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**Inheritance Law and
Investment in Family Firms**

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Summary
Entrepreneurs may be constrained by the law to bequeath a minimal stake to non-controlling heirs. The size of this stake can reduce investment in family firms, by reducing the future income they can pledge to external financiers. Using a purpose-built indicator of the permissiveness of inheritance law 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. Moreover, as predicted by the model, inheritance law affects investment only in family firms that experience a succession.

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Recent international evidence highlights the importance of family-owned firms: 45 percent of publicly listed international firms are family-owned (La Porta et al., 1999), and even in the U.S. family firms' presence is significant with almost one third of S&P500 firms and 37 percent of Fortune 500 being family-owned (Anderson and Reeb, 2003, and Villalonga and Amit, 2006). Therefore it is not surprising that an increasingly large body of empirical literature focuses on the performance of family firms, and in particular by the way in which their performance is affected by the intergenerational transfer of control.

So far, two main problems associated to intergenerational succession in family firms have been investigated. First, the heir may not be as talented as the founder or a market professional, and this 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 (2008) document with reference to Thai family firms that control by a larger number of male siblings is associated with lower performance.[1] Indeed, various measures of firm performance (return on assets and market-to-book ratios) deteriorate when control is passed from the founder to a family descendant (Morck, Shleifer, and Vishny 1988, McConaughy et al. 1998, Fahlenbrach, 2005, and Perez-Gonzalez, 2006).

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 constrain its ability to fund

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[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).

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 countries with a common law tradition, there are no restrictions on the fraction 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 investment and growth 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 in different 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 appropriate 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 private benefits are reduced, and on the controlling shareholder's wealth, as in Holmstrom and Tirole (1997). By reducing the controlling heir's wealth, restrictive 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, stricter

inheritance law reduces investment 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 reducing the investment of family firms. The adverse effect of the inheritance tax on the investment is stronger 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 stricter 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. 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. If retaining the firm in the family also yields non-monetary benefits of control, and if family firms differ from non-family ones only for the presence of the inheritance constraint, then 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 limits that inheritance law sets to 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 collect 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. This maximum share binds the testator's actions, as it cannot be exceeded via inter-vivos donations, with heirs being generally entitled to challenge in court donations made in breach of their rights. Inheritance law is also binding in another sense: the median household headed by a wealthy entrepreneur features more than one child (in almost all the countries for which we have such data), so that in most cases the choice of a controlling heir and of his (or her) stake is not a trivial decision.

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. In our baseline regression, we include fixed country and industry effects, but can still identify the effect of inheritance law on investment by exploiting its differential effect on family and non-family firms: in line with our model's predictions, we find that a more permissive inheritance law is associated with larger investment in family firms, and that this effect is amplified in countries that also feature better investor protection.

Our second test is based on a methodology similar to that used by Rajan and Zingales (1998), suitably adapted to take into account that our data are at firm-level (rather than industry-level) and that we are interested in the effect of inheritance law and investor protection (as opposed to financial development) on investment. We regress the investment rate of each firm (averaged over the time interval of our sample) on Rajan and Zingales' indicator of financial dependence, interacted with our measure of the permissiveness of the inheritance law, with various measures of investor protection, and with the product of these

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two variables, controlling for country and industry fixed effects. This methodology allows us to test not only whether inheritance law matters for family firms' investment, but also whether it does *not* matter for *non*-family firms' investment. Also this further implication of the model turns out to be consistent with the data: the permissiveness of inheritance law enhances investment only in family firms.

To probe the data further, we split the sample of family firms into a group that experience succession during the sample period and another group that do not, in line with the idea that inheritance laws should be relevant mainly for firms that experience an intergenerational transfer of control. The data are consistent with this hypothesis as well. Finally, we estimate a panel regression with firm fixed effects using the sub-sample of family firms, and test whether their investment declines in the wake of a succession and whether this decline is attenuated in countries where inheritance law is more permissive and investor protection is stronger. Also these predictions are born out by the data.

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 various extensions of the baseline model, mainly aimed at exploring the robustness of its predictions. Section 3 presents the data. Section 4 explains the empirical strategy and reports the estimates. Section 5 concludes.

1. The model

We consider a firm that is initially owned by its founder, who has two prospective heirs, denoted as 1 and 2.[2] The firm is the combination of physical assets, whose scrap value is normalized to 1, and entrepreneurial "know-how". The founder's wealth is entirely invested in the firm's physical assets. Only the founder and heir 1 have the know-how to run the firm.[3]

All parties have linear utility and no discounting: they simply maximize their final wealth. We assume a perfectly competitive capital market, whose equilibrium interest rate is standardized to zero for simplicity.

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). The assumption that partial liquidation is efficient is made only for simplicity and will be relaxed in Section 2.2.

At $t = 0$, the founder retires and must choose how much he wants to leave to each of his heirs.[4] As the entire 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

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

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

[4] 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 firm's assets but also its know-how to an outsider, and distribute the sale proceeds among the two heirs. We explore this extension in Section 2.3.

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 expositional simplicity, we stick to the first interpretation.

The founder chooses the split between the heirs, x, so as to maximize their total wealth: [5]

$$w_f = w_1 + w_2,\qquad\qquad (1)$$

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 3, in many countries the law sets a lower bound on the share of the estate that each heir must receive.[6] We capture this legal constraint by assuming that the founder must assign a minimum fraction u of total wealth to the non-controlling heir, that is, $w_2 = x \geq u$, and therefore entitles heir 2 to challenge in court any division of the founder's estate that does not satisfy this condition. 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 funding to raise on the capital market. The firm's investment I is funded by heir 1's wealth $1-x$ plus external

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[5] 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 2.5.

[6] 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.

funds that he raises. Investors are given a claim R_I over the firm's cash flow. This claim can be thought of as debt or non-voting equity. For the sake of clarity, we will stick to the first interpretation. Each unit of capital costs 1, and at $t = 2$ yields revenue $1 + g$ (for $g > 0$), up to a critical level $\bar{I}$.[7] Therefore, the firm's revenue is

$$R = \begin{cases} (1+g)I & \text{if } I \leq \bar{I}, \\ (1+g)\bar{I} & \text{otherwise.} \end{cases} \tag{2}$$

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

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[7] 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.

firms agrees with a large body of evidence (see Beck and Levine, 2005, and Malmendier, 2007, for two recent surveys).

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 and the effect of the inheritance constraint on investment for different degrees of investor protection $\bar{\phi}$.

At date 2, heir 1 decides how to allocate the revenues. The law constrains him to divert at most $\bar{\phi}R$ as private benefits. As diversion is costless, heir 1 extracts the maximum benefit allowed by the law, $\bar{\phi}$, so that the firm's pledgeable income is $(1-\bar{\phi})R = (1-\bar{\phi})(1+g)I$.

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 $g > 0$, 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: $R_I \leq (1-\bar{\phi})(1+g)I$. 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 $(1-\bar{\phi})(1+g)I$. Taken together, heir 1's optimal investment choice and the investors' participation constraint imply:

$$(1-\bar{\phi})(1+g)I = I-(1-x). \tag{3}$$

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

(i) Unconstrained investment: if $(1+g)(1-\bar{\phi}) \geq 1$, 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 $\bar{I}$.

(ii) Finance-constrained investment: if $(1+g)(1-\bar{\phi}) < 1$, 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. Here investment is determined by equation (3): $I = (1-x)/[1-(1+g)(1-\bar{\phi})]$, and heir 1 can borrow up to $(1-x)(1+g)(1-\bar{\phi})/[1-(1+g)(1-\bar{\phi})]$. In other words, for every dollar of his wealth $1-x$ invested in the firm, heir 1 can borrow an additional amount $(1+g)(1-\bar{\phi})/[1-(1+g)(1-\bar{\phi})]$, which is increasing in profitability g and investor protection $1-\bar{\phi}$. Moreover, the larger the wealth invested by heir 1, the greater his borrowing capacity. Heir 1 will use his entire borrowing capacity only if investment is below the efficient scale $\bar{I}$. Thus investment is [8]

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

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,

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[8] 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. The assumption that cash flow rights and voting rights can be perfectly separated, while extreme, is made only for simplicity. 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.

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

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

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

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 remains under family control, then a fraction u of its assets are liquidated, its investment is* $I = \min\left\{\overline{I}, (1-u)/[1-(1+g)(1-\overline{\phi})]\right\}$ *and the founder's welfare is*

$$w_f = 1 + g \min\left\{\overline{I}, (1-u)/[1-(1+g)(1-\overline{\phi})]\right\}.$$

This proposition implies that the firm can achieve the efficient level of investment $\overline{I}$ if $1 - \overline{\phi} \geq [1 - (1-u)/\overline{I}]/(1+g)$. 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 $1 - \overline{\phi}$ that the inheritance law imposes no efficiency loss. This is most clearly seen in the limiting case of perfect investor protection, $1 - \overline{\phi} = 1$, where the previous condition is always met (recalling that $\overline{I} > 1$ 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. $1-\bar{\phi}<[1-(1-u)/\bar{I}]/(1+g)$, 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 constrained region, which corresponds to the shaded area in Figure 2, (i) a more permissive inheritance law (a greater $1-u$) reduces the share of family assets to be liquidated, and thereby increases investment and founder's utility, (ii) stronger investor protection enhances investment, and (iii) its positive effect is larger the more permissive is inheritance law. These results follow from the following derivatives being all positive in this region:

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

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

These results are summarized formally in the following proposition:

Proposition 2. *If investor protection is low $(1-\bar{\phi}<[1-(1-u)/\bar{I}]/(1+g))$, then an increase in the permissiveness of inheritance law $1-u$ raises the investment of family firms. This effect is increasing in the degree of investor protection $1-\bar{\phi}$. If instead investor protection is high $(1-\bar{\phi}\geq[1-(1-u)/\bar{I}]/(1+g))$, 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.[9]

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[9] Of course this does not rule out 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.

2. Extensions and Robustness of the Model

In the baseline model just analyzed, we 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 briefly discuss 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 bequests, the wealth transmitted by the founder to his heirs is only a fraction $1-\tau$ of the bequest.[10] 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 $u(1-\tau)$.[11]

Going through the same steps as in the previous analysis, it is easy to show that the level of investment is $I = \min\{\bar{I}, (1-\tau)(1-u)/[1-(1+g)(1-\bar{\phi})]\}$. 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 $1-\tau$. 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 law on investment is dampened relative to the case where the inheritance tax is not present.

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[10] The presence of the inheritance tax may also affect the allocation of consumption across generations, as it makes 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.

[11] 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 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 it is never optimal for the founder to liquidate a fraction of the assets to compensate heir 2. A more efficient arrangement is for him to satisfy the inheritance law constraint of heir 2 by assigning him a financial claim. Since heir 2 is entitled to reject any offer that violates his claim, the value of this financial claim must be at least equal to u. For instance, heir 2 could be given a debt claim $R_2 = u$ with a covenant that prevents heir 1 from issuing more senior debt. Alternatively, he can be given an equity stake if heir stipulates not to dilute its value below u by issuing more equity.

The only amendment to be made to the model's time line 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, $\bar{\phi}(1+g)I$. Anticipating his decision, the investors' participation constraint at $t = 1$ is

$$R_1 \geq I - 1,$$

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_1 cannot exceed the pledgeable income $(1-\bar{\phi})(1+g)I$ minus heir 2's claim, R_2.

Formally, $R_1 \leq (1-\bar{\phi})(1+g)I - R_2$.

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

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

As in the baseline model, we must distinguish between two cases:

(i) If $(1 + g)(1 - \bar{\phi}) \geq 1$ 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 $w_f = 1 + g\bar{I}$.

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

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 $I - (1 - u)$.

Finally, we have to check that heir 2's participation constraint, $(1 + g)I(1 - \bar{\phi}) \geq u$ is indeed satisfied.[12] Note that this participation constraint is equivalent to imposing that investment satisfies 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 $1 - \bar{\phi} \geq u / (1 + g)$. If instead $1 - \bar{\phi} < u / (1 + g)$, 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

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[12] Otherwise heir 2 would force liquidation of the firm's assets.

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 gI.

In conclusion, the additional insight from the presence of inefficient partial liquidation 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 Sell-out decision

So far only heir 1 was assumed to be the only agent 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 it out 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 benefit of control.[13]

Therefore, if the amenity potential is so high as to exceed the firm's competitive price, then obviously the family will retain control. When instead the amenity potential is below the firm's price a tradeoff arises: the family will be ready to sacrifice the amenity potential only if

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[13] 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, firm ownership allows the family to be a member of important political or social networks.

keeping the firm under family control would severely limit its investment, which occurs if investor protection is sufficiently poor.

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), *ceteris paribus*, 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. However, the amenity potential may happen to be higher in countries with strict inheritance law and poor legal investor protection. If indeed this were the case, the sample selection bias would tend to boost the effect of inheritance law and investor protection on family firm investment.

2.4. Shared control

So far, we have maintained 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 the 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 $(1-\bar{\phi})(1+g)I$. 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 heirs manage to jointly 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 $(1-u)/[1-(1+g)(1-\bar{\phi})]$ to $1/[1-(1+g)(1-\bar{\phi})]$, 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 heirs, and thereby curtail family firm investment below its efficient level. However, this investment shortfall will not be systematically related to inheritance law.

2.5. 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 $x = (1+g)\phi/[2(1+g)\phi - g] > 1/2$, if the firm is in the financially constrained region $((1+g)(1-\bar{\phi}) > 1)$: 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 predictions about firm investment we bring together two types of data: (i) measures of country-level institutional characteristics, which include novel indicators of 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 sent to law firms belonging to the Lex Mundi association and in some cases from other sources, such as direct access to legal sources.[14] The resulting measure is displayed in the first five columns of Table 1. In each country, this measure varies depending on the presence of a surviving spouse and of the total number of children.[15] 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.[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

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[14] 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.

[15] For some countries, 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 by our simple indicator. Specifically: (i) for Bangladesh, Jordan, Kuwait and Saudi Arabia, we assume that heirs are all male, as in those countries male heirs receive twice as much as females; (ii) in Canada, we disregarded the case of Quebec, where 50 percent 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 percent but in some states can be up to 50 percent, 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.

[16] 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 an heir is deprived of his/her inheritance may contest such a donation only under certain conditions and within specified deadlines.

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 other siblings. For instance in Italy, a person with a spouse and two children can freely

allocate only one fourth of his total wealth, so that he cannot give more than 50 percent of the

family's wealth to one child. The figure goes down to 41.7 percent with three children, and

decreases monotonically to 33.3 percent with six children (not shown 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 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 these will have to take a decision on which child gets control

and confer him/her a different stake in countries with different inheritance laws.

That civil law countries have more restrictive inheritance laws is confirmed by 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 percent if there are two siblings and 54 percent if

there are three, while in common law countries the corresponding figure is 96 percent 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 percent

for the case of two children and a spouse, and from 25 to 100 percent for the case of three

children and a spouse. In other words, not all civil law countries are equally restrictive.

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[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.

[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 from 0.35 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 0.19 (and not significant) for the legality index defined by Berkowitz et al. (2003).[18]

3.2. Firm-level data

In the 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

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

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, when all these sources proved ineffective, we 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.

A company is defined as a non-family firm if (i) the ownership sources (Worldscope, AMADEUS, Faccio and Lang (2002) and Claessens et al. (2000)) indicate 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 at least 20 percent of the cash flow rights[20] are owned by a single family, although later we test the robustness of our results to alternative definitions. This baseline definition is stricter than the definitions used so far by the literature, and leaves us with 3,288 firms out of the total 10,245 firms in our sample that are classified as family-owned.

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 web site or, failing this, by contacting the firm. Since it is reasonable to expect that any impact of

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[19] We drew information on whether the firm's founding family is still present in the ownership structure and 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 sought information on its beneficial owners or controlling family by looking at the respective web sites. If the foundation or private firm is controlled by a group of people with the same last name, these are considered as the family controlling the company.

[20] We cannot use a cut-off based on voting rights, since for much of our sample this information is not available.

the succession should be felt after the transfer of control occurs, we look for successions also before 1990, which is the start year of our financial and accounting sample. Out of 3,288 family firms, 1,195 firms are found to have experienced a succession over the 21 year period from 1985 to 2006. This sample includes 1,021 family firms where the family CEO passed control to another family member and 174 family firms where he/she passed control to an outside manager. We can also ascertain that 1,552 firms did not have any succession during the 1985 to 2006 interval.[21] We could not ascertain succession for 541 family firms.

Table A1 shows that in the Worldscope data under our definition the breakdown between family and non-family firms is fairly consistent with the literature.[22] Family firms are more prevalent in civil law countries and less so in common law countries. For example, they constitute more than 44 percent of the firms in Brazil, France, Germany, Italy, Mexico, Spain, South Korea, Sweden and Taiwan whereas they constitute less than 29 percent of the firms in Australia, Canada, Ireland, Japan, and United Kingdom. These statistics are very similar to those reported 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.[23] 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 vehicles, other chemicals, petroleum and coal products, and professional goods.

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

[22] 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.

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

4. The evidence

We use a variety of empirical methodologies to test the main predictions of the model in Section 1. We start with cross-sectional estimates based on the entire sample of firms, using two different specifications: the first of these allows us to test only for the differential effect of inheritance law on family and non-family firms' investment, while the second also allows to test for the effect of inheritance law on non-family firms' investment, which we expect to be zero. Then we repeat the estimation separately for a sub-sample that includes only family firms that experience succession and another that includes only those that do not. Finally, we turn to panel data estimation for the subset of family firms that experience succession, to test whether for these firms investment changes around the succession date and whether the magnitude of this change is related to inheritance law and investor protection.

4.1. Cross-sectional regressions: entire sample

Our first specification provides a simple and direct test of our model, based on the differential effect of inheritance law on family and non-family firms. The dependent variable is the average firm-level investment rate over the sample period, defined as the ratio of capital expenditure (Capex) to total assets (I_{jsc}), where j identifies the firm, s the sector and c the country. This variable is regressed on sector effects α_s ($s = 1,…, S$) and country effects δ_c ($c = 1,…, C$), on a family firm dummy (F_{jsc})[24] and a set of interactions between this dummy and investor protection IP_c, inheritance law permissiveness H_c and their product $IP_c \cdot H_c$. As additional controls, the explanatory variables include the log of the firm's initial total assets, A_{jsc}, and of its initial market-to-book ratio, MB_{jsc}, and their interactions with the family firm dummy variable. Initial total assets and the market-to-book ratio are respectively

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[24] This dummy equals 1 if the firm is owned by a family blockholder with at least 20 percent of the firm's cash flow rights and 0 otherwise.

meant to control for the firm's size and its investment opportunities, and are measured in the first year for which data are available in Worldscope.[25] Therefore, the specification is:

$$I_{jsc} = \alpha_s + \delta_c + \left(\beta_0 + \beta_1 IP_c + \beta_2 H_c + \beta_3 IP_c \cdot H_c + \beta_4 A_{jsc} + \beta_5 MB_{jsc} \right) \cdot F_j$$
$$+ \beta_6 A_{jsc} + \beta_7 MB_{jsc}. \tag{7}$$

The main testable predictions of the model are that $\beta_2 > 0$ and $\beta_3 > 0$, that is, the permissiveness of inheritance law H_c has a differential impact on family and non-family firms, both directly and through its interaction with IP_c. Owing to the presence of both family and non-family firms in our sample, this methodology allows us to identify the effect of these legal variables through their differential impact on these two types of firms, while controlling for unobserved heterogeneity at the country and industry levels via fixed effects.

We show the estimates of this regression in Table 3, where standard errors are corrected for clustering at the country level. In each column of Table 3, the degree of investor protection IP_c is measured by a different index: (a) the revised anti-director rights index of LLSV (1998) in column 1, (b) the self-dealing index of Djankov et al. (2008) in column 2, (c) the anti-director rights index of Spamann (2008) in column 3, and (d) the creditors' rights index of Djankov et al. (2007) in column 4. Employing these four different indices allows probing the robustness of our results, given that in the literature there is no clear consensus about measures of investor protection. We also include a measure of creditor rights protection because debt finance is an important source of finance for family firms.

[Insert Table 3]

The most important result in Table 3 is that inheritance law permissiveness has a strong positive impact on family firms' investment compared to that of non-family firms. Three out

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

of the four coefficient estimates of β_2 are significantly different from zero at the 5 percent level and in all instances the impact is economically significant.

The second striking result is that the coefficient β_3 is also positive and significant, implying that the effect of inheritance law permissiveness on family firm investment (relative to that of non-family firms) is amplified by the strength of investor protection. The estimate of β_3 is statistically significant at the 5 percent level when investor protection is measured by the self-dealing index (column 2) and at the 10 percent level when measured by the anti-director rights index (columns 1 and 3), while it is not significant when we rely on the creditors' rights index.

In most cases the impact of inheritance law permissiveness on family firms' investments is also economically significant. To understand its economic magnitude, we consider an 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, in a country with the mean level of self-dealing index (which in our sample is Belgium, whose index is 0.54). This change in inheritance law permissiveness will increase Capex ratio of family firms by 1.5 percent, an increase of more than 16 percentage points in the mean Capex ratio of family firms.[26] Similar impacts, albeit lower in magnitude, are obtained when we use the two anti-director rights indices and the creditors' rights index to measure investor protection.

The other estimates in the table show that family firms tend to have higher investment than non-family firms, though the difference is not statistically significant, and that this difference increases as investor protection improves, although this result is statistically significant at the 10 percent confidence level only when we use the revised anti-director rights

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[26] To obtain this economic impact we use the estimates of the two interaction terms that include inheritance laws (β_2 and β_3).

index of LLSV (1998) and the self-dealing index of Djankov et al. (2008). The estimates also indicate that firms' initial assets and initial investment opportunities increase investment, but that these variables do not differentially affect family and non-family firms' investment.

A limitation of the specification of Table 3 is that it allows us only to gauge the differential impact of inheritance laws on family relative to non-family firms, but not to estimate the impact of inheritance laws on non-family firms, which by our model should be zero. Testing this hypothesis would require including inheritance law among the regressors, which is not feasible in this specification, because this variable is perfectly collinear with the country effects. To investigate this further prediction, and at the same time take into account that according to our model H_c and IP_c should affect family firms only if these are financially constrained, we employ a second specification. This is based on the approach 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 financial development constrains the growth of each industry in each country) and use this interacted variable in a regression for industry-level growth. Financial dependence measures each industry's need for external finance from U.S. firm-level data, on the assumption that for U.S. listed firms access to financial markets is not an obstacle to investment. Thus, differences across U.S. firms in reliance on external finance reflect primarily differences in the demand for funds due to differences in technology. The methodology rests on the assumption that these technology-driven capital requirements vary across industries but not across countries.

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In our context, the main advantage of this methodology is that, by interacting legal variables with the sectoral index of financial dependence (D_s), it allows us to identify the coefficients of these variables for *both* family and non-family firms, while still including fixed effects to control for unobserved heterogeneity at the country and industry level. More specifically, the equation to be estimated includes a set of interactions of financial dependence D_s with investor protection IP_c, inheritance law permissiveness H_c and their product $IP_c \cdot H_c$, beside the variables in (7):

$$
\begin{aligned}
I_{jsc} = \alpha_s + \delta_c + &\left(\beta_0 + \beta_1 D_s \cdot IP_c + \beta_2 D_s \cdot H_c + \beta_3 D_s \cdot IP_c \cdot H_c + \beta_4 A_{jsc} + \beta_5 MB_{jsc} \right) \cdot F_{jsc} \\
&+ \beta_6 D_s \cdot IP_c + \beta_7 D_s \cdot H_c + \beta_8 D_s \cdot IP_c \cdot H_c + \beta_9 A_{jsc} + \beta_{10} MB_{jsc}.
\end{aligned}
\tag{8}
$$

Set in the context of specification (8), the testable predictions of our model are twofold: not only $\beta_2 > 0$ and $\beta_3 > 0$, that is, H_c should have a larger impact on family than on non-family firms, *but also* $\beta_7 = 0$ and $\beta_8 = 0$, meaning that H_c should have no impact on non-family firms. Yet another prediction that can be tested is whether financial constraints affect the investment of the two groups of firms, by looking at the coefficients of IP_c: specifically, $\beta_6 > 0$ and $\beta_1 + \beta_6 > 0$ would respectively indicate that both non-family and family firms are financially constrained, respectively, and $\beta_1 > 0$ that the financial constraints faced by family firms are more stringent than those of non-family ones.

[Insert Table 4]

Table 4 confirms the central results of Table 3. The interaction between the family firm dummy, financial dependence and inheritance law permissiveness has a positive and significant coefficient ($\beta_2 > 0$), and the same is true of the interaction of these three variables with investor protection ($\beta_3 > 0$). In other words, the permissiveness of the inheritance law is

more favorable for the performance of family firms, relative to non-family firms, in countries where investor protection is stronger.

The value added of the estimates in Table 4 is that they show that the interaction terms that include inheritance law but exclude the family firm dummy are not significantly different from zero, that is, the hypotheses $\beta_7 = 0$ and $\beta_8 = 0$ cannot be rejected. This is as expected: inheritance law matters only matter for family firms, whose effect is already controlled for by the terms whose coefficients are β_2 and β_3.

To gauge the overall economic significance of the estimated effect of inheritance laws on family firms, we consider an increase in 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. We assess the overall impact on family firm investment using the estimates shown in column 2 of the interaction terms that include inheritance law permissiveness and the family firm dummy (β_2, β_3, β_7 and β_8). This exercise is performed for an industry with the mean level of financial dependence (0.31) and a country with the mean level of self-dealing index (0.54). Such a change in inheritance law permissiveness is estimated to increase the Capex ratio of family firms by almost 1.8 percent, which is more than 19 percentage points of its mean. Similarly, the estimates in columns 1, 3 and 4 imply a 14.5, 15 and 8 percentage points increase in family firms' investment, respectively.

In addition, the positive and significant estimate of the coefficient β_6 of the interaction between financial dependence and investor protection indicates that an improvement in investor protection promotes investment in both types of firms. The evidence that the financial constraints are more stringent for family firms is rather tenuous, since the coefficient β_1 – though positive – is rather imprecisely estimated in most specifications,

Finally, the estimates of Table 4 confirm that, consistent with our findings in Table 3, family firms tend to have higher investment than non-family ones (though again the difference is not statistically significant) and that the coefficients of both initial assets and market-to-book ratio are positive and significant, as expected.

4.2. Cross-sectional regressions: family firms with and without succession

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 experienced a succession (a control transfer from the entrepreneur to his/her offspring or immediate relatives) between 1985 and 2006, and those that did not. In our sample we have 1,025 family firms that experienced succession, 1,548 firms that did not and 541 firms for which we were unable to obtain any information. This means that almost a third of our family firms experienced a succession, by which control was handed over to another family member. We also have 174 family firms where control was transferred to a professional manager.

Our model predicts that the effect of inheritance law should be concentrated in the sample of family firms that experienced succession in the sample period. To this purpose, we re-estimate the RZ specification shown in Table 4 before, but separately for family firms that experienced succession (Panel A) and those that did not (Panel B). The sub-sample used in Panel A is obtained by removing from the sample those family firms (a) that did not experience succession, (b) for which we have no information on succession, and (c) for which succession occurred but control was handed over from a family member to an outside manager. This leaves us with a sample of 7,982 firms, formed by family firms experiencing

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succession plus all the non-family firms. The sub-sample in Panel B instead excludes all family firms that experienced a succession where control was handed over to another family member, and therefore comprises the family firms not experiencing succession plus all the non-family firms. We estimate both specifications (7) and (8), but for the sake of brevity Table 5 only reports the results obtained with specification (8): the estimates obtained with (7) are very similar.

[Insert Table 5]

The coefficients β_2 and β_3 of the two interaction variables that include inheritance law permissiveness 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 smaller and less precisely estimated. This result shows that the driving force behind our results in Tables 3 and 4 is the sub-sample of family firms that experience succession. Also the coefficient β_6 of the interaction between financial dependence and investor protection confirms the finding in Table 4 that firms are subject to financing constraints, but now the estimate of β_1 shows that the magnitude of the 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.

4.3. Panel regressions: family firms before and after succession

Yet 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 in family firms experiencing a succession investment should decrease more in countries with restrictive inheritance laws.

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As a preliminary step to gauge how inheritance law affects the pattern of investment around the succession date, in Figure 3 we plot the average Capex ratio for the 1,025 family firms that experienced both succession and handover of control to another family member, separately for a sub-sample of firms where inheritance law is relatively permissive (above-median permissiveness) and another sub-sample where it is not (below-median permissiveness). The figure shows that firms in countries with relatively rigid inheritance law experience a larger drop in investment than those in countries with more permissive inheritance law. More precisely, in countries with rigid inheritance law, mean Capex ratio drops from 8.4 percent in the five years before succession to 6.3 percent in the subsequent nine years – the difference being significant at the 10 percent level. In contrast, in countries with permissive inheritance law the mean Capex ratio drops only from 9.6 percent to 8.8 percent, and the difference is not statistically different from zero. This suggests that the effect of inheritance law permissiveness on family firm investment occurs precisely around the time of succession.

[Insert Figure 3]

To investigate this point in a panel estimation framework, we define a firm-level "succession dummy" variable S_{jt}, which for each firm j equals 1 during and after the succession and 0 for previous years, and estimate two specifications. The first is:

$$I_{jt} = \delta_j + \delta_t + \left(\phi_1 + \phi_2 IP_c + \phi_3 H_c + \phi_4 IP_c \cdot H_c \right) \cdot S_{jt}, \tag{9}$$

where δ_j are firm fixed effects and δ_t are calendar year effects, while the second one is based on the RZ methodology:

$$I_{jt} = \delta_j + \delta_t + \left(\phi_1 + \phi_2 D_s \cdot IP_c + \phi_3 D_s \cdot H_c + \phi_4 D_s \cdot IP_c \cdot H_c \right) \cdot S_{jt}. \tag{10}$$

In both specifications, the dependent variable is the ratio of Capex of firm j in year t to its Total Assets in year $t-1$, while all other variables are defined as in previous expressions.

We estimate these regressions on two samples. First, we concentrate on the sub-sample of 1,025 family firms that experienced succession and where control was handed over to a family member.[27] Second, we use the whole sample of family firms, removing only those for which (a) we have no information about the occurrence of succession or (b) succession occurred but led to a control transfer to an outside manager. In this second approach, the sample consists of 2,573 family firms. For the sake of brevity, in Table 6 we present only the results from the sample of family firms with succession: the results that we obtain with the larger sample are similar, and indeed are statistically and economically stronger.

[Insert Table 6]

Succession has a strong and significantly negative impact on family firm investment ($\phi_1 < 0$). The impact is economically significant: succession leads to a decrease of investment by around 16 percentage points. But inheritance law permissiveness is found to mitigate this negative impact of succession on family firm investment (or, equivalently, its strictness exacerbates this negative impact), as shown by the fact that the estimated coefficient ϕ_3 is positive and precisely estimated. The estimated coefficient ϕ_4 for the triple interactive term is also positive but is significant only when we use the revised anti-director rights index (at the 10 percent level) and the self-dealing index (at the 5 percent level). The mitigating influence of inheritance laws is considerable: taking together the impact from both coefficient estimates we find that an increase in inheritance law permissiveness from the 25th to the 75th percentile decreases the negative impact of succession by more than 13 percentage points.

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[27] Hence, we remove family firms with succession where control was passed to an outside manager.

Better investor protection is found to exert a similar mitigating influence on the post-succession investment drop. To gauge the overall impact, one must add the estimated coefficient of the succession dummy, ϕ_1, that of its interaction with investor protection, ϕ_2, and that of the interaction with investor protection and inheritance law permissiveness, ϕ_4. For example, increasing investor protection (using the self-dealing index) by one standard deviation away from its mean decreases the negative impact of succession by almost 7 percentage points. This mitigating effect, though precisely estimated only when using the anti-director rights index and the self-dealing index, is consistent with the view that higher investor protection allows family firms to suffer less from the increased stringency of financial constraints around succession.

4.4. Robustness checks

Finally, we perform a variety of robustness checks of the empirical results reported so far. First of all, we investigate whether our results are robust to the use of sales growth as the dependent variable rather than capital expenditure, as our model implies that inheritance law also affects family firms' growth. We require data on sales for at least seven consecutive years, so that missing data reduce the number of family firms to 2,191 and of non-family firms to 5,468. We report the results using sales growth as the dependent variable in Table 7. For sake of brevity we only show the results obtained with specification (8) but similar results are obtained with (7).

[Insert Table 7]

For the main coefficients of interest, most of the estimates in Table 7 are more imprecise and smaller in size than those obtained in Table 4. But the important result in the context of this paper is that the coefficient estimates of the interaction between the family firm dummy,

financial dependence and inheritance law permissiveness are positive and are both statistically and economically significant, confirming the results obtained for investment in Table 4. Increasing the index of inheritance law permissiveness from the 25th to the 75th percentile increases family firms' growth by 9 to 12 percentage points. The estimates of the interaction between the family firm dummy, financial dependence and investor protection in the second row are positive but in general they lack statistical significance, implying that the growth in family firms is not more sensitive to improvements in investor protection than that of non-family firms. Also the estimated coefficient of the interaction between financial dependence, inheritance law permissiveness and investor protection is not significantly different from zero.

We conclude by performing four other robustness checks of the results obtained in Table 3 and 4. Their results are shown in Table 8.

[Insert Table 8]

In Panel A, we control for the effect of the tax rate on bequests, using data for the top marginal transfer rate from parent to children from the Coopers and Lybrand International Tax Summaries.[28] 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. We adapt specification (8), by adding a new interaction term between the family firm dummy, financial dependence and inheritance taxes. Second, and 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 main impact of introducing inheritance taxes is that, while the results for β_2 and β_3 remain largely unchanged, their statistical and economic significance decreases relative to that in Table 4. The estimates in the

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[28] These data were kindly provided by Antoinette Schoar.

fourth and fifth rows show that the effect of inheritance taxes on investment is negative and larger for family firms, consistently with the model, though not significant even for them.[29]

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 counter the possible criticism that, given the correlation between our inheritance law index and common law countries, the 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 4 survive even when we restrict the sample to firms in civil countries alone, although with two differences: the size and precision of the estimate of β_2 are smaller than those obtained with the full sample, and the estimate of β_3 is no longer statistically significant. This is to be expected, since the variability in the inheritance law index is greatly reduced when all common law countries are removed from the sample. Even so, 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 firms. Recall that in earlier tables family firms were defined as those where a family owns at least 20 percent of the firm's 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 this reduces the likelihood that coefficient estimates be contaminated by the presence of non-family firms mistakenly classified as family firms. 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 20 percent of the cash flow rights but also to participate in the firm's active management either by holding the CEO position or by having

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[29] 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 4 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. The results are not shown here for the sake of brevity.

members on the board of directors; and a less restrictive one, which requires the family blockholder to own at least 5 percent 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 coefficient estimate of β_3 gains in statistical and economic significance when we use a more restrictive definition of family firm compared to the results shown in Table 4 and loses its statistical significance when we use a less restrictive definition.

Our last robustness check deals with the definition of financial dependence used in the estimation of specification (8). 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. If so, it would be more reasonable to use the financial dependence of the median U.S. firm in the same size class where the international firm is placed: for instance, one should use the financial dependence of the median U.S. firm in the small-firm 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: we split 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 so far do not change: 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 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: in the words of a family entrepreneur, "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".[30] Similarly, the main business newspaper criticizes the restrictiveness of Italian inheritance law: "In the likely case where the designated (controlling) heir does not have enough wealth to compensate the other heirs, the generational transfer would be possible only when the family firm has a large borrowing capacity".[31] 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.[32]

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 on the founder's estate lead to lower investment by family firms, 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 and growth in

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

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

[32] 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. Similar legal battles have occurred in other prominent business dynasties, such as the owners of Campari, Star, Mondadori and Coin, and especially Marzotto.

family firms, while it leaves investment unaffected in non-family firms. Moreover, the negative effect of strict inheritance law on family firms' investment is exacerbated by poor investor protection, which is also in accordance with the model.

We also find that the results are mostly driven by family firms that experience succession in our sample 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. Indeed we find that during and after succession family firms experience a decrease in investment that is more severe for firms located in countries with stricter inheritance law. Also in this case, poor investor protection is found to exacerbate the effect of strict inheritance law, as well as having a direct negative effect on investment.

Our results are robust to the use of different specifications of the investment equation, to the inclusion of inheritance taxes (which have no statistically significant effect on family firms' investments), to different definitions of family firms and different measures 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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Table 1. Inheritance Law Permissiveness and Investor Protection Around the World

Columns 1 to 5 report 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. Regressions 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. 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: Family Firm is a dummy variable that equals 1 for family firms and 0 otherwise; Family Firm × Investor Protection is interaction between the Family Firm dummy variable and a measure of Investor Protection; Family Firm × Inheritance Law is the interaction between the Family Firm dummy variable and the maximum share that can be given to a child in the presence of a spouse and three children; and Family Firm × Inheritance Law × Investor Protection is the interaction of all three variables. Investor Protection is defined as the Revised Anti-Director Rights Index of LLSV (1998) in column 1, the Self Dealing Index of Djankov et al. (2008) in column 2, the Anti-Director Rights Index of Spamann (2008) in column 3, and the Creditors' Rights Index of Djankov et al. (2007) in column 4. Standard errors are corrected for clustering at the country level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	1	2	3	4
Family Firm	0.0029	0.0031	0.0030	0.0034
	(1.52)	(1.56)	(1.57)	(1.60)
Family Firm × Investor Protection	0.0035*	0.0186*	0.0046*	0.0018
	(1.84)	(1.88)	(1.70)	(1.29)
Family Firm × Inheritance Law Permissiveness	0.0182**	0.0201**	0.0179**	0.0205*
	(2.21)	(2.26)	(2.04)	(1.89)
Family Firm × Inheritance Law Permissiveness × Investor Protection	0.0079*	0.0362*	0.0048	0.0072
	(1.80)	(1.90)	(1.62)	(1.59)
Family Firm × Log of Initial Market-to-Book	0.0018	0.0020	0.0017	0.0021
	(0.76)	(0.80)	(0.89)	(0.92)
Family Firm × Log of Initial Assets	0.0009	0.0008	0.0010	0.0007
	(1.08)	(1.02)	(1.14)	(0.92)
Log of Initial Market-to-Book	0.0534**	0.0591**	0.0560**	0.0608**
	(2.38)	(2.26)	(2.49)	(2.45)
Log of Initial Assets	0.0042**	0.0040**	0.0039***	0.0046**
	(2.58)	(2.55)	(2.94)	(2.23)
Country and Industry effects	YES	YES	YES	YES
Adjusted R^2	0.2562	0.2714	0.2618	0.2082
Number of Observations	10,245	10,245	10,245	10,245

Table 4. Regressions of Family and Non-Family Firms' Investment With Financial Dependence

This table presents the estimates of a cross-sectional regression model for 10,245 firms from 32 countries. The dependent variable is the mean of the ratio of Capital Expenditure to Total Assets in the previous year and calculated as described in Table 3. The independent variables are as follows: Family Firm is a dummy variable that equals 1 for family firms and 0 otherwise; Family Firm × Financial Dependence × Investor Protection is the interaction between the Family Firm dummy, Financial Dependence and Investor Protection; Family Firm × Financial Dependence × Inheritance Law is the interaction between the Family Firm dummy, Financial Dependence and the maximum share that can be given to a child in the presence of a spouse and three children; and Family Firm × Financial Dependence × Inheritance Law × Investor Protection is the interaction of all four variables. Financial Dependence is drawn from Rajan and Zingales (1998). Investor Protection is defined as the Revised Anti-Director Rights Index of LLSV (1998) in column 1, the Self Dealing Index of Djankov et al. (2008) in column 2, the Anti-Director Rights Index of Spamann (2008) in column 3, and the Creditors' Rights Index of Djankov et al. (2007) in column 4. Standard errors are corrected for clustering at the country level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	1	2	3	4
Family Firm	0.0019	0.0020	0.0016	0.0025
	(1.05)	(1.09)	(0.99)	(1.18)
Family Firm × Financial Dependence × Investor Protection	0.0085*	0.0482*	0.0082	0.0042
	(1.70)	(1.82)	(1.62)	(1.28)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0687**	0.0801**	0.0708**	0.0532*
	(2.19)	(2.26)	(2.01)	(1.89)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0089*	0.1105*	0.0142	0.0102
	(1.74)	(1.90)	(1.59)	(1.49)
Financial Dependence × Investor Protection	0.0122**	0.0548**	0.0103*	0.0098*
	(1.97)	(2.08)	(1.90)	(1.72)
Financial Dependence × Inheritance Law Permissiveness	-0.0107	0.0074	0.0085	-0.0022
	(-0.78)	(0.65)	(0.52)	(-0.81)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.0021	-0.0106	-0.0017	-0.0029
	(-0.49)	(-0.82)	(-0.21)	(-0.27)
Family Firm × Log of Initial Market-to-Book	-0.0015	0.0011	-0.0014	-0.0015
	(-0.54)	(0.62)	(-0.60)	(-0.59)
Family Firm × Log of Initial Assets	0.0004	0.0002	0.0005	-0.0002
	(0.85)	(0.76)	(0.92)	(-0.41)
Log of Initial Market-to-Book	0.0380**	0.0354**	0.0409**	0.0452**
	(2.31)	(2.10)	(2.35)	(2.41)
Log of Initial Assets	0.0035**	0.0037**	0.0032***	0.0040**
	(2.27)	(2.17)	(2.41)	(2.44)
Country and Industry effects	YES	YES	YES	YES
Adjusted R^2	0.2982	0.3022	0.3184	0.2411
Number of Observations	10,245	10,245	10,245	10,245

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Table 5. Regression Analysis for Family Firms With Succession and Without Succession

This table presents the estimates of a cross-sectional regression model for 9,704 firms from 32 countries. We split the sample in two sub-samples: in Panel A, estimation is performed on the sub-sample that includes non-family firms and family firms that experienced a succession over 1985-2006 period (1,025 family firms); in Panel B, it is performed using a sub-sample that includes all non-family firms and family firms that did not experience any succession (1,548 family firms). In both cases we exclude from the sample 541 family firms for which no information on succession is available. From Panel A we also exclude 174 family firms that experienced succession where control was handed over from a family member to an outside manager. 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 defined as in Table 4. 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. The other control variables are the following: Log of Initial Market-to-Book; Log of Initial Assets; Family Firm × Log of Initial Market-to-Book; Family Firm × Log of Initial Assets. 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
Family Firm	-0.0016	-0.0019	0.0035	0.0038
	(-0.98)	(-1.02)	(1.60)	(1.62)
Family Firm × Financial Dependence × Investor Protection	0.0098*	0.0528**	0.071	0.0391
	(1.89)	(1.97)	(1.53)	(1.45)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0809**	0.0892**	0.0519	0.0654*
	(2.39)	(2.45)	(1.60)	(1.81)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0128*	0.1602**	0.0065	0.1070
	(1.91)	(2.31)	(1.40)	(1.15)
Financial Dependence × Investor Protection	0.0115*	0.0572**	0.0136*	0.0589**
	(1.90)	(2.12)	(2.05)	(2.28)
Financial Dependence × Inheritance Law Permissiveness	-0.0092	0.0058	-0.0095	0.0079
	(-0.52)	(0.57)	(-0.52)	(0.49)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.0016	-0.0084	-0.0038	-0.0089
	(-0.35)	(-0.62)	(-0.68)	(-0.79)
Country and Industry effects	YES	YES	YES	YES
Other Control Variables (see table legend)	YES	YES	YES	YES
Adjusted R^2	0.3288	0.3415	0.2604	0.2529
Number of Observations	7,982	7,982	8,679	8,679

Table 6. Capital Expenditure in Family Firms Around Succession

This table presents the estimates of a cross-sectional regression model for 1,025 family firms from 32 countries that experienced succession over the period 1985-2006. The dependent variable is the ratio of Capital Expenditure to Total Assets in the previous year. The independent variables are as follows: Succession is a dummy variable that takes the value of 1 from the year before succession until the end of the sample period and the value of 0 for all the years before; Succession × Investor Protection is the interaction between the Succession dummy variable and Investor Protection; Succession × Inheritance Law is the interaction between the Succession dummy variable and the maximum share that can be given to a child in the presence of a spouse and three children; and Succession × Inheritance Law × Investor Protection is the interaction of all three variables. Investor Protection is defined as the Revised Anti-Director Rights Index of LLSV (1998) in column 1, the Self Dealing Index of Djankov et al. (2008) in column 2, the Anti-Director Rights Index of Spamann (2008) in column 3, and the Creditors' Rights Index of Djankov et al. (2006) in column 4. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	1	2	3	4
Succession	-0.0164***	-0.0159***	-0.0162***	-0.0155***
	(-2.65)	(-2.71)	(-2.64)	(-2.51)
Succession × Investor Protection	0.0028*	0.0152*	0.0044*	0.0016
	(1.78)	(1.81)	(1.68)	(1.05)
Succession × Inheritance Law Permissiveness	0.0215**	0.0206**	0.0224**	0.0208*
	(2.08)	(2.10)	(1.97)	(1.89)
Succession × Investor Protection × Inheritance Law	0.0050*	0.0225**	0.0045	0.0031
Permissiveness	(1.76)	(1.99)	(1.49)	(1.28)
Fixed firm effects	YES	YES	YES	YES
Calendar year effects	YES	YES	YES	YES
Adjusted R^2	0.1628	0.1644	0.1681	0.1474
Number of Observations	10,721	10,721	10,721	10,721

Table 7. 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. The dependent variable is the mean of sales growth in percentage terms. 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 4. Investor Protection is defined as the Revised Anti-Director Rights Index of LLSV (1998) in column 1, the Self Dealing Index of Djankov et al. (2008) in column 2, the Anti-Director Rights Index of Spamann (2008) in column 3, and the Creditors' Rights Index of Djankov et al. (2007) in column 4. Standard errors are corrected for clustering at the country level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	1	2	3	4
Family Firm	1.0825	1.1294	1.0092	1.0072
	(0.82)	(0.85)	(0.79)	(0.76)
Family Firm × Financial Dependence × Investor Protection	0.2951	4.7412*	0.3518	0.2419
	(1.48)	(1.71)	(1.50)	(1.21)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	6.0921*	7.0782**	6.3708**	6.2508*
	(1.90)	(2.01)	(1.97)	(1.89)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.6002	7.2215	0.8571	0.7928
	(1.60)	(1.59)	(1.47)	(1.28)
Financial Dependence × Investor Protection	1.4882**	5.4531**	1.2274**	1.0998**
	(2.31)	(2.35)	(2.28)	(1.98)
Financial Dependence × Inheritance Law Permissiveness	-0.9270	-0.6811	-0.7915	-0.4112
	(-0.58)	(-0.49)	(-0.40)	(-0.51)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.1022	-0.7165	-0.1558	-0.1902
	(-0.35)	(-0.41)	(-0.31)	(-0.38)
Family Firm × Log of Initial Market-to-Book	-0.0402	-0.0421	-0.04407	-0.0425
	(-0.25)	(-0.29)	(-0.30)	(-0.28)
Family Firm × Log of Initial Assets	0.0629	0.0611	0.0640	0.0628
	(0.85)	(0.78)	(0.91)	(0.85)
Log of Initial Market-to-Book	0.9810	1.0291	0.9715	0.9601
	(1.08)	(1.10)	(1.04)	(0.99)
Log of Initial Assets	0.4817***	0.5011***	0.4906***	0.4891***
	(3.10)	(3.28)	(3.19)	(3.08)
Country and Industry effects	YES	YES	YES	YES
Adjusted R^2	0.1725	0.1587	0.1604	0.1407
Number of Observations	7,659	7,659	7,659	7,659

Table 8. Robustness Checks

This table presents several robustness checks of the estimates reported in Table 4 using the same specification. Variables are also defined as in Table 4. In Panel A we include Inheritance Tax which 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 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 Panel C.1 they are defined as firms in which a family blockholder owns at least a 20 percent share and participates in the firm's active management, while in Panel C.2 they are defined as firms in which a family blockholder owns at least a 5 percent stake. All regressions include country and industry dummies. In Panel D we repeat the estimation with a size-dependent measure of Financial Dependence, obtained splitting U.S. companies present in Compustat into three sub-samples respectively formed by large, medium and small firms, and computing financial dependence for the median company in each sub-sample. In Panels A to D Investor Protection is defined as the Revised Anti-Director Index in column 1, and the Self Dealing Index in column 2. The other control variables are the following: Family Firm; Log of Initial Market-to-Book; Log of Initial Assets; Family Firm $\times$ Log of Initial Market-to-Book; and Family Firm $\times$ Log of Initial Assets. 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

	1	2
Family Firm $\times$ Financial Dependence $\times$ Investor Protection	0.0078*	0.0409*
	(1.68)	(1.75)
Family Firm $\times$ Financial Dependence $\times$ Inheritance Law Permissiveness	0.0552**	0.0704**
	(1.98)	(2.01)
Family Firm $\times$ Financial Dependence $\times$ Inheritance Law Permissiveness $\times$ Investor Protection	0.0070	0.1027*
	(1.60)	(1.71)
Family Firm $\times$ Financial Dependence $\times$ Inheritance Tax	-0.0081	-0.097
	(-1.41)	(-1.52)
Financial Dependence $\times$ Inheritance Tax	-0.0171	-0.0152
	(-1.19)	(-1.15)
Financial Dependence $\times$ Investor Protection	0.0104*	0.0447*
	(1.89)	(1.92)
Financial Dependence $\times$ Inheritance Law Permissiveness	-0.0045	0.0029
	(-0.50)	(0.42)
Financial Dependence $\times$ Inheritance Law Permissiveness $\times$ Investor Protection	-0.0010	-0.0085
	(-0.21)	(-0.50)
Country and Industry effects	YES	YES
Other Control Variables (see table legend)	YES	YES
Adjusted R^2	0.3410	0.3526
Number of Observations	10,245	10,245

Panel B. Civil Law Countries Only

	1	2
Family Firm × Financial Dependence × Investor Protection	0.0030 (1.47)	0.0405* (1.70)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0512* (1.90)	0.0704** (1.99)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0052 (1.50)	0.0941* (1.72)
Financial Dependence × Investor Protection	0.0097* (1.71)	0.0412* (1.80)
Financial Dependence × Inheritance Law Permissiveness	0.0086 (0.50)	0.0044 (0.51)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0015 (0.29)	-0.0082 (-0.49)
Country and industry effects	YES	YES
Control Variables (see table legend)	YES	YES
Adjusted R^2	0.1605	0.1618
Number of Observations	6,721	6,721

Panel C.1 Different Definitions of Family Firms

	Blockholder owns at least of 20% and present in management	
	1	2
Family Firm × Financial Dependence × Investor Protection	0.0102** (1.97)	0.0549** (2.09)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0762** (2.38)	0.0907** (2.38)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0109* (1.89)	0.1297** (2.10)
Financial Dependence × Investor Protection	0.0115** (1.96)	0.0508** (2.01)
Financial Dependence × Inheritance Law Permissiveness	-0.0097 (-0.79)	0.0070 (0.59)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.0024 (-0.52)	-0.0098 (-0.80)
Country and industry effects	YES	YES
Control Variables (see table legend)	YES	YES
Adjusted R^2	0.3102	0.3015
Number of Observations	10,245	10,245

Panel C.2 Different Definitions of Family Firms

	Family Blockholder owns at least of 5%	
	1	2
Family Firm × Financial Dependence × Investor Protection	0.0031 (1.40)	0.0329 (1.52)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0507* (1.74)	0.0701* (1.85)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0062 (1.48)	0.0912 (1.50)
Financial Dependence × Investor Protection	0.0128** (1.99)	0.0557** (2.10)
Financial Dependence × Inheritance Law Permissiveness	-0.0115 (-0.84)	0.0070 (0.68)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.0019 (-0.45)	-0.0112 (-0.84)
Country and industry effects	YES	YES
Control Variables (see table legend)	YES	YES
Adjusted R^2	0.2692	0.2702
Number of Observations	10,245	10,245

Panel D. Different Definitions of Financial Dependence

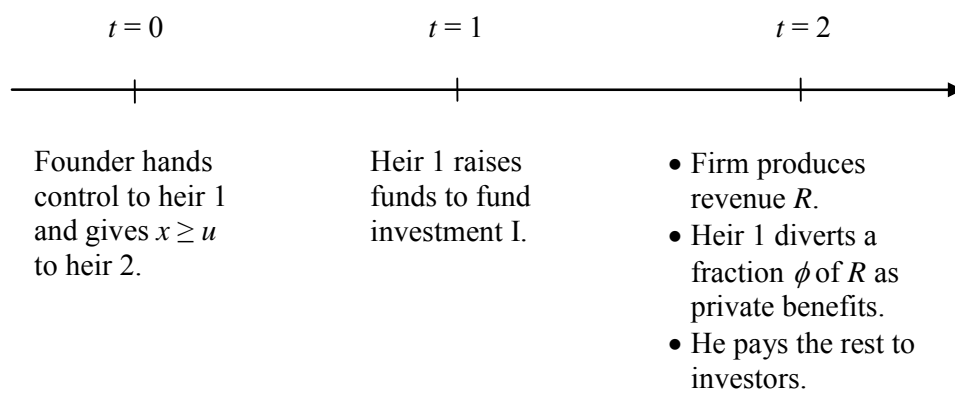|	1	2
Family Firm × Financial Dependence × Investor Protection	0.0094* (1.75)	0.0577** (1.98)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0705** (2.30)	0.0881** (2.32)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0095* (1.82)	0.1095* (1.88)
Financial Dependence × Investor Protection	0.0148** (2.40)	0.0647** (2.38)
Financial Dependence × Inheritance Law Permissiveness	-0.0062 (-0.41)	0.0095 (0.74)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.0014 (-0.25)	-0.0088 (-0.49)
Country and industry effects	YES	YES
Control Variables (see table legend)	YES	YES
Adjusted R^2	0.3215	0.3285
Number of Observations	10,245	10,245

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	1,358	180
Australia	428	158	Mexico	39	47
Austria	65	34	Netherlands	70	45
Belgium	70	32	New Zealand	38	11
Brazil	81	108	Norway	155	54
Canada	341	85	Peru	14	17
Colombia	14	18	Philippines	67	58
Denmark	62	45	Portugal	44	35
Finland	115	94	South Africa	38	20
France	491	352	South Korea	184	205
Germany	581	381	Spain	326	248
Greece	16	35	Sweden	170	115
India	31	68	Switzerland	135	102
Ireland	95	22	Taiwan	70	78
Israel	98	41	Thailand	49	141
Italy	112	150	UK	1,582	278

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)	60	171	Other industries (390)	570	165
Basics ex. fert. (3511)	65	58	Paper products (341)	53	88
Beverage (313)	129	49	Petroleum and coal products (354)	148	21
Drugs (3522)	325	25	Petroleum refining (353)	157	25
Electric machinery (383)	362	145	Plastic products (356)	281	112
Food products (311)	421	295	Pottery (361)	152	118
Footwear (324)	47	51	Printing and publishing (342)	171	135
Furniture (332)	140	129	Professional goods (385)	430	74
Glass (362)	114	102	Pulp paper (3411)	209	157
Iron and steel (371)	347	74	Radio (3832)	94	42
Leather (323)	90	104	Rubber products (355)	82	105
Machinery (382)	238	91	Ship (3841)	118	72
Metal products (381)	244	98	Spinning (3211)	50	74
Motor vehicle (3843)	115	42	Synthetic resins (3513)	114	45
Non-ferrous metal (372)	140	97	Textiles (321)	195	155
Non-metal products (369)	215	81	Tobacco (314)	76	11
Office and computing (3825)	122	87	Transportation equipment (384)	255	34
Other chemicals (352)	427	61	Wood products (331)	201	95

$t = 0$	$t = 1$	$t = 2$

Founder hands
control to heir 1
and gives $x \geq u$
to heir 2.

Heir 1 raises
funds to fund
investment I.

- Firm produces
  revenue R.
- Heir 1 diverts a
  fraction ϕ of R as
  private benefits.
- He pays the rest to
  investors.

Figure 1. Time line of the model
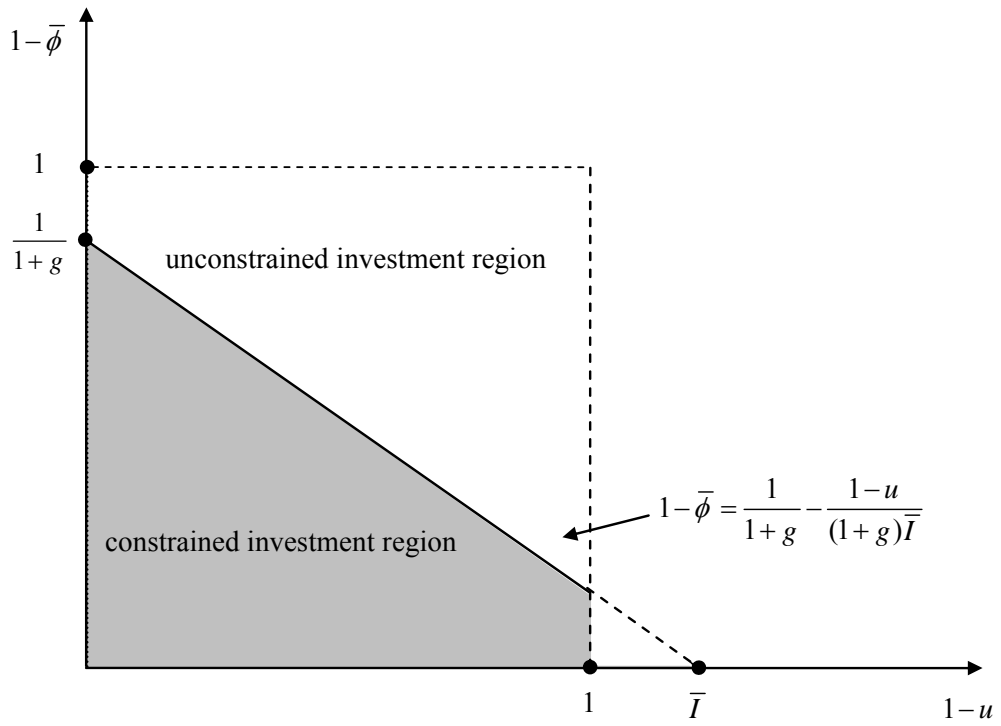
Figure 2. Family firm investment, investor protection $(1-\overline{\phi})$
and permissiveness of inheritance law $(1-u)$
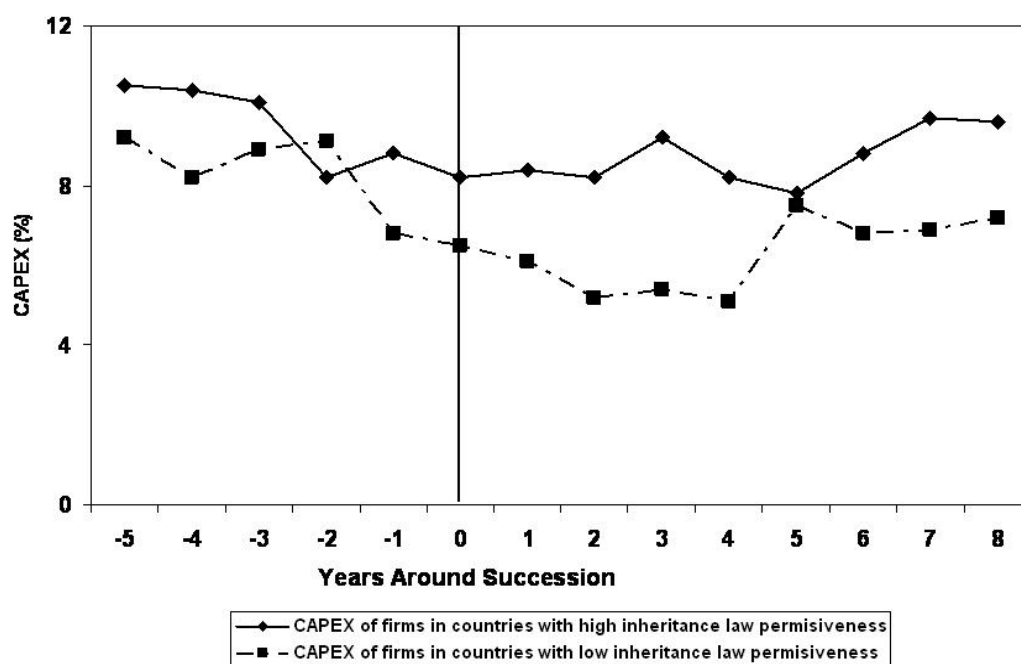
Figure 3. Investment (ratio of CAPEX to total assets) in family firms around the succession year