained, as explained in Section 4.

example, we find that family firms constitute more than 44% of the firms in Brazil, France, Germany, Italy, Mexico, Spain, South Korea, Sweden and Taiwan whereas they constitute less than 29% of the firms in Australia, Canada, Ireland, Japan, and United Kingdom. These statistics are very similar to those found by Faccio and Lang (2002) for European firms, Claessens et al. (2000) for East Asian firms, Setia-Atmaja et al. (2007) for Australian firms, and King and Santor (2007) for Canadian firms. Table A2 shows that all sectors are well represented in the sample.[22] In most sectors, the breakdown between family and non-family firms is rather balanced, and their ratio appears to reflect mainly the importance of the efficient scale of operation and capital intensity. The incidence of family firms is larger in sectors with low capital-intensity and minimal scale, such as apparel, footwear, furniture, glass, leather, office and computing, paper products, pottery and wood products. Conversely, it is lower in drugs, food products, motor vehicle, other chemicals, petroleum and coal products, and professional goods.

4. The evidence

The empirical methodology that we use to test the main predictions of the model in Section 1 is akin to that proposed by Rajan and Zingales (1998) – henceforth RZ – suitably adapted to take into account that our data are at a different level of aggregation (firm-level as opposed to industry-level) and that we are interested in the effect that inheritance law and investor protection (as opposed to financial development) have on firm investment. RZ construct their test by first identifying each industry's need for external finance from firm-level data for the U.S., under the assumption that financial development is highest in that country. Then they interact this industry-level "external dependence" variable with a country-level proxy for the degree of financial development (so as to obtain a variable that measures the extent to which

[22] We map the SIC 3-digit codes of Worldscope into the ISIC codes used by RZ.

financial development constrains the growth of each industry in each country) and use this interacted variable in a regression for industry-level growth. The advantages of this methodology are that this interacted variable – intended to measure the effect of financing constraints – can be taken to be exogenous with respect to firm-level investment and growth, and that one can include fixed effects to control for unobserved heterogeneity due to country and industry characteristics.

In our case, the dependent variable is the average firm-level investment rate over the sample period, defined as the ratio of capital expenditure to total assets ($I_{j,s,c}$), where *j* identifies the firm, *s* the industry sector and *c* the country. In our most general specification, this variable is regressed on a set of company characteristics (the firm's initial total assets relative to the *s* industry median $X_{j,s,c}$, the log of its initial total assets A_j and its initial market-to-book ratio MB_j), a set of interaction variables (financial dependence D_s interacted with investor protection IP_c, with our measure of inheritance law permissiveness H_c and with their product $IP_c \cdot H_c$), sector fixed effects α_s (*s* = 1,…, *S*) and country-level fixed effects δ_c (*c* = 1,…, *C*):

$$I_{j,s,c} = \beta_1 X_{j,s,c} + \beta_2 A_j + \beta_3 MB_j + \beta_4 D_s \cdot IP_c + \beta_5 D_s \cdot H_c + \beta_6 D_s \cdot IP_c \cdot H_c + \alpha_s + \delta_c \qquad (9)$$

The financial dependence D_s measures each industry's need for external finance from U.S. firm-level data. The assumption is that for U.S. listed firms access to financial markets is not an obstacle to investment, so that U.S. firms face a perfectly elastic supply curve for funds. Thus, differences across U.S. firms in reliance to external finance reflect primarily differences in demand triggered by differences in technology. Therefore, the methodology rests on the assumption that technology, and therefore capital requirements, vary across industries but not across countries. The testable predictions of the model are that the

coefficients β_4, β_5 and β_6 should be all positive for family firms, while the coefficients β_5 and β_6 should be zero for non-family firms, since inheritance law should be irrelevant for this type of companies. The log of total assets A_j and the initial market-to-book ratio MB_j are respectively meant to control for the firm's size and its investment opportunities, and they are both measured in the first year for which data are available in Worldscope.[23] We also control for the firm's investment opportunities by taking the log of the firm's Market-to-Book ratio in the first year for which we can find data in Worldscope.

[Insert Table 3]

Table 3 reports the estimation results separately for family firms (columns 1 and 2) and for non-family firms (columns 3 and 4). The investor protection variable is defined as the revised anti-director rights index of LLSV (1998) in columns 1 and 3, and as the self-dealing index of Djankov et al. (2008) in columns 2 and 4. Standard errors are corrected for clustering at the country level.

The estimates along the top row show that the interaction between financial dependence and investor protection is positively associated with firm investment, for both family and non-family firms, and for both investor protection measures. But for family firms the magnitude of the relevant coefficient is larger than for non-family firms: the evidence suggests that family firms face tighter financing constraints than non-family ones, so that an improvement in investor protection promotes their investment more than that of non-family firms.

The second striking result – and the most important one in the context of this paper – is found reading across the second row of the table: the interaction between financial dependence and the permissiveness of the inheritance law has a positive and significant coefficient *only* for family firms, as predicted by the model. This result conforms to the

[23] The data for most of the firms in the sample is for 1990.

prediction of our model – that the stringency of the inheritance law acts as a drag only on the investment of family firms, while leaving non-family businesses unaffected – and suggests that relaxing inheritance law would on average promote the investment of family firms. To understand its economic magnitude, one can focus on the industry with the mean level of financial dependence (Transportation Equipment, whose financial dependence is 0.31), and consider a increase of the index of inheritance law permissiveness from the 25th to the 75th percentile, that is, from 0.625 to 1, which is twice the standard deviation of the inheritance law index in our sample. The coefficient estimate in column (2) implies that this increase in the permissiveness of inheritance law is associated with a 0.9% increase in the Capex ratio of family firms, which, compared with the average sample ratio of 8.8%, implies an increase of almost 11 percentage points in family firms' investment. Performing the same calculation with the estimate in column (1) leads to a somewhat lower impact (8 percentage points).

Another result that accords with the model is that the interaction term between all three variables (financial dependence, inheritance law permissiveness and investor protection) has a positive coefficient for family firms alone, while it is not significantly different from zero for non-family firms. In other words, the stringency of the inheritance law is more detrimental for the performance of family firms in countries where investor protection is weaker. Recall that our model predicts that this amplifying effect of inheritance law should be observed insofar as family firms are in the region where investment is finance-constrained (the case of country A in Figure 2). This squares with the fact that, as already mentioned, the estimates in Table 3 indicate that family firms are finance-constrained, indeed more severely so than non-family ones. To assess the economic significance of this result, we focus on the industry with the mean level of financial dependence and the country with the mean level of self-dealing index (Belgium, whose index is 0.54), and again consider an increase in the index of inheritance law permissiveness (from the 25th to the 75th percentile). Using the estimates of both the interaction terms that include inheritance law (β_5 and β_6) in column 2, this change is

associated with an increase of family firms' investment amounting to almost 18 percentage points of the sample average. Using the anti-director rights index and the coefficient estimates in column 1 leads to a 14 percentage points increase in family firms' investments.

The impact of inheritance laws on family firms' investments should occur around the intergenerational transfer of control, when entrepreneurs typically allocate stakes to their controlling and non-controlling heirs. Hence, we expect the impact of inheritance laws to be stronger in family firms that experience a succession during the sample period. To test this prediction, we divide the sample of family firms into those that experience a succession (a control transfer from the entrepreneur to his/her offspring or immediate relatives) between 1985 and 2006, and those that did not. We remove from the sample of firms that experience a succession the 195 family firms where control was transferred to a professional manager.[24] The results are shown in Table 4, where we report the estimates of the same specification as before, but separately for family firms that experienced succession (Panel A) and those that did not (Panel B).

[Insert Table 4]

First, the coefficients β_5 and β_6 of the two interaction variables that include inheritance law are almost all statistically significant at conventional confidence levels and economically large for family firms that experience succession. Instead, for family firms without succession they are less precisely estimated and smaller in size. This result shows that the driving force behind our results in Table 3 is the sub-sample of family firms that experience succession. Second, the coefficient β_4 of the interaction between financial dependence and investor protection, whose estimates are shown along the top row, indicate that both family firms with and without succession are subject to financing constraints, but that the magnitude of the

[24] We remove these firms because succession in such cases may occur because of bad performance and hence such instances may suffer from endogeneity problems.

relevant coefficient is larger for family firms with succession: family firms face tighter financing constraints around succession, so that an improvement in investor protection promotes their investment the most.

Another way of investigating the impact of succession on family firm investments is to analyze the difference between capital expenditure before and after such an event. Our model predicts that the investments of family firms experiencing a succession should decrease only in countries with restrictive inheritance laws. To investigate this issue, we start from the sample of 1,085 family firms that experienced succession and remove firms for which succession occurred before 1996 or after 2003, so as to be able to define an interval "before succession" of at least 5 years, a 2-year interval "around succession" and a 3-year interval "after succession". The length of these intervals reflects the fact that our financial and accounting data starts from 1990 and that a long enough period before succession (at least 5 years, from 1990 to 1994) is necessary to provide a meaningful benchmark for the change in capital expenditure after succession. Likewise, the number of years required for the "after succession" period provides a cut-off year (2003) given that our data is up to 2006. We expect the impact of succession to start materializing in the period around the succession and after it.

We run two regressions to investigate the change of investments. The first one with the dependent variable being the average capital expenditure of family firms in the "before succession" period, and the second one uses the average capital expenditure in the "around succession" and "after succession" period. In each case, we use the interaction between Financial Dependence and Investor Protection as the independent variable. We estimate these regressions separately for countries with permissive inheritance laws (an index value above the median) and for countries with restrictive inheritance laws (an index value below the median). The results are shown in Table 5.

[Insert Table 5]

The second and third rows of Table 5 show the coefficient estimates for the sensitivity of capital expenditure to the interaction between Financial Dependence and Investor Protection for family firms in countries with permissive inheritance laws and countries with restrictive laws, respectively. The capital expenditure of family firms decreases after succession, and the decrease is large and statistically significant in countries with restrictive inheritance laws, while it is small and not statistically significant from zero in those with permissive inheritance laws, as predicted by our model.

Next, we investigate whether our results are robust to the use of sales growth as the dependent variable rather than capital expenditure, as our model also implies that inheritance laws influence family firms' growth. As we require data on sales for at least seven consecutive years, due to missing data this screen reduces the number of family firms to 2,418 and of non-family firms to 5,248. We use again the specification described in (9), and report the results using sales growth as the dependent variable in Table 6.

[Insert Table 6]

The statistical significance and economic impact of the estimate in Table 6 are smaller than those obtained in Table 3 for both family and non-family firms. The coefficient estimates of the interaction between Financial Dependence and Investor Protection reported in the first row are significant at the 10% confidence level for both family and non-family firms. Thos of the interaction between Financial Dependence and Inheritance Law Permissiveness are significant only for family firms, confirming the result obtained for investment in Table 3. Finally, the triple interaction between Financial Dependence, Inheritance Law Permissiveness and Investor Protection is never significant.

We conclude by performing four different robustness checks of the results obtained in Table 3. The results of these checks are shown in Table 7.

[Insert Table 7]

In Panel A, we try to control for the effect of the tax rate on bequests, based on data for the top marginal transfer rate from parent to children from the Coopers and Lybrand International Tax Summaries.[25] This variable may be a rather imprecise measure of the actual inheritance taxes paid on the estates of entrepreneurs' families, due to the considerable amount of tax evasion and avoidance of inheritance taxes that is possible in many countries. In accordance with the model, this variable is also entered interactively with financial dependence, since inheritance taxes are predicted to compress investment only for financially constrained firms. The estimates show that the effect of inheritance taxes on investment is negative and larger for family firms, though not significant even in their case, as predicted by the model. All the other results for family firms remain unchanged while their statistical and economic significance decreases with respect to those in Table 3. We also test another prediction by the model – that the effects of inheritance law and investment protection are lowered by the presence of inheritance taxes – by splitting the sample and re-estimating the specifications of Table 3 separately for the countries where the inheritance tax rate is below and above the median in our sample of countries. The estimated coefficients do not significantly differ across these two sub-samples.[26]

In Panel B, we perform a second robustness check, where we consider investment in family and non-family firms *only* in civil law countries, to face the possible criticism that, given the correlation between our inheritance law index and common law countries, our inheritance law index is essentially capturing the difference between common law and civil law countries. Panel B of Table 7 shows that the main results from Table 3 survive even when we restrict the sample to firms in civil countries alone, although with two differences. First,

[25] This data was kindly provided by Antoinette Schoar.

[26] The results are not shown here for the sake of brevity.

both the statistical and economic significance of the coefficient estimates of the two double interaction terms are smaller compared to those obtained with the full sample. Second, the triple interaction term is no longer statistically significant. The lower statistical significance and economic impact is to be expected given that the variability in the inheritance law index is greatly reduced when all common law countries are removed from the sample. Notwithstanding this, it is important to note that the main difference in which family and non-family firms respond to inheritance laws remain largely unchanged.

In Panel C we investigate the robustness of our results to different definitions of family firm. Recall that in Table 3 family firms were defined as those where a family owns at least 10% of the cash flow rights. However, one can either use a more or less restrictive definition of a family firm. The results should become stronger when using a more restrictive definition of a family firm, as the impact of the non-controlling heir should be most felt if family ownership is concentrated. In Panel C we use two different family firm definitions: a more restrictive one, which requires the family blockholder not only to own at least 10% of the cash flow rights but also to participate in the firm's active management either by holding the CEO position or by having members on the board of directors; and a less restrictive one, which requires the family blockholder to own at least 5% of the cash flow rights.

In line with expectations, the results in Panel C.1 (with a more restrictive definition of family firms) are significantly stronger than those in Panel C.2 (where the definition is less restrictive). In particular, the triple interactive term gains in statistical and economic significance when we use a restrictive definition of family firm compared to the results shown in Table 3 and loses its statistical significance when we use a less restrictive definition.

The last robustness check that we perform deals with the definition of financial dependence. It can be argued that the median U.S. firm in each industry is larger than the median firm in the same industry in most other countries. According to this view, it would be

more reasonable to use the financial dependence of the median U.S. firm in the same size category where the international firm is placed: for instance, one should use the financial dependence of the median U.S. firm in the small sized sub-sample to determine the financial dependence of a small firm in the same industry in another country. To do so, we repeat the estimation with a size-dependent measure of Financial Dependence. This measure is computed dividing U.S. companies present in Compustat into three sub-samples respectively formed by large, medium and small firms, and compute financial dependence for the median company in each sub-sample. We use the financial dependence determined in this way in Panel D. The basic results obtained before do not change and family firms' investments continue to be sensitive to the inheritance law index while non-family firms are not.

5. Concluding remarks

Even though the literature produced by academic research on family firms is vast and rapidly expanding, so far very little attention has been devoted to the role that inheritance norms can have in constraining their investment and growth. This is quite surprising, considering that in contrast to economists, businessmen are keenly aware of the problem, the more so as the impact of inheritance law on family firms has been exacerbated in recent years by the increasing shift from the traditional family to extended families, with children being born in different marriages or out of wedlock.

For example, in Italy family firms are advocating a less stringent inheritance law. A family entrepreneur claims: "Today the family is no longer what it used to be sixty years ago: […] it would be obvious to adjust the norms on inheritance law, giving to the testator more flexibility in disposing of his assets".[27] Similarly, the main business newspaper regards the Italian restrictive inheritance law as inadequate: "In the likely case where the designated (controlling) heir does not have enough wealth to compensate the other heirs, the generational

[27] "E l'eredità? Dev'essere libera", *Corriere Economia*, 2 April 2007, page 9.

transfer would be possible only when the family firm has a large borrowing capacity".[28] Under the current law, the potential claims of non-controlling heirs are so large that they can destabilize even the largest family firms, such as Fiat.[29]

This paper shows that such concerns are consistent with theory and evidence. In the context of a stylized model of succession in a family firm, we show that larger legal claims by non-controlling heirs to the founder's estate can lead to lower investment by family firms, insofar as they reduce the firm's ability to pledge future income streams to external financiers. We bring this prediction to the data, by collecting information about inheritance law in 62 countries and building indicators of its permissiveness from the viewpoint of a testator who wishes to bequeath the largest possible fraction of his/her estate to a single child. Then we merge this novel indicator of the permissiveness of inheritance law with measures of investor protection and with data for 10,245 firms from 32 countries for the 1990-2006 interval, and find that indeed the strictness of inheritance law is associated with lower investment in family firms, while it leaves investment unaffected in non-family firms.

We also find that the results are mostly driven by family firms that experience succession during the 1985 to 2006 period. It is precisely around and after succession that the effects of inheritance laws are mostly felt, because it is at this time that the decision on who is appointed as the controlling heir and his/her stake is determined. Our results are robust to the inclusion of inheritance taxes (which have no statistically significant effect on family firms' investments), to different definitions of family firms and of the measure of financial dependence. Finally, they survive even if the estimation is confined to the sub-sample of firms in civil law countries.

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[28] "Sulla legittima è tempo per i correttivi", *Il Sole 24 Ore*, 7 May 2007, page 35.

[29] In June 2007 Margherita Agnelli challenged the inheritance agreement subscribed by all heirs after the death of Giovanni Agnelli in 2004 because she regarded it as too penalizing for the children born in their second marriage and too advantageous for the children born from her first marriage with Alan Elkann, and especially for John Elkann, heir of Giovanni Agnelli as the head of the FIAT industrial and financial empire.

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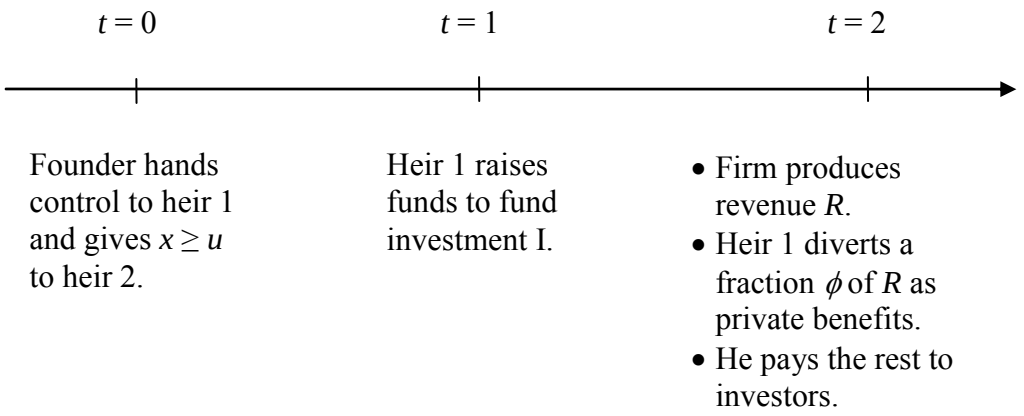

Figure 1. Time line of the model

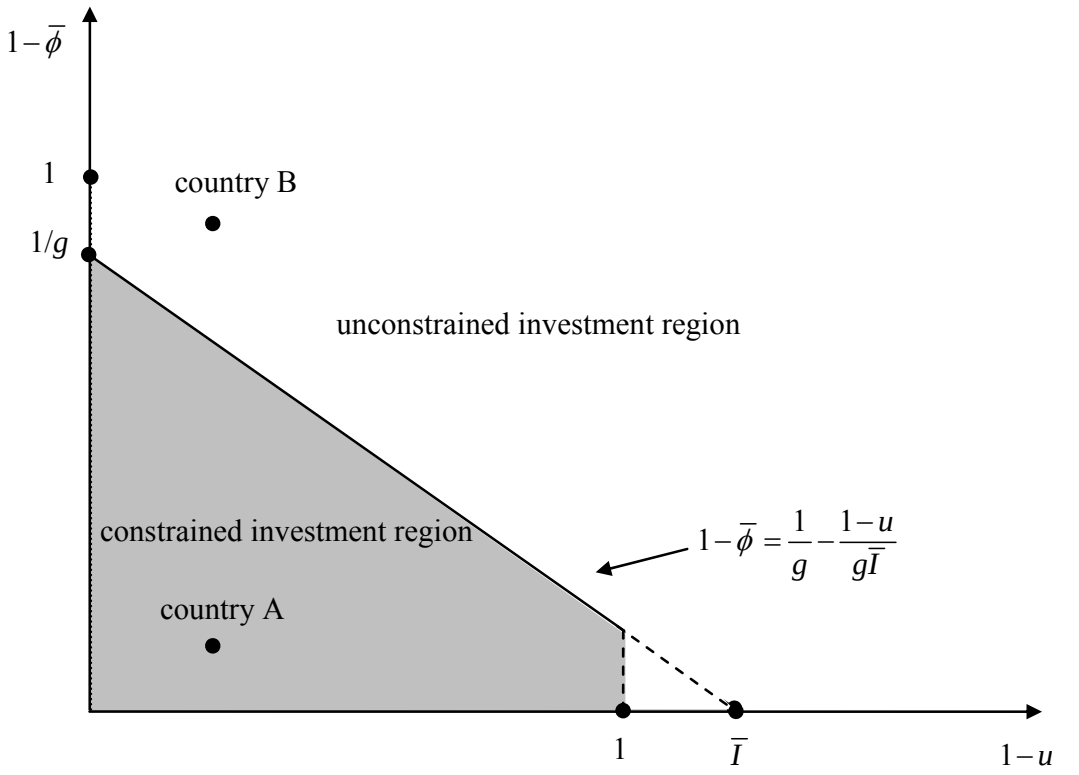

Figure 2. Family firm investment, investor protection ($1-\bar{\phi}$) and permissiveness of inheritance law ($1-u$)

Table 1. Inheritance Law Permissiveness and Investor Protection Around the World

Columns 1 to 5 provide data on the largest share of the estate that in each country a testator can bequeath to a single child in the absence of a surviving spouse (columns 1 and 2) or in the presence of a surviving spouse (column 3, 4 and 5), for different numbers of children. For example, column 1 shows the share that can be bequeathed to a single child in the presence of 2 children but no spouse, while column 4 shows the corresponding figure in the presence of 2 children and a spouse. In column 6, 7 we show the Revised Anti-Director Index and the Self Dealing Index, all drawn from Djankov et al. (2006). Column (8) shows the median number of children of entrepreneurs (defined as self-employed or business owners) who are at least 50-years-old and belong to the third or fourth income quartile. This number is only available for 13 countries, and is drawn from the Health and Retirement Study (U.S.), English Longitudinal Study of Ageing (U.K.), and Survey of Health, Ageing and Retirement in Europe (other European countries).

Country	**2 children, without spouse** (1)	**3 children, without spouse** (2)	**1 child, with spouse** (3)	**2 children, with spouse** (4)	**3 children, with spouse** (5)	**Anti-director index** (6)	**Self-dealing index** (7)	**Median number of children of firm owners** (8)
Argentina	0.667	0.556	0.667	0.556	0.5	2	0.34	-
Australia	1	1	1	1	1	4	0.76	-
Austria	0.75	0.667	0.833	0.667	0.611	2.5	0.21	2
Bangladesh	0.5	0.333	0.667	0.333	0.222	-	-	-
Belgium	0.667	0.5	0.5	0.333	0.25	3	0.54	2
Bolivia	0.6	0.467	0.8	0.5	0.4	2	0.14	-
Brazil	0.75	0.667	0.75	0.667	0.625	5	0.27	-
Bulgaria	1	1	1	1	1	3	0.65	-
Canada	1	1	1	1	1	4	0.64	-
Cayman Islands	1	1	1	1	1	-	-	-
Chile	0.75	0.667	0.75	0.625	0.6	4	0.63	-
Colombia	0.75	0.667	0.5	0.375	0.333	3	0.57	-
Costa Rica	1	1	1	1	1	-	-	-
Croatia	0.75	0.68	0.75	0.68	0.625	2.5	0.25	-
Cyprus	0.625	0.5	0.625	0.5	0.438	-	-	-
Denmark	0.75	0.667	0.833	0.667	0.611	4	0.46	2
El Salvador	1	1	1	1	1	2	0.43	-
Estonia	0.75	0.667	0.75	0.667	0.625	-	-	-
Finland	0.75	0.667	1	0.75	0.667	3.5	0.46	-
France	0.66	0.5	1	0.66	0.5	3.5	0.38	2
Germany	0.75	0.667	0.75	0.667	0.625	3.5	0.28	2
Greece	0.75	0.667	0.875	0.688	0.625	2	0.22	2
Guatemala	1	1	1	1	1	-	-	-
Hungary	0.75	0.667	1	0.75	0.667	2	0.18	-
Iceland	0.667	0.556	0.778	0.556	0.481	4.5	0.24	-
India	1	1	1	1	1	5	0.58	-
Ireland	1	1	0.667	0.667	0.667	5	0.79	-
Israel	1	1	1	1	1	4	0.73	-
Italy	0.667	0.556	0.667	0.5	0.417	2	0.42	2
Jamaica	1	1	1	1	1	4	0.35	-
Japan	0.75	0.667	0.75	0.625	0.583	4.5	0.5	-
Jordan	0.5	0.333	0.667	0.333	0.222	1	0.16	-

Kenya	1	1	1	1	1	2	0.21	-
Kuwait	0.5	0.333	0.667	0.333	0.222	-	-	-
Latvia	0.75	0.667	0.75	0.667	0.625	4	0.32	-
Lebanon	0.75	0.667	0.9	0.7	0.633	-	-	-
Liechtenstein	0.75	0.667	0.666	0.5	0.444	-	-	-
Lithuania	0.75	0.667	0.875	0.688	0.625	4	0.36	-
Luxembourg	0.667	0.5	1	0.66	0.5	2	0.28	-
Malta	0.833	0.778	0.75	0.583	0.528	-	-	-
Mexico	1	1	1	1	1	3	0.17	-
Monaco	0.667	0.5	1	0.667	0.5	-	-	-
Netherlands	0.75	0.667	0.75	0.667	0.625	2.5	0.2	2
New Zealand	1	1	1	1	1	4	0.95	-
Norway	0.667	0.556	0.75	0.417	0.305	3.5	0.42	-
Peru	0.667	0.556	0.667	0.556	0.5	3.5	0.45	-
Philippines	0.5	0.333	0.5	0.333	0.25	4	0.22	-
Portugal	0.667	0.556	0.667	0.542	0.472	2.5	0.44	-
Romania	0.667	0.5	0.875	0.583	0.438	5	0.44	-
Saudi Arabia	0.5	0.333	0.667	0.333	0.222	-	-	-
Slovak Rep.	0.75	0.5	0.75	0.5	0.375	3	0.29	-
South Africa	1	1	1	1	1	5	0.81	-
South Korea	0.75	0.667	0.7	0.643	0.611	4.5	0.47	-
Spain	0.833	0.778	0.667	0.5	0.444	5	0.37	2
Sri Lanka	1	1	1	1	1	4	0.39	-
Sweden	0.75	0.667	1	0.75	0.667	3.5	0.33	3
Switzerland	0.625	0.5	0.75	0.5	0.417	3	0.27	2
Taiwan	0.75	0.667	0.75	0.667	0.625	3	0.56	-
Thailand	1	1	1	1	1	4	0.81	-
United Kingdom	1	1	1	1	1	5	0.95	2
United States	1	1	1	1	1	3	0.65	2
Uruguay	0.667	0.5	0.667	0.5	0.438	1	0.18	-
Venezuela	0.75	0.667	0.75	0.667	0.625	1	0.09	-

Table 2. Inheritance Law Permissiveness: Descriptive Statistics

Panel A provides descriptive statistics on the maximum share that can be bequeathed to a single child in the absence or presence of a surviving spouse, for 2 or 3 numbers of children in civil law countries. Panel B provides the same statistics for common law countries. Panel C shows the correlation of the maximum share that can be bequeathed to a single child with the Revised Anti-Director Index, the Self Dealing Index and the ratio of Stock Market Capitalization to GDP drawn from Djankov et al. (2006) and the Legality Index defined by Berkowitz et al. (2003). P-values are shown in parenthesis.

Panel A

Civil law countries	2 children, without spouse	3 children, without spouse	2 children, with spouse	3 children, with spouse
Mean	0.72	0.63	0.60	0.54
Standard deviation	0.09	0.12	0.15	0.16
Minimum	0.50	0.33	0.33	0.25
Maximum	1.00	1.00	1.00	1.00

Panel B

Common law countries	2 children, without spouse	3 children, without spouse	2 children, with spouse	3 children, with spouse
Mean	1	1	0.96	0.96
Standard deviation	0	0	0.12	0.12
Minimum	1	1	0.67	0.67
Maximum	1	1	1	1

Panel C

Correlation with	2 children, without spouse	3 children, without spouse	2 children, with spouse	3 children, with spouse
Anti-director index	0.48	0.47	0.35	0.37
	(0.004)	(0.005)	(0.043)	(0.031)
Self Dealing Index	0.65	0.65	0.53	0.56
	(0.000)	(0.000)	(0.000)	(0.000)
Legality Index	0.16	0.15	0.19	0.14
	(0.374)	(0.448)	(0.311)	(0.447)

Table 3. Regression of Family and Non-Family Firms Investment

This table presents the estimates of a cross-sectional regression model for 10,245 firms from 32 countries. Panel A shows results for family firms and Panel B shows results for non-family firms. The dependent variable is the mean of the ratio of Capital Expenditure to Total Assets in the previous year. The mean of the ratio is calculated over the period 1990-2006 for all firms for which we have at least 6 years of data. The independent variables are as follows: Financial Dependence × Investor Protection is the level of industry-specific financial dependence interacted with Investor Protection; Financial Dependence × Inheritance Law is the interaction between financial dependence and the maximum share that can be given to a child in the presence of a spouse and three children; and Financial Dependence × Inheritance Law × Investor Protection is the interaction of all three variables. Investor Protection is defined as the Revised Anti-Director Index of LLSV (1998), in columns (1) and (3); and the Self Dealing Index of Djankov et al. (2008) in columns (2) and (4). All regressions include country and industry dummies. Standard errors are corrected for clustering at the country level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	Panel A Family firms		**Panel B Non-family firms**	
	1	2	3	4
Financial Dependence × Investor Protection	0.0382**	0.2089**	0.0305**	0.1822**
	(2.04)	(2.38)	(2.45)	(2.29)
Financial Dependence × Inheritance Law	0.0721**	0.0954**	0.0179	0.0185
Permissiveness	(2.01)	(2.06)	(0.84)	(0.72)
Financial Dependence × Inheritance Law	0.0215	0.1085*	-0.0124	-0.0581
Permissiveness × Investor Protection	(1.60)	(1.79)	(-1.15)	(-1.29)
Log of Initial Market-to-Book	0.0073**	0.0074**	0.0044**	0.0045**
	(2.38)	(2.26)	(2.49)	(2.45)
Log of Initial Assets	0.0049**	0.0045**	0.0038***	0.0039**
	(2.58)	(2.55)	(2.94)	(2.23)
Adjusted R^2	0.2870	0.2901	0.2611	0.2583
Number of Observations	3,670	3,670	6,575	6,575

Table 4. Regression Analysis for Family Firms With Succession and Without Succession

This table presents the estimates of a cross-sectional regression model for 3,670 family firms from 31 countries. Panel A shows results for family firms that experienced a succession at some date between 1985 and 2006. Panel B shows results for family firms that have not experienced any succession in the sample period. From Panel A we exclude 195 family firms that experienced succession where control was handed over from a family member to an outside manager. We exclude from the sample 655 family firms, for which no information on succession is available. The dependent variable is the mean of the ratio of Capital Expenditure to Total Assets in the previous year. The mean of the ratio is calculated over the period 1990-2006 for all firms for which we have at least 6 years of data. The independent variables are as defined in Table 3. Investor Protection is defined as the Revised Anti-Director Index of LLSV (1998) in columns (1) and (3), and the Self Dealing Index of Djankov et al. (2008) in columns (2) and (4). All regressions include country and industry dummies. Standard errors are corrected for clustering at the country level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	Panel A: Family Firms With Succession		**Panel B: Family Firms Without Succession**	
	1	2	3	4
Financial Dependence × Investor Protection	0.0453**	0.2507**	0.0308**	0.1950**
	(2.18)	(2.49)	(2.13)	(2.05)
Financial Dependence × Inheritance Law	0.0855**	0.1258***	0.0609*	0.0884*
Permissiveness	(2.41)	(2.95)	(1.70)	(1.86)
Financial Dependence × Inheritance Law	0.0295*	0.1481**	0.0154	0.0724
Permissiveness × Investor Protection	(1.91)	(2.09)	(1.14)	(1.25)
Log of Market-to-Book in First Year	0.0068**	0.0069**	0.0074**	0.0084***
	(2.19)	(2.15)	(2.58)	(2.77)
Log of Assets in First Year	0.0041**	0.0039**	0.0058***	0.0051***
	(2.41)	(2.09)	(3.10)	(2.83)
Adjusted R^2	0.3488	0.3508	0.2211	0.2109
Number of Observations	1,085	1,085	1,735	1,735

Table 5. Capital Expenditure in Family Firms Around Succession

This table presents the estimates of a cross-sectional regression model for 482 family firms from 32 countries that experienced succession between 1996 and 2003. The dependent variable is the mean of the ratio of Capital Expenditure to Total Assets (Capex Ratio) in the previous year. The independent variable is Financial Dependence × Investor Protection and is the level of industry-specific financial dependence interacted with Investor Protection which is defined as the Self Dealing Index of Djankov et al. (2008). We run the regression model for family firms in countries with restrictive inheritance laws (shown in the second row) and for family firms in countries with permissive inheritance laws (shown in the third row). Countries with permissive inheritance laws are defined as those with an index value above the median and countries with restrictive inheritance laws are those with an index value below the median. Panel A shows the coefficient estimates for the Capex Ratio in the period before succession. Panel B shows the coefficient estimates for the Capex Ratio in the period around and after the succession. We run two tests to determine the statistical significance of any change in the coefficient estimates from the period before succession to the period after succession between family firms in countries with restrictive inheritance laws and those in countries with permissive inheritance laws. The asterisks (*, ** and ***) symbol indicates statistical significance (at the 10%, 5% and 1% level, respectively) of the coefficient estimates from the period before succession to the period after succession for similar inheritance rows (across columns). The #, ## and ### symbols indicate statistical significance (at the 10%, 5% and 1% level, respectively) of the coefficient estimates between countries with different inheritance laws (across rows).

	Panel A Capital Expenditure Before Succession	**Panel B Capital Expenditure After Succession**
All Family Firms with Succession between 1996 and 2003	0.2851	0.2642
Family Firms in Countries with Restrictive Inheritance Laws	0.3105#	0.2744**#
Family Firms in Countries with Permissive Inheritance Laws	0.2594	0.2502

Table 6. Regression of Family and Non-Family Firms Sales Growth

This table presents the estimates of a cross-sectional regression model for 7,659 firms from 32 countries. Panel A shows results for family firms and Panel B shows results for non-family firms. The dependent variable is the mean of sales growth (in %) for seven consecutive years. The mean of the growth rate is calculated over the period 1990-2006 for all firms for which we have at least 7 consecutive years of sales data. The independent variables are as defined in Table 3. Investor Protection is defined as the Revised Anti-Director Index of LLSV (1998), in columns (1) and (3); and the Self Dealing Index of Djankov et al. (2008) in columns (2) and (4). All regressions include country and industry dummies. Standard errors are corrected for clustering at the country level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	Panel A Family firms		**Panel B Non-family firms**	
	1	2	3	4
Financial Dependence × Investor Protection	3.7190*	17.0172*	3.5822*	14.9172*
	(1.87)	(1.90)	(1.88)	(1.92)
Financial Dependence × Inheritance Law	6.1028*	8.7511**	1.0292	1.415
Permissiveness	(1.89)	(1.98)	(0.95)	(0.51)
Financial Dependence × Inheritance Law	2.0185	9.5814	1.4274	1.4457
Permissiveness × Investor Protection	(1.50)	(1.62)	(1.08)	(0.72)
Log of Initial Market-to-Book	0.6517*	0.7181*	0.4914*	0.4215*
	(1.92)	(1.90)	(1.85)	(1.89)
Log of Initial Assets	0.5210**	0.4982**	0.2810**	0.3092**
	(2.26)	(2.41)	(2.48)	(2.28)
Adjusted R^2	0.1802	0.1882	0.1511	0.1492
Number of Observations	2,418	2,418	5,241	5,241

Table 7. Robustness Checks

This table presents several robustness checks of the estimates reported in Table 3. Variables are defined as in Table 3. Inheritance Tax is defined as the top marginal transfer rate from parent to children data and is drawn from the Coopers and Lybrand International Tax Summaries. In Panels A to D Investor Protection is defined as the Revised Anti-Director Index in columns (1) and (3); and the Self Dealing Index in columns (2) and (4). In Panel B the estimates are performed only for companies incorporated in Civil Law countries, as defined by Djankov et al. (2008). In Panel C they are repeated with two different definitions of family firms: in columns (1) and (2) they are defined as firms in which a family blockholder owns at least a 10% share and participates in the firm's active management, while in columns (3) and (4) they are defined as firms in which a family blockholder owns at least a 5% stake. All regressions include country and industry dummies. In Panel D we repeat the estimation with a size-dependent measure of Financial Dependence. This measure is computed dividing U.S. companies present in Compustat into three sub-samples respectively formed by large, medium and small firms, and compute financial dependence for the median company in each sub-sample. All regressions include country and industry dummies. Standard errors are corrected for clustering at the country level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level respectively).

Panel A. Controlling for Inheritance Taxes

	Family Firms		**Non-Family Firms**	
	1	2	3	4
Financial Dependence × Investor Protection	0.0280**	0.1804**	0.0279**	0.1704**
	(1.98)	(2.27)	(2.28)	(1.98)
Financial Dependence × Inheritance Law	0.0559**	0.0847**	0.0142	0.0172
	(1.97)	(1.98)	(0.71)	(1.39)
Financial Dependence × Inheritance Law ×	0.0191	0.0905*	-0.0114	-0.0522
Investor Protection	(1.57)	(1.70)	(-1.02)	(-1.15)
Financial Dependence × Inheritance Tax	-0.0148	-0.0128	0.0081	0.0116
	(-1.48)	(-1.19)	(0.79)	(0.94)
Log of Market-to-Book in First Year	0.0067**	0.0070**	0.0039***	0.0039**
	(2.20)	(2.18)	(3.01)	(2.37)
Log of Assets in First Year	0.0042**	0.0039**	0.0035***	0.0036**
	(2.48)	(2.34)	(3.15)	(2.17)
Adjusted R^2	0.3008	0.3056	0.2711	0.2701
Number of Observations	3,670	3,670	6,575	6,575

Table 7, continued.

Panel B. Civil Law Countries Only

	Family Firms		Non-Family Firms	
	1	2	3	4
Financial Dependence × Investor Protection	0.0252*	0.1861*	0.0251*	0.1685**
	(1.87)	(1.94)	(1.92)	(2.01)
Financial Dependence × Inheritance Law	0.0472*	0.0851**	-0.0207	0.0209
	(1.85)	(1.97)	(-0.72)	(1.10)
Financial Dependence × Inheritance Law × Investor Protection	0.0197	0.0781	0.0148	0.0301
	(1.52)	(1.57)	(0.98)	(0.75)
Log of Market-to-Book in First Year	0.0069**	0.0070**	0.0051**	0.0050***
	(2.51)	(2.18)	(2.59)	(3.08)
Log of Assets in 1990	0.0046***	0.0048**	0.0030**	0.0035***
	(2.70)	(2.34)	(2.10)	(3.80)
Adjusted R^2	0.2271	0.2319	0.2001	0.1954
Number of Observations	2,746	2,746	4,036	4,036

Panel C. Different Definitions of Family Firms

	Panel C.1 Blockholder owns at least of 10% and present in management		Panel C.2 Blockholder owns at least of 5%	
	1	2	3	4
Financial Dependence × Investor Protection	0.0489**	0.2410**	0.0358*	0.1896**
	(2.40)	(2.47)	(1.90)	(1.99)
Financial Dependence × Inheritance Law	0.0781**	0.1107**	0.0502*	0.0829*
	(2.12)	(2.18)	(1.70)	(1.76)
Financial Dependence × Inheritance Law × Investor Protection	0.0322*	0.1128*	0.0185	0.0815
	(1.75)	(1.85)	(1.50)	(1.64)
Log of Market-to-Book in First Year	0.0078**	0.0078**	0.0068**	0.0070**
	(2.49)	(2.35)	(2.25)	(2.52)
Log of Assets in First Year	0.0052**	0.0049**	0.0042**	0.0043**
	(2.56)	(2.50)	(2.48)	(2.48)
Adjusted R^2	0.3102	0.2915	0.2271	0.2204
Number of Observations	1,918	1,918	4,019	4,019

Panel D. Different Definitions of Financial Dependence

	Family Firms		Non-Family Firms	
	1	2	3	4
Financial Dependence × Investor Protection	0.0324**	0.2115**	0.0315***	0.1985**
	(2.28)	(2.42)	(3.04)	(2.35)
Financial Dependence × Inheritance Law	0.0741**	0.1105**	0.0175	0.0165
	(2.24)	(2.28)	(0.76)	(1.02)
Financial Dependence × Inheritance Law × Investor Protection	0.0301*	0.1251*	-0.0098	-0.0158
	(1.70)	(1.94)	(-0.19)	(-0.41)
Log of Market-to-Book in First Year	0.0069**	0.0072**	0.0050***	0.0049**
	(2.24)	(2.30)	(2.78)	(2.53)
Log of Assets in First Year	0.0044**	0.0041**	0.0037***	0.0031**
	(2.46)	(2.51)	(3.04)	(2.30)
Adjusted R^2	0.3115	0.3202	0.2815	0.2885
Number of Observations	3,670	3,670	6,575	6,575

Table A1. Company Data: Sample Description

Panel A. Geographical Distribution of the Sample

Country	Number of non-Family Firms	Number of Family Firms	Country	Number of non-Family Firms	Number of Family Firms
Argentina	18	31	Japan	1,297	205
Australia	415	178	Mexico	35	47
Austria	63	34	Netherlands	65	45
Belgium	70	32	New Zealand	34	11
Brazil	81	108	Norway	148	61
Canada	321	94	Peru	12	17
Colombia	11	18	Philippines	55	75
Denmark	60	45	Portugal	44	37
Finland	108	94	South Africa	28	21
France	471	408	South Korea	127	271
Germany	558	435	Spain	326	294
Greece	16	35	Sweden	167	115
India	56	52	Switzerland	128	102
Ireland	87	22	Taiwan	64	87
Israel	86	54	Thailand	48	141
Italy	112	150	UK	1,464	351

Panel B. Industrial Classification of Sample Firms

Industrial Sector	Number of non-Family Firms	Number of Family Firms	Industrial Sector	Number of non-Family Firms	Number of Family Firms
Apparel (322)	54	251	Other industries (390)	355	198
Basics ex. fert. (3511)	49	86	Paper products (341)	40	138
Beverage (313)	98	75	Petroleum and coal products (354)	110	32
Drugs (3522)	245	38	Petroleum refining (353)	118	42
Electric machinery (383)	274	225	Plastic products (356)	205	178
Food products (311)	318	457	Pottery (361)	115	181
Footwear (324)	35	78	Printing and publishing (342)	129	210
Furniture (332)	106	198	Professional goods (385)	325	112
Glass (362)	86	158	Pulp paper (3411)	158	241
Iron and steel (371)	261	115	Radio (3832)	78	37
Leather (323)	68	158	Rubber products (355)	62	152
Machinery (382)	178	142	Ship (3841)	89	127
Metal products (381)	183	157	Spinning (3211)	38	114
Motor vehicle (3843)	85	70	Synthetic resins (3513)	85	71
Non-ferrous metal (372)	105	160	Textiles (321)	150	192
Non-metal products (369)	160	128	Tobacco (314)	58	14
Office and computing (3825)	89	153	Transportation equipment (384)	193	56
Other chemicals (352)	398	98	Wood products (331)	154	148