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Inheritance Law and Investment in Family Firms

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Abstract

Entrepreneurs may be legally bound 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 10,188 firms from 37 countries in 1990-2006, we find that stricter inheritance law is associated with lower investment in family firms, but does not affect investment in non-family firms. Moreover, as the model predicts, 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, Lopez-de-Silanes and Shleifer 1999), and even in the United States, the presence of family firms is significant, counting almost one third of S&P500 firms and 37 percent of the Fortune 500 (Anderson and Reeb 2003, and Villalonga and Amit 2006). So it is not surprising that a growing body of empirical literature focuses on the performance of family firms, and in particular on how it is affected by intergenerational transfers of control.

Two main problems associated with intergenerational succession have been investigated. First, the heir may not be as talented as the founder or a market professional, which may constrain the family firm's growth and profitability compared to non-family firms (see Burkart, Panunzi and Shleifer 2003, and Caselli and Gennaioli 2005). Second, family infighting may paralyze decision-making or lead to underperformance: for instance, Bertrand, Johnson, Schoar and Samphantharak (2008) show, with reference to Thai family firms, that control by a larger number of male siblings is associated with poorer performance.[1] Various measures of firm performance (return on assets, market-to-book ratios and management practices) tend to deteriorate when control is passed from the founder to a descendant (Bennedsen, Nielsen, Pérez-González and Wolfenzon 2007, Bloom and Van Reenen 2007, Fahlenbrach 2005, McConaughy, Henderson and Mishra 1998, Morck, Shleifer and Vishny 1988, and Perez-Gonzalez 2006).

In this paper we concentrate on another reason why succession may slow growth and investment or even lead to liquidation: the rights that inheritance norms confer on non-controlling heirs over the founder's estate reduce the firm's ability to pledge future income streams to external financiers and so constrain its ability to fund investment. The larger the portion assigned to non-controlling heirs, the smaller the part left to the one designated to remain at the helm. Absent any friction in capital markets, less wealth of the controlling heir would not affect the family firm' ability to borrow and invest. But if there are capital market imperfections, it could hinder investment. This effect of inheritance law is empirically testable, as heirs' legal rights differ widely around the world. In countries with a common law

[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 and Gordon and Nicholson 2008).

tradition, there are no restrictions on the fraction of assets that can be bequeathed to any heir, while in civil law countries such legal restrictions generally exist but vary considerably.

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 test the model's main prediction using firm-level data on investment and growth in different countries.

The baseline version of our model posits 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 amount of investment that the firm can undertake depends on investor protection (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 limit 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 robustness of these predictions to several extensions of the model. First, we show that inheritance tax reduces the investment of family firms. This effect is the stronger, the weaker investor protection. In another extension, we relax the baseline model's assumption that the firm's assets can be partially liquidated at no cost. Our conclusions still hold under the assumption of inefficient partial liquidation. In this setup, instead of cash the non-controlling heir is given a financial claim over the firm's cash flow. The larger the stake of the non-controlling heir, the lesser the firm's ability to raise funds on capital markets. Thus, as before, a stricter inheritance law reduces investment. The only additional insight is that in this case, if investor protection is very weak, the value of the financial claim of the non-controlling heir may fall below the minimal threshold set by inheritance law. In this case the family is forced to liquidate the entire firm, even though this does not maximize total family wealth. We also explore how inheritance constraints affect the transition from family to non-family firm. If keeping the firm in the family also yields non-monetary benefits of control, and if family are distinguished from non-family firms only by the inheritance constraint, then the stringency of the constraint makes the family less likely to retain control.

Our next step is to assess whether the evidence is consistent with the model's main prediction: that family firms' investment and growth are diminished by the legal limits on 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. For the empirical test, we collect data on inheritance law in 63 countries, mainly via questionnaires sent to law firms participating in the Lex Mundi project. We define and measure the "permissiveness" of a country's inheritance law as the largest share of the estate that can be bequeathed to a single child, depending on the presence or absence of a spouse and the total number of children. Because this maximum share binds the testator's actions, it cannot be exceeded via *inter vivos* donations: heirs can generally challenge donations in breach of their rights in court. Inheritance law is also binding in another sense: almost everywhere the median household headed by a wealthy entrepreneur has more than one child, so 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 10,188 family and non-family firms from 37 countries between 1990 and 2006. In our baseline regression, we include fixed country and industry effects but can still identify the effect of inheritance law on investment by exploiting the differential effect on family and non-family firms. In line with our model's predictions, we find that more permissive inheritance law is associated with greater 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), adapted to our data (firm-level rather than industry-level) and our focus on the investment impact of inheritance law and investor protection. We regress the investment rate of each firm (averaged over our time interval) on Rajan and Zingales' indicator of financial dependence, interacted with our measure of inheritance law permissiveness, a measure of investor protection, and the product of these two variables, controlling for country and industry fixed effects. This methodology enables us to test not only whether inheritance law matters for family firm investment but also whether it is indifferent (as expected) for *non*-family firm investment. This further implication of the model also finds support in the data: permissive inheritance law enhances investment only in family firms.

To probe the data further, we split the sample of family firms into a group that undergo a succession and those that do not, since inheritance laws should be relevant mainly when there is an intergenerational transfer of control. The data are consistent with this hypothesis as well. Finally, we estimate a panel regression with firm fixed effects on the sub-sample of family

firms to test whether their investment declines in the wake of a succession and whether such decline is attenuated in countries where inheritance law is more permissive and investor protection is stronger. Again, these predictions are borne out by the data.

The rest of the paper is organized as follows. In Section 1 we present the baseline model and 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 sets out various extensions, mainly aimed at testing robustness. Section 3 presents the data, Section 4 explains the empirical strategy and reports the estimates, and Section 5 concludes.

1. The model

We consider a firm that is initially owned by its founder, who has two prospective heirs, denoted 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, and for simplicity standardize the equilibrium interest rate to zero.

1.1. Baseline model structure

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

[Insert Figure 1]

Family succession

We assume that the firm's physical assets can be liquidated on a perfect secondary market (at their scrap value of 1) and are perfectly divisible. Thus partial liquidation is feasible and efficient, an assumption made only for simplicity that will be relaxed in Section 2.2.

At $t = 0$, the founder retires and decides how much to leave to each of his heirs. As all of family's wealth is invested in the firm, the founder liquidates a fraction x and bequeaths the

[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. But if we assume that in addition to heir 1 an outside manager also has the talent to run the company, the firm could be sold to the latter as a going concern 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 transmit its know-how to the acquirer, and distribute the sale proceeds among the two heirs. We explore this extension in Section 2.3.

proceeds to heir 2 (who invests it on the financial market at zero rate of return). The remaining fraction $1-x$ goes to heir 1, who is now the manager of the 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 and retention of heir 2 within the investor base) are completely equivalent when partial liquidation is efficient.[4] For ease of exposition, we stick to the first interpretation.

The founder apportions the bequest between the heirs, choosing x so as to maximize their total wealth:[5]

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

The distinctive feature of the model is that the law constrains the founder's ability to allocate assets among his heirs. As we shall see in Section 3, in many countries the law sets a minimum share of the estate that each heir must receive. 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 any apportionment of the estate that does not satisfy this condition in court.[6] 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, totally permissive legislation would make this measure equal to 1, so that the controlling heir can inherit the entire firm.

Investment technology

At $t=1$, heir 1 decides how much to invest and therefore how much funding to raise on the capital market. The investment I is funded by heir 1's wealth $1-x$ plus external funds. 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 clarity we stick to the first interpretation. Each unit of capital costs

[4] The intuitive reason for this is that, when heir 2 remains within the investor base, he can still demand that future cash flows corresponding to his shares (or bonds) be paid out to him and not be pledged to external financiers. In practice, this requires that heir 2's claims cannot be diluted by those of the external financiers. So external financiers cannot count on the cash flows earmarked to heir 2, but only on those accruing to heir 1 (net of private benefits) to recover their money.

[5] Our objective function excludes the possibility that the founder may have a preference for fairness in the treatment of 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.

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

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

Clearly, it is inefficient to expand capital beyond the scale $\bar{I}$. 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, either paying them out to shareholders or diverting them as private benefits (by outright theft or else, more subtly, by 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 $(1-\phi)R$.

The law limits expropriation of outside investors, thus setting an upper bound $\bar{\phi}\in[0,1]$ on the revenues that can be diverted. Therefore, $1-\bar{\phi}$ measures the minimum fraction of the firm's cash flow that must be disgorged to investors by law; accordingly, we term this the measure of "investor protection". The assumption that the legal degree of investor protection affects external finance to firms concords with a large body of evidence (see Beck and Levine 2005, and Malmendier 2008, for recent surveys).

1.2. Effect of inheritance law on family firm investment

To analyze the founder's problem, we solve the model by backward induction: we start from the expropriation decision at $t=2$ to obtain the investment level I at $t=1$, 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 $\bar{\phi}$.

[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.

At $t=2$, heir 1 decides how to apportion the revenues. The law obliges him to divert no more than $\bar{\phi}R$ as private benefits. As diversion is costless, heir 1 extracts the maximum benefit allowed, so that the firm's pledgeable income becomes $(1-\bar{\phi})R=(1-\bar{\phi})(1+g)I$.

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

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

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

(i) Unconstrained investment: if $(1+g)(1-\bar{\phi}) \ge 1$, one dollar invested generates at least one dollar of pledgeable income, so there is no upper bound on external fund-raising: heir 1 will choose the maximal efficient investment level $\bar{I}$.

(ii) Finance-constrained investment: if $(1+g)(1-\bar{\phi}) < 1$, one dollar invested generates less than one dollar of pledgeable income, so that external funding is determined by the investors' participation constraint. So investment is given 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 $1-\bar{\phi}$. Borrowing capacity will be used to the full if investment is below the efficient scale $\bar{I}$. Thus investment is [8]

[8] When investment is financially constrained, it is optimal for heir 1 to retain no cash flow right in the family firm. This conclusion may seem to 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. If the family must keep a minimum fraction of cash flow rights to retain control, the parameter region where investment is constrained expands: intuitively, the family's control stake reduces the fraction of the firm's income that can be

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

Knowing heir 1's optimal investment at t = 1, we now turn to the founder's succession decision at t = 0, i.e. 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,

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

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

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

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 possible amount of the family firm's assets needed to satisfy the inheritance constraint. To summarize:

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

This proposition implies that the firm can achieve the efficient level of investment $\bar{I}$ if $1-\bar{\phi} \geq [1-(1-u)/\bar{I}]/(1+g)$. 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 degree of investor protection $1-\bar{\phi}$ strong enough that the inheritance law imposes no efficiency loss. This is most clear in the limiting case of perfect investor protection, $1-\bar{\phi} = 1$, where the previous condition is always met (recalling that $\bar{I} > 1$ by assumption) and we are above the vertical intercept in

pledged to external investors, and therefore the external funds that can be raised. By the same token, the larger the minimum control stake, the lower the investment that the firm can carry out if it is finance-constrained.

Figure 2: absent agency problems between firm and investors, even a controlling heir with very low wealth can raise the funds required to invest at the efficient level.

[Insert Figure 2]

If, instead, investor protection falls short of this level, i.e. $1-\bar{\phi} < [1-(1-u)/\bar{I}]/(1+g)$, then the inheritance law constrains the controlling heir to a suboptimal level of investment: weak investor protection prevents him from fully offsetting his wealth shortfall by external funding to achieve the efficient investment level. In this constrained region, which corresponds to the shaded area in Figure 2, (i) more permissive inheritance law (greater $1-u$) reduces the share of family assets that must be liquidated and so increases investment and the founder's utility, (ii) stronger investor protection enhances investment, and (iii) its positive effect is greater, the more permissive is inheritance law. These results follow from the fact that in this region the following derivatives are positive:

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

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

These results are summarized in the following proposition:

Proposition 2. *If investor protection is weak ($1-\bar{\phi} < [1-(1-u)/\bar{I}]/(1+g)$), then more permissive inheritance law increases the investment of family firms. This effect is increasing in the degree of investor protection. If instead investor protection is strong ($1-\bar{\phi} \geq [1-(1-u)/\bar{I}]/(1+g)$), more permissive inheritance law has no effect on investment.*

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 nil regardless of the degree of investor protection.[9]

[9] This does not rule out that the degree of investor protection *per se* may affect investment also in non-family firms, insofar as these firms too face agency problems in raising external funds – which however are not modelled in this setting.

2. Extensions and Robustness

In the baseline model just analyzed, we made a number of stark simplifying assumptions. Here, we remove several of these, both to test the robustness of the predictions and to bring out some interesting new implications. We also briefly discuss an issue that we have neglected so far, i.e. how inheritance law and shareholder protection affect the family's decision to keep control over the company or sell it out altogether.

2.1. Inheritance taxes

So far we have assumed that the founder can bequeath his entire wealth, but of course many countries levy estate taxes. 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 wealth that must be assigned to heir 2, which decreases from u to $u(1-\tau)$.[11]

By the same steps as in the previous analysis, it is easily shown that the level of investment is $I = \min\left\{\bar{I}, (1-\tau)(1-u)/[1-(1+g)(1-\bar{\phi})]\right\}$. The tax has two effects on the level of family firm investment: first, it amplifies the region where investment is below the first-best level; second, in the region where investment is constrained, both its level and its sensitivity to inheritance law is decreased by a factor $1-\tau$. To sum up, the main empirical predictions of this extension are that inheritance taxes reduce the amount of investment by family firms and attenuate the effect of the permissiveness of inheritance law on investment.

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 can be sold without reducing liquidation value. In practice, however, firms' assets are imperfectly divisible. That is, a fraction x of the assets may be worth less than x times their value when undivided. Here we consider the extreme case where the liquidation value of any fraction $x<1$ of the assets is zero.

Inefficient partial liquidation implies that it is never optimal to liquidate a fraction of the assets in order to compensate heir 2. It is more efficient to satisfy the inheritance law

[10] Inheritance taxes may also affect the allocation of consumption across generations, as they make the heir's consumption more costly. This may translate into greater consumption by the founder, so that the wealth transmitted to the heir becomes $1-\tau-c$, where c is the extra-consumption by the founder.

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

constraint by assigning him a financial claim. Since heir 2 can seek legal redress against any offer that violates his right, the value of this 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 1 pledges not to dilute its value below u by issuing more equity.

The only modification needed to the time line is at $t = 0$: if the founder turns control over to heir 1, heir 2 gets a claim on R_2 out of the firm cash flow at $t = 2$. As before, at *t* = 2 heir 1 extracts 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 $\bar{I}$). His funding capacity is limited by the amount of income he can pledge to outside investors: R_1 cannot exceed the pledgeable income $(1-\bar{\phi})(1+g)I$ less 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 two cases:

(i) If $(1+g)(1-\bar{\phi}) \geq 1$ the firm can raise any amount of funding it wishes, so 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 $(1+g)(1-\bar{\phi}) < 1$, the firm's external funding capacity is limited, and to maximize investment, the founder must maximize pledgeable income. Since $R_1 \leq (1-\bar{\phi})(1+g)I - R_2$, the inheritance constraint is binding: $R_2 = u$. Then the claim that can be given to outside investors is $R_1 = (1-\bar{\phi})(1+g)I - u$, which together with their participation constraint yields $(1-\bar{\phi})(1+g)I = I - (1-u)$.

It is easy to see that the investment in the constrained regime is again given by expression $(1-u)/[1-(1+g)(1-\bar{\phi})]$, obtained under the assumption of no liquidation costs. The reason is that heir 2 is exactly like any other outside investor in the family firm. It is as if the family

wealth invested in the firm 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: the firm's pledgeable income must at least equal the funds contributed by heir 2 by leaving his stake *u* invested in the firm.[12] Upon replacing *I* with the expression for investment in the financially constrained regime, it is apparent that heir 2's participation constraint is satisfied only for $1-\bar{\phi} \geq u/(1+g)$. If instead $1-\bar{\phi} < u/(1+g)$, the firm's pledgeable income is not even be sufficient to repay heir 2. In this case, the company must be liquidated to satisfy the inheritance constraint. This is inefficient, since if the company were not liquidated it would add gI to the family's wealth.

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, since pledgeable income is insufficient to give heir 2 a stake large enough to meet the inheritance constraint.

2.3 The decision to sell

So far heir 1 was assumed to be the only agent able to manage the firm after the founder's demise. Now we relax this assumption by considering outsiders who have the same managerial ability as heir 1 and may therefore 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 to an external acquirer not bound by the constraint on investment may be more appealing. Indeed, if the firm can be sold at its fair value, this option will always dominate when investment would be constrained under family management.

But a trade-off will arise if the firm cannot be sold at its fair value, for instance because the market for corporate control is not competitive: the family will be ready to sell at the required discount only if retaining control would imply facing a severe constraint on investment. A similar trade-off is present if keeping the firm within the family generates an "amenity potential" (a non-pecuniary benefit of control).[13] If the amenity potential exceeds the firm's competitive price, obviously the family will retain control. But if it is below that

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

[13] This term was introduced by Demsetz and Lehn (1985). Unlike the private benefits of control, the amenity potential gives utility to the party in control without reducing profits and the firm's value. For instance, the founder may draw pleasure from having his child manage the 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.

price, the family will sell only if keeping the firm under its control would severely limit investment. As we know from the previous analysis, the firm's investment is severely constrained if inheritance law is very restrictive. So strict inheritance law makes families more likely to sell, other things equal.[14]

This result is relevant for our empirical analysis – it implies that even family firm status itself is affected by inheritance law. In countries with stricter inheritance law, we should observe fewer firms under family control. Since in this parameter region investment is predicted to be most severely constrained, this sample selection should bias the evidence against finding an effect of inheritance law on investment by family firms. However, the market discount or the amenity potential might be higher in countries with strict inheritance law. If so, the sample selection would tend to bias the evidence in the opposite direction, amplifying the investment effect.

2.4. Shared control

So far, we posited that the founder can confer control over the firm to one heir only. 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 a fraction of them. This assumes that heir 2 has an informational advantage over outside investors that allows him to verify private benefit extraction, or else that heir 1 is altruistic and willingly accepts sharing the private benefits. Since in our setting private benefits have no deadweight cost, the two heirs will agree to extract the maximum benefit $(1-\bar{\phi})(1+g)I$. This leaves the firm's borrowing and investment capacity unaffected, and simply confers a rent on heir 2 above 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, not to unverifiable private benefits.

[14] In contrast, the effect of investor protection on the decision to sell is ambiguous: weak legal shareholder protection also constrains investment and thereby makes families more inclined to divest (just as stricter inheritance law), but it can also make it harder for an outside acquirer to raise funds for the acquisition, since it limits the funds that he can pledge to financiers. If the private wealth of the outside acquirer is not sufficient to fully compensate the family for the loss of the private benefits of control, the family may prefer to retain control. Otherwise said, weak legal shareholder protection lowers the family's reservation sell price but may constrain the acquirer's bid price, so that its effect on the likelihood of a sale cannot be signed.

A more extreme interpretation of shared control is that the heirs jointly decide investment. This implies that heir 2 agrees to leave his stake u invested in the firm and to pledge the corresponding cash flow to outside investors, so as to maximize investment. Of course, this presupposes that heir 2 is confident of sharing in the private benefits of control so as to (at least) recover his investment u. If such an arrangement is feasible, the financially constrained level of investment rises 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 level of investment.

In this extreme version, therefore, shared control completely offsets the effect of inheritance law. If this form of shared control is widespread in family firms, one should expect to find no effect of inheritance law on investment. However, this prediction rests on the premise that shared control is assisted by a high degree of trust within the family. In the presence of conflict between heirs, joint control may instead result in deadlocks and disagreements, which may impact on the firm profitability and thus curtail investment below its efficient level. Insofar as it leads to fragmented family ownership and thereby makes shared control more likely, a strict inheritance law may also increase the likelihood of squabbles in the management of family firms, and thereby hurt their investment and growth. Thus joint control does not *per se* remove a possible adverse effect of inheritance law on family firm investment.

2.5. Fairness in bequest allocation

Another assumption of the model is that the founder is interested only in the sum of his heirs' wealth, not its distribution. And in fact, in the benchmark model distribution is inequitable: heir 2 gets a share $u \leq 1/2$ of the estate, heir 1 gets at least $1-u$ (which is what he gets when the firm has zero borrowing ability). Thus if the founder cares for fairness, his bequest x to heir 2 will exceed the minimum u prescribed by the law. At 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 the founder, the greater the efficiency cost 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 social norms generally dictate more fairness in inheritance than is required by law, then family firms' investment will reflect

international differences in social norms, not laws. In practice, social norms are likely to have some correlation with inheritance law, since typically law is an outgrowth of custom, as the history of both Roman and Common law makes clear. However, to the extent that the correlation is less than perfect, both social norms and laws may have a detectable effect. Empirically, this suggests that to estimate the effect of cross-country differences in inheritance law it is worthwhile to control for cross-country differences in social norms, as measured by the responses to international surveys.

3. The data

In our empirical test 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 in 37 countries.

3.1. Inheritance law and investor protection

To measure the permissiveness of inheritance law around the world, we gathered information on the maximum share of the estate that a testator can bequeath to a single child in 63 countries. The data were collected via questionnaires sent to law firms belonging to the Lex Mundi association and in some cases were drawn (or double-checked) from other sources, such as direct access to legal sources.[15] The question asked to the law firms was: "What is the maximum fraction of the estate that can be bequeathed to a single child depending on the number of children and on the presence of a surviving spouse?" The instructions made it clear that the question referred to the legal limits on a testator's will, not to social norms. The resulting measure is shown in the first five columns of Table 1, where Panel A displays the figures for the 37 countries to be included in our regression analysis and Panel B those for 25 more countries for which we were able to collect inheritance law information. In each country, this measure varies depending on the presence of a surviving spouse and of the total

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

number of children.[16] 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 any such donations in court.[17]

[Insert Table 1]

Table 1 clearly shows that the degree of permissiveness of inheritance law is greater in common law countries than in civil law ones: in most common law counties, there is complete freedom to leave one's estate to a single child, irrespective of the presence of a spouse and of the number of siblings.[18] In contrast, in civil law countries the law limits the share that can be bequeathed to any child, and this limit is stricter if there are other siblings and/or a surviving spouse. 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 percentage goes down to 41.7 percent with three children, and decreases monotonically to 33.3 percent with six children (not shown for brevity).

[16] 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 norms of the Indian Succession Act, disregarding the more restrictive rules of the Hindu Succession and the Muslim law; (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 disregard the more restrictive laws of the state of Louisiana.

[17] Of the 32 countries used in our estimation, 23 set legal limits to a testator freedom. Using information drawn from the www.globalpropertyguide.com website, supplemented by other sources for some countries, we have verified that in 15 of these 23 countries (Argentina, Belgium, Brazil, Finland, France, Germany, Greece, Italy, Japan, Norway, Philippines, Portugal, Spain, Switzerland and Taiwan), the law states that a gift made between ascendants and descendants or spouses is interpreted as an advance payment of inheritance, and cannot deprive legal heirs of their rights. Heirs can challenge the donation in court, although the protection varies across countries: for example, it may be subject to different deadlines. Exceptions are South Korea, where there appear to be no limits to *inter vivos* donations, and Austria, where only donations made in the last two years before the testator's death can be claimed by a heir entitled to a reserved portion of the estate. We could not find relevant information for the other 5 countries that limit testator freedom (Colombia, Denmark, the Netherlands, Peru and Sweden). The remaining 9 countries of our sample (Australia, Canada, India, Ireland, Israel, Mexico, New Zealand, South Africa, Thailand, and United Kingdom) set no limit to a testator's will (in the case of Ireland, only if there is no surviving spouse).

[18] However, 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. But there are no general and clear guidelines regarding the circumstances in which such judicial remedies can be successfully used.

The legal limit that is likely to apply to the typical entrepreneur in the countries for which data are available is that corresponding to 2 children and a surviving spouse, shown in Column 4 of the table: as shown in Column 8, the median number of children of entrepreneurs (defined as self-employed workers or business owners) aged over 50 and earning more than the median income is 2, in twelve of the thirteen countries for which such data are available (the exception being Sweden, where the median number of children is 3).[19] In the estimation, we use this as the benchmark figure, but we check the robustness of our results by also considering the legal limits for 3 and 4 children – which are probably relevant in many cases, considering the frequency of multiple marriages and the implied number of children.

That civil law countries have more restrictive inheritance laws is confirmed by Panels A and B of Table 2 where we report descriptive statistics for the 63 countries for which we have inheritance law data:[20] 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 children and 54 percent if there are three, while in common law countries the corresponding figure is 96 percent in both cases. However, 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 three children and a spouse.

[Insert Table 2]

The existence of some dispersion in this indicator within civil law countries is essential if empirically this variable is to serve as more than a mere indicator of the country's type of legal order, and hence to be distinguished from measures of shareholder protection, which are known to be closely correlated with legal origin, i.e. 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 from perfect (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, Lopez-de-Silanes, Shleifer and Vishny (1998) and 0.53 for the self-dealing index by Djankov

[19] This figure is drawn from the Survey of Health, Ageing and Retirement for Austria, Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Spain, Sweden and Switzerland, from the English Longitudinal Study of the Ageing for the United Kingdom and from the Health and Retirement Study for the United States.

[20] The descriptive statistics for the 37 countries for which we have both inheritance law data and firm-level data and which are in our sample are very similar to the ones reported in Table 2.

La Porta, Lopez-de-Silanes and Shleifer (2008) to 0.19 (and not significant) for the legality index defined by Berkowitz, Pistor and Richard (2003).[21]

One may wonder whether the legal limits in Table 1 are ever binding, considering the well-known evidence that in the U.S. estates tend to be split equally among children. However, this evidence does not apply to entrepreneurs, as noted by Menchik (1980).[22] This is crucial for our model, which considers only the bequest behavior of entrepreneurs, and not of the population at large. Furthermore, in the U.S. *inter vivos* transfers are considerably more unequally distributed than bequests.[23]

Even more importantly for our hypothesis, inequality in bequests is larger for countries with permissive inheritance law than in those with strict inheritance law, based on evidence on post-succession firm ownership for our sample of family firms (described in Section 3.2 below). Using data obtained via a questionnaire sent to the family firms that experience succession (with a 48.2 percent response rate), we find that in countries where inheritance law is more permissive (i.e., where the limit in Column 4 of Table 1 exceeds the median value) (i) the controlling heir's median stake is larger (25 percent) than in countries with stricter laws (19 percent), (ii) the median aggregate stake of other family shareholders is smaller (6 percent against 20 percent), (iii) the median number of these shareholders is lower (1.5 versus 2.7), and (iv) the distribution of equity stakes within the family is more concentrated (the Herfindahl index of family shareholders' stakes being 0.6781 against 0.4152).[24] For all these variables, the median values differ significantly across the two groups of countries at the 5 percent confidence level. So there are considerable deviations from equal sharing (at least in family firm ownership), and in countries with permissive inheritance law family firm ownership is more concentrated in the hands of the controlling heir, and less in those of other family members, than in countries with strict inheritance law – consistently with our model. [25]

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[21] The legality index is a weighted average of the legal indicators by La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 1998).

[22] While equal sharing was the rule in his entire sample of 1050 households' probate records from Connecticut, Menchik found that in the sub-sample of estates in which a family farm or business was held, sharing among all children was "15-29 percent more unequal than for the full sample": specifically, in this sub-sample equal sharing is observed only in 25 out of 73 cases.

[23] Light and McGarry (2004) report that in the U.S. "in any given year, approximately 75% of parents who make inter vivos transfers to their children, give unequal amounts. Even when making bequests—where equal division is the norm—as many as 20% of parents treat their children unequally" (p. 1669).

[24] The sample includes 287 observations from countries with permissive inheritance law (above median) and 207 from countries with strict inheritance law (below median).

[25] This evidence is consistent comparing the scant international evidence available from other studies. In France the estimated frequency of equal sharing is over 92 percent (Arrondel and Laferrère, 1992) and in Sweden it is 91.4 percent (Ohlsson, 2007), which both exceed the highest estimates of the frequency of equal sharing in the U.S., i.e. 77 percent in Wilhelm (1996) and 70.5 percent in Menchik (1980).

3.2. Firm-level data

We draw financial and accounting data from the Worldscope and Compustat data bases for 18,134 publicly listed companies from the 37 countries listed in Panel A of Table 1 over the period 1990-2006. We apply two screens: first, we only keep firms for which 6 years of financial and accounting data are available; second, we remove financial companies. These two screens reduce the sample to 12,826 companies. Merging accounting data with ownership structure data forces us to drop another 1,504 firms for which ownership information is unavailable, leaving a sample of 11,322. We then winsorize the sample by removing the top and bottom 5 percent of the companies by ratio of capital expenditure to assets, in order to remove the influence of outliers. This leaves us with a final sample of 10,188 firms.

Ownership information is drawn from various sources. We supplement the rather scanty Worldscope data with hand-collected data taken from company websites as of 2007,[26] 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 and by Claessens et al. (2000) for East Asian firms. 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. For U.S. firms, we collect information about their ownership structure through the 20-F forms or proxy statements every two years over the same period.[27]

A company is defined as a non-family firm if (i) the ownership sources just cited indicate that no individual blockholder is present and (ii) the company's web site does not indicate a family blockholder. We define family firms as those where at least 20 percent of the cash flow rights[28] are held by a single family, but later we test the robustness of our results to alternative

[26] We learned whether the firm's founding family is still present in the ownership structure and on the size of its stake either from the "company history" page or the "investor relations" page of the web site. If the main shareholder 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.

[27] For most U.S. firms we can only find the 20-F forms or proxy statements starting from 1996. In these cases, if we determine that in 1996 a firm can be classified as a family firm, then we assume that it is classified as such also in 1990. In these cases, we checked that the family blockholder did not buy its stake at any point between 1990 and 1996 by searching the Lexis-Nexis data base.

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

definitions. This baseline definition is stricter than those used by the literature,[29] and leaves us with 3,142 family firms in our total sample of 10,188 firms.

For family firms, we obtain further information on (i) whether the family blockholder is involved in the firm's active management (the CEO is a family member or the family is present on the Board of Directors), and (ii) whether there has been a succession between 1985 and 2006. We define succession as control being handed over to offspring or close relatives of the entrepreneur from the previous generation. This information 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 a succession's impact will be felt after the transfer of control has occurred, we look for successions also before 1990, which is the first year of our financial and accounting sample. Out of our 3,142 family firms, 1,074 are found to have experienced a succession over the 21-year period from 1985 to 2006. This sample includes 948 family firms in which the family CEO passed control onto another family member and 126 in which he/she turned control over to an outside manager. We also ascertain that 1,507 firms did not have any succession,[30] while for 561 we were unable to make a determination.

Table 3 reports descriptive statistics for the Capex ratio, sales growth, total assets, market-to-book value and ownership concentration for the companies in the sample. It also breaks down these statistics by family and non-family firms (Panels B and C), and further decomposes family firms depending on whether they are in strict or permissive inheritance law countries (Panels D and E),[31] and in countries with weak or strong investor protection, as measured by anti-director rights (Panels F and G).

[Insert Table 3]

The mean Capex ratio for the entire sample is 7.01 percent. Panels B and C show that on average family and non-family firms do not have significantly different Capex ratios (0.0724 and 0.0689) and sales growth (12.31 and 12.72 percent). However, family firms have are significantly smaller size by total assets ($1,227 million versus $2,091 million) and larger

[29] In particular, existing studies for the U.S. use a 5 percent threshold for the family blockholder's stake to classify a firm as family-owned (Anderson et al. (2003) and Villalonga and Amit (2006)).

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

[31] We define as strict inheritance law countries those where the largest share that can be bequeathed to a single child (in the presence of 2 children and a surviving spouse) does not exceed the median of the 37 countries sample (0.667), and as permissive inheritance law countries those where this share exceeds this median value. This results in 2,126 and 1,016 family firms in strict and permissive inheritance law countries, respectively. The greater numerosity of the first subsample partly arises from the fact that 8 countries featuring exactly the median value (Austria, Brazil, Denmark, Germany, Ireland, Netherlands, Taiwan and Uruguay) are classified as strict inheritance law countries.

book-to-market ratios (1.62 versus 1.38).[32] Accordingly, we shall control for these two variables in our investment regressions. As expected, ownership concentration is larger in family firms (38 percent) than in non-family ones (15 percent), and the main shareholders tend to be families in the former and institutional blockholders in the latter.

More importantly, Panels D and E show that on average family firms in countries with permissive inheritance laws have larger Capex ratio than their counterparts in countries with strict inheritance laws (0.0782 versus 0.0674), higher sales growth (12.94 and 12.07 percent) and larger size by total assets ($1,480 million versus $1,077 million), while they have similar market-to-book ratios (1.64 and 1.61). They also have lower ownership concentration (32 versus 42 percent).[33] These univariate tests provide the first empirical indication that family firms in countries with permissive inheritance laws invest more and grow faster than those in countries with strict inheritance laws, even though they have similar investment opportunities. The same picture emerges when we compare family firms in countries with high investor protection (Panel F) with those in low investor protection countries (Panel G). This suggests the need to control for investor protection in our investment regression.

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. Family firms are more prevalent in civil law countries and less so in common law countries. For example, they account for more than 44 percent of the firms in Brazil, France, Germany, Italy, Mexico, Spain, South Korea, Sweden and Taiwan whereas they are less than 28 percent of the firms in Australia, Canada, Ireland, Japan, United Kingdom and the United States. 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.[34] 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 being larger in sectors with low capital-intensity and minimal scale.

[32] The differences in size and market-to-book ratios are statistically significant at the 5 and 10 percent level, respectively.

[33] Capex, size and ownership concentration of family firms are significantly different between countries with permissive and strict inheritance laws at the 5 percent confidence level, and sales growth differs at the 10 percent level, while market-to-book ratio is not significant different at any conventional level.

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

4. The evidence

We use several different methods to test the main predictions of the model empirically. First we use cross-sectional estimates based on the entire sample of firms, with two different specifications. The first tests only for the differential effect of inheritance law on the investment of family and non-family firms; the second also tests for the effect of inheritance law on non-family firms, which we expect to be zero. We then repeat the estimation for a sub-sample of family firms that experience succession and another of 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 the model, based on the differential effect of inheritance law on family and non-family firms. The dependent variable is the firm's average 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 ($s = 1,\ldots, S$) and country effects δ_c ($c = 1,\ldots, C$), on a family firm dummy (F_{jsc})[35] 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. Initial total assets and the market-to-book ratio, measured in the first year for which data are available in Worldscope, control for the firm's size and investment opportunities.[36] Therefore, the specification is:

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

The model's main testable predictions 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

[35] Set to 1 if there is a family blockholder with at least 20 percent of the firm's cash flow rights and 0 otherwise.
[36] For most of the firms in the sample, 1990.

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.

These estimates are given in Table 4, where standard errors are corrected for clustering at the country and sector level. In each column, 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 indices allows us to probe the robustness of our results, as the literature offers no clear consensus on the appropriate indicator of investor protection. We also include a measure of creditor rights protection because debt is an important source of finance for family firms.

[Insert Table 4]

The most important result to emerge from Table 4 is that inheritance law permissiveness does have a strong positive impact on family firms' compared to non-family firms' investment. Three 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.

Second, the coefficient β_3 is also positive and significant, which means that the effect of permissive inheritance law is amplified when investor protection is strong. The estimate of β_3 is statistically significant at the 10 percent level when investor protection is measured by anti-director rights (Column 1) and when measured by the self-dealing index (Column 2); it is not significant when the measure is the creditors' rights index.

In most cases the impact of permissive inheritance law on family firms' investment is 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 self-dealing index (which in our sample is Belgium, whose index is 0.54). This change in inheritance permissiveness increases the Capex ratio of family firms by 0.0089, which is equivalent to slightly more than 12 percentage points of the mean Capex

ratio of family firms (0.072).[37] Similar if smaller impacts are obtained using the two anti-director rights indices and the creditors' rights index to measure investor protection.

It should be stressed that the effect of inheritance law obtains for family firms only, not for all firms with concentrated ownership: if the regressions in Table 4 are re-estimated replacing the family firm dummy with a blockholder dummy (that is 1 if there is a family or non-family blockholder with at least 20 percent of the shares, and 0 otherwise), the coefficients of the inheritance law interactions are no longer significant.

The other estimates in Table 4 show higher investment in family than non-family firms, though the difference is not statistically significant, and this difference increases as investor protection improves; this result too is statistically weak, being significant at the 10 percent confidence level only for the revised anti-director rights index and the self-dealing index. The estimates also indicate that firms' initial assets and investment opportunities increase investment, but that these variables do not have differential effects on family and non-family firms.

A limitation of the specification of Table 4 is that it bears only on the differential impact of inheritance law on family relative to non-family firms: it does not permit an estimate of the impact of inheritance law on non-family firms, which according to our model should be nil. 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, while taking into account that in our model H_c and IP_c should affect family firms only if they are financially constrained, we adopt a second specification. This is based on the approach proposed by Rajan and Zingales (1998), suitably adapted for our different level of aggregation (firm as opposed to industry level) and our focus on inheritance law and investor protection (as opposed to financial development). Rajan and Zingales 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 greatest 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

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

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 mainly reflect differences in funding requirements due to differences in technology. The methodology rests on the assumption that these technology-driven capital requirements vary across industries but not across countries.

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 $IP_c \cdot H_c$, in addition to the variables in (7):

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

In the context of specification (8), we have two testable predictions: 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 $\beta_8 = 0$, i.e. H_c should have zero impact on non-family firms. A third prediction that can be tested is whether financial constraints affect the investment of the two groups of firms, which can be tested by looking at the coefficients of IP_c: specifically, $\beta_6 > 0$ and $\beta_1 + \beta_6 > 0$ would indicate, respectively, that non-family and family firms are financially constrained, while $\beta_1 > 0$ would imply that the financial constraints faced by family firms are more stringent than those of non-family firms.

[Insert Table 5]

Table 5 confirms the main results of Table 4.[38] The interaction between the family firm dummy, financial dependence and inheritance law permissiveness has a positive and significant coefficient ($\beta_2 > 0$). Also the interaction of these three variables with investor protection is positive ($\beta_3 > 0$), and significantly different from zero in columns 1 and 2. In

[38] In estimating equation (8), we drop companies from the United States from the sample (as also done by Rajan and Zingales 1998), since our identifying assumption is that U.S. listed firms are financially unconstrained.

other words, the differential benefit of permissive inheritance law for family over non-family firms is greater in countries where investor protection is stronger. The standard errors in the table are clustered at the country and sector level.

The additional information provided by the estimates in Table 5 is 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 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 25^{th} to the 75^{th} 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 of the interaction terms that include inheritance law permissiveness and the family firm dummy (β_2, β_3, β_7 and β_8) shown in Column 2. This exercise is performed for an industry with mean 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 0.010, which is about 13 percent of its sample mean. Similarly, the estimates in columns 1, 3 and 4 imply an impact of 14, 13 and 8 percent of the mean family firms' Capex ratio, respectively.

Moreover, 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 imprecisely estimated in most specifications.

Finally, the estimates of Table 5 confirm that, consistent with our findings in Table 4, family firms tend to invest more than non-family firms (though again the difference is not statistically significant); and as expected, the coefficients of initial assets and market-to-book ratio are both positive and significant.

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

The timing of inheritance law's impact on family firms' investments should be around the intergenerational transfer of control, when entrepreneurs 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. 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. About a third, 1,074 of the family firms, experienced succession and 1,507 firms did not. For 561 firms we could not obtain any information, and in another 126 control was transferred to a professional manager.

Our model predicts that the effect of inheritance law should be concentrated in family firms that actually underwent a succession during our sample period. To this purpose, we restrict the sample to family firms alone, and modify the Rajan-Zingales specification of Table 5 by interacting the terms involving inheritance law with a succession dummy S_{jsc}, that equals 1 for family firms that underwent a succession in our sample period, and 0 for firms that did not. The resulting specification is:

$$\begin{aligned} I_{jsc} = \alpha_s + \delta_c + \left(\gamma_0 + \gamma_1 D_s \cdot IP_c + \gamma_2 D_s \cdot H_c + \gamma_3 D_s \cdot IP_c \cdot H_c + \gamma_4 A_{jsc} + \gamma_5 MB_{jsc}\right) \cdot S_{jsc} \\ + \gamma_6 D_s \cdot IP_c + \gamma_7 D_s \cdot H_c + \gamma_8 D_s \cdot IP_c \cdot H_c + \gamma_9 A_{jsc} + \gamma_{10} MB_{jsc}, \end{aligned} \quad (9)$$

where the coefficients γ_6 to γ_{10} measure the effect of each variable on family firms' investment, whereas γ_0 to γ_5 measure the additional effect connected with succession. Beside non-family firms, the sample excludes family firms for which we have no information on succession and those for which succession occurred but control was handed over to an outside manager. As a result, the sample shrinks to 2,455 firms.

[Insert Table 6]

Table 6 confirms that succession in family firms is the major driving force behind the results reported in Tables 4 and 5. In fact, the coefficients of the interaction variables that include inheritance law permissiveness (γ_7 and γ_8) are positive for the whole sample of family firms, but they are only statistically significant at conventional confidence levels and economically substantial only for the subsample that experience succession (γ_2 and γ_3). Also the effect of investor protection is present only for family firms that experience succession: γ_1 is positive and significantly different from zero, while γ_6 is small and imprecisely estimated. Only for firms that actually undergo succession the frictions due to strict inheritance laws influence investment, and make financing constraints binding.

4.3. Panel regressions: family firms before and after succession

Another way of investigating the impact of succession on family firm investments is to examine capital expenditure before and after such an event. Our model predicts that in these cases investment will decrease more in countries with restrictive inheritance laws. 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 948 family firms where in-family succession occurred, separately for a sub-sample of firms where inheritance law is permissive (above-median permissiveness) and another sub-sample where it is strict (below-median permissiveness). The figure shows that firms in countries with strict inheritance law experience a large drop in investment: the mean Capex ratio drops from 0.080 in the five years before succession to 0.058 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 0.086 to 0.079, 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 framework, we define a firm-level "succession period" dummy variable S_{jt}, which for each firm j is equal to 1 during and after the succession and 0 previous to it,[39] and estimate two specifications. The first is:

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

where δ_j are firm fixed effects and δ_t are calendar year effects. The second one is based on the Rajan-Zingales methodology:

$$I_{jt} = \delta_j + \delta_t + \left(\phi_1 + \phi_2 D_s \cdot IP_c + \phi_3 D_s \cdot H_c + \phi_4 D_s \cdot IP_c \cdot H_c\right) \cdot S_{jt}\,. \qquad (11)$$

In both specifications, the dependent variable is the ratio of Capex of firm j in year t to its total assets in year $t-1$; all other variables are defined as above.

We estimate these regressions on two samples: first, the sub-sample of 948 family firms that experienced in-family succession,[40] and second, the whole sample of family firms,

[39] Due to its time dimension, the "succession period" dummy S_{jt} differs from the cross-sectional "succession" dummy S_{jsc} used in equation (9) and Table 6 to identify firms that undergo a succession.

removing only (a) those for which we have no information about succession and (b) those in which succession occurred but led control by an outside manager. In this second approach, the sample consists of 2,455 family firms. For the sake of brevity, in Table 7 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). The standard errors of the estimates are corrected for clustering at the company level.

[Insert Table 7]

Succession has a strong and significant negative impact on family firm investment ($\phi_1 < 0$). The impact is economically significant: the implied fall in the investment ratio (0.012) is approximately 16 percent of its sample mean. But permissive inheritance law is found to mitigate this negative impact (or, conversely, strict law to exacerbate it), 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 or the self-dealing index (at the 10 percent level). The mitigating influence of permissive inheritance law 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 almost 11 percentage points, bringing its net effect down to 5 percent of the sample mean.

Better investor protection is found to have a similar mitigating influence. 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 (gauged by the self-dealing index) by 1 standard deviation away from its mean decreases the negative impact of succession by almost 5 percentage points of the sample mean. 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 stronger investor protection allows family firms to suffer less from the increased stringency of financial constraints around succession.

[40] Thus excluding successions in which control was passed to an outside manager.

4.4. Effects on growth

Since our model implies that inheritance law also affects family firms' growth, we seek to determine whether the results reported so far for investment extend to growth. Table 8 shows the estimates obtained replacing sales growth for investment as the dependent variable in specification (8).[41] As we require data on sales for at least seven consecutive years, missing data reduce the family firms to 1,986 and the non-family firms to 5,094.

[Insert Table 8]

For the main explanatory variables, most of the coefficients are lower and less precisely estimated than in the corresponding investment regressions in Table 5. But the coefficient of the interaction between the family firm dummy, financial dependence and inheritance law permissiveness is positive and both statistically and economically significant, confirming the results obtained for investment in Table 5. Increasing the index of inheritance law permissiveness from the 25th to the 75th percentile increases family firms' growth by 9 to 11 percent of the sample mean, depending on the specification: that is, sales growth rises to between 13.42 and 13.68 percent, up from a sample mean of 12.31 percent. The coefficients of the interaction between the family firm dummy, financial dependence and investor protection are positive but in general they lack statistical significance, implying that growth is no more sensitive to better investor protection in family than in non-family firms. The coefficient of the interaction between financial dependence, inheritance law permissiveness and investor protection is not significantly different from zero.

4.5. Robustness checks

Finally, we perform a variety of robustness checks of the empirical results reported obtained in Tables 4 and 5. Their results are shown in Table 9.[42]

[41] Similar results are obtained with specification (7).

[42] We have also performed several other robustness checks that are not reported for brevity. Specifically, we have re-estimated specifications (7) and (8) with industry-country interaction fixed effects, rather than industry and country separately: the estimates regarding the effect of inheritance law and investor protection have remained qualitatively unchanged. We have also estimated specification (7) dropping the observations for Japan and the U.K. and the U.S. (the countries with the largest number of companies in our sample), and the results actually become stronger. Finally, in specification (8) we have added interactions between financial dependence and other country characteristics that might perhaps affect differentially the investment of family and non-family firms, i.e., legal origin, religion and quality of enforcement (measured by "judicial efficiency" or by the "legality index"). In all these additional regressions, the coefficients of the interaction terms involving these country characteristics are not significantly different from zero, while the interaction between inheritance law permissiveness, financial dependence and the family firm dummy remains positive and significant.

[Insert Table 9]

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.[43] This may be imprecise as a measure of actual inheritance taxes, as it hardly does justice to the complexity of national tax codes and to the different degree of evasion or avoidance of inheritance taxes. We adapt specification (8), by adding a new interaction term between the family firm dummy, financial dependence and inheritance taxes. In accordance with the model, this variable is also entered interactively with financial dependence, since we expect inheritance taxes to compress investment only for financially constrained firms. Although the results for β_2 and β_3 remain largely unchanged when inheritance tax is included, their statistical and economic significance decreases by comparison with Table 5. The effect of inheritance tax on investment is negative and larger for family firms, consistent with the model, though not significant even for them.[44]

Second, we check whether our results survive when *only* civil law countries are considered, to counter the possible criticism that, given the correlation between our inheritance law index and common law countries, the index essentially just captures the difference between common law and civil law systems. Panel B of Table 9 shows that the main results from Table 5 do survive even for this subsample, although with two differences: the size and precision of the estimate of β_2 are less than for the full sample, and the estimate of β_3 is no longer statistically significant. This is to be expected, since excluding the common law countries sharply diminishes the variability in the inheritance law index. Even so, the main difference between the response of family and non-family firms' investment to inheritance laws remains largely unchanged.

Third, it is worth checking whether the effect of inheritance law on family firms' investment in our regressions is not really capturing the effect of social norms: in particular, in countries where parents care more for their children they may opt more equal sharing than in other countries, irrespective of what is required by inheritance law. If so, measures of "family values" should differentially affect investment in family and non-family firms, and entirely absorb the explanatory power of inheritance law. To investigate this point, we draw a

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

[44] We also test another prediction by the model – that the effect of inheritance law is lowered by the presence of inheritance taxes – by splitting the sample and re-estimating the specifications of Table 5 separately for the countries where the inheritance tax rate is below and above the median in our sample of countries. The coefficients do not significantly differ across these two sub-samples. The results are not shown for brevity.

measure of "family values" from the World Value Survey,[45] and expand the specification of equation (8) to include two additional explanatory variables: the interaction between financial dependence and family values, and the interaction of these two variables with the family firm dummy. As shown in Panel C of Table 9, the coefficients of the interaction terms that include family values are not significantly different from zero, while the interaction between inheritance law permissiveness, financial dependence and the family firm dummy remains positive and significant. This suggests that inheritance law is not simply acting as a proxy for pro-family social norms.

Our next robustness check involves different definitions of family firm. In Panel D, we experiment with a more stringent definition of family firm than in our previous estimated: we requires the family blockholder not only to own at least 20 percent of the cash flow rights (as in the estimates reported so far) but also to participate in the firm's active management either as CEO position or as member of the board of directors. We find that the results become stronger with this more restrictive definition, probably because this reduces potential contamination of the sample by non-family firms mistakenly classified as family-controlled.

Another dimension in which the definition of family firms can be relaxed or tightened concerns the threshold equity stake that the family is required to hold. Indeed many studies in the literature employ a lower threshold that the 20 percent required by our baseline definition. Instead of experimenting with various thresholds, in Panel E we replace the family dummy with the actual stake held by the family blockholder, as a measure of the extent to which the firm can be considered as family controlled. This flexible specification allows us to gauge the effect of inheritance law and investor protection for different levels of the family blockholder's stake: for instance, changing inheritance law permissiveness from the 25th to the 75th percentile that is, from 0.625 to 1, is associated with one percentage point increase of

[45] Consistent with Alesina and Giuliano (2007), we rely on the 1995-97 and 1999-2000 waves of the World Value Surveys for the 37 countries in our sample. We define "family values" as the negative of the weakness of family ties, and measure the latter by extracting the first principal component of the answers given to three separate questions in the World Value Surveys that capture the beliefs about the importance of the family, the various responsibilities of parents and children to each other, and the love and respect for the parents. The first question asks how important is the family in the life of an individual (the answer can take values from 1 to 4, where 1 is "very important" and 4 "not important at all"). The second question asks the respondent to answer with which statement s/he is in agreement with: (1) "Regardless of what the qualities and faults of one's parents are, one must always love and respect them" or (2) "One does not have the duty to respect and love parents who have not earned it". Likewise the third question asks the respondent to answer with which statement s/he is in agreement with: (1) "It is the parents' duty to do their best for their children even at the expense of their own well-being" or (2) "Parents have a life of their own and should not be asked to sacrifice their own well being for the sake of their children". The answers to the second and third questions can be either 1 or 2. In our sample, this measure of the weakness of family ties is largest in Germany and smallest in the Philippines. In other words, family values are weakest in Germany and strongest in the Philippines.

the investment ratio if the family's stake is 5 percent, three percentage points if the stake is 10 percent, and almost 11 percentage points if it is 40 percent.[46] So also in this sense, the effect becomes stronger the more restrictive is the definition of family firms.

Our final robustness check concerns the definition of financial dependence in specification (8). Since the median U.S. firm in each industry is larger than its analogue in most other countries, it may be more reasonable to use the financial dependence of the median U.S. firm in the size class of its non-U.S. analogue. To do so, we repeat the estimation with a size-dependent measure of financial dependence, splitting U.S. companies into large, medium, and small firms, and computing financial dependence for the median in each of three subsamples. As shown by Panel F of Table 9, this alternative measure of financial dependence leaves our basic results qualitatively unaffected: family firms' investment continues to be sensitive to the inheritance law index, but not non-family firms' investment.

5. Concluding remarks

The literature produced by academic research on family firms is vast and rapidly expanding, but very little attention has been devoted to the role that inheritance norms may have in constraining their investment and growth. This is surprising, considering that unlike economists, businessmen are keenly aware of the problem, the more so as the impact of inheritance law has been amplified in recent years by the 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 less stringent inheritance law. In the words of one, "Today the family is no longer what it was sixty years ago: […] The need to adapt the norms on inheritance law, giving the testator more flexibility in disposing of his assets, should be self-evident".[47] Indeed, restrictive inheritance rules are seen as an obstacle to the generational transfer of control: "In the likely case where the designated (controlling) heir does not have enough wealth to compensate the other heirs, generational transfer would be possible only if the family firm had a large borrowing capacity".[48] 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.[49]

[46] The mean ownership of the family blockholder in our sample is 38 percent.

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

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

[49] 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 unfair to the children of their second marriage and too favorable to those of her first marriage with Alan Elkann, and especially to John Elkann, heir to Giovanni

We have shown that such concerns are consistent both with theory and with evidence. In the context of a stylized model of succession in a family firm, larger legal claims by non-controlling heirs on the founder's estate lead to lower investment, because they reduce the firm's ability to pledge future income streams to external financiers. We bring this prediction to the data, by building an indicator of the degree of permissiveness of inheritance law from the viewpoint of a testator who wishes to bequeath the largest possible fraction of the estate to a single child. We merge this inheritance law indicator with measures of investor protection and with data for 10,188 firms from 37 countries for the period 1990-2006. We find that stricter inheritance law is in fact associated with lower investment and slower growth in family firms while leaving investment in non-family firms unaffected. Further, the negative effect of strict inheritance law on family firms' investment is exacerbated by poor investor protection, again as the model predicts.

We also find that the results are driven mostly by family firms that undergo a succession in our sample period, and that the effects of inheritance laws are strongest precisely in the wake of succession. During and after the transfer of control to the next generation, there is a decrease in investment that is more sever if the firm is located in a country with stricter inheritance law. In this case too, poor investor protection compounds the effect of strict inheritance law, in addition to its direct negative effect on investment.

Our results are robust to different specifications of the investment equation, and survive if the estimation is confined to civil law countries alone, to the inclusion of inheritance tax and of a measure of pro-family social norms, to different definitions of family firm and different measures of financial dependence.

Agnelli as the head of the FIAT industrial and financial empire. Similar legal battles have occurred in other prominent business dynasties, such as Campari, Star, Mondadori, Coin and Marzotto.

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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 (columns 1 and 2) or presence of a surviving spouse (columns 3, 4 and 5), for different numbers of children. Columns 6, 7 display the Revised Anti-Director Index and the Self Dealing Index, from Djankov et al. (2006). Column 8 shows the median number of children of self-employed workers or business owners above age 50 and earning above-median income, 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). Panels A and B show data for the 38 countries included in the estimation and for 25 other countries respectively.

Panel A. Countries Included in the Estimation

Country	2 children, no spouse (1)	3 children, no 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
Belgium	0.667	0.5	0.5	0.333	0.25	3	0.54	2
Brazil	0.75	0.667	0.75	0.667	0.625	5	0.27	-
Canada	1	1	1	1	1	4	0.64	-
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	-
Denmark	0.75	0.667	0.833	0.667	0.611	4	0.46	2
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
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
Japan	0.75	0.667	0.75	0.625	0.583	4.5	0.5	-
Mexico	1	1	1	1	1	3	0.17	-
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	-
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
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	-
U.K.	1	1	1	1	1	5	0.95	2
U.S.A.	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	-

Panel B. Other Countries

Country	2 children, no spouse (1)	3 children, no 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)
Bangladesh	0.5	0.333	0.667	0.333	0.222	-	-	-
Bolivia	0.6	0.467	0.8	0.5	0.4	2	0.14	-
Bulgaria	1	1	1	1	1	3	0.65	-
Cayman	1	1	1	1	1	-	-	-
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	-	-	-
El Salvador	1	1	1	1	1	2	0.43	-
Estonia	0.75	0.667	0.75	0.667	0.625	-	-	-
Guatemala	1	1	1	1	1	-	-	-
Hungary	0.75	0.667	1	0.75	0.667	2	0.18	-
Jamaica	1	1	1	1	1	4	0.35	-
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	-	-	-
Monaco	0.667	0.5	1	0.667	0.5	-	-	-
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	-
Sri Lanka	1	1	1	1	1	4	0.39	-

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. Company-Level Descriptive Statistics

This table reports descriptive statistics for the sample of 10,188 firms from 37 countries over the period from 1990 to 2006. Panel B and C report descriptive statistics for the 3,142 family and for the 7,046 non-family firms in the sample, respectively. Panels D and E report descriptive statistics for family firms in countries with strict inheritance laws and permissive inheritance laws, respectively. Strict inheritance law countries are defined as those where the largest share that can be bequeathed to a single child (in the presence of 2 children and a surviving spouse) does not exceed the median of the 37 countries sample (0.667), and permissive inheritance law countries as those where this share exceeds this median value. Panels F and G report descriptive statistics for family firms in countries with low and high investor protection respectively, using the Revised Anti-Director Rights Index of LLSV (1998), using the median value of the Index (value of 3.5) to partition the sample. Capex is the ratio of capital expenditure to total assets. Sales Growth is the percentage sales growth. Firm Size is the firm's total assets in millions of U.S. dollars. Market-to-Book Ratio is the market value of equity plus the book value of assets less book value of equity, all divided by total assets. Ownership Concentration is the percent of cash flow rights of the firm's largest blockholder.

	Capex	Sales Growth %	Firm Size	Market-to-Book Ratio	Ownership Concentration (%)
Panel A: Total Sample					
Mean	0.0701	12.58	1,829	1.46	23.18
Std. Dev.	0.0611	9.87	3,545	0.91	16.42
No. Obs.	10,188	10,188	10,188	10,188	10,188
Panel B: Family Firms					
Mean	0.0724	12.31	1,227	1.62	38.25
Std. Dev.	0.0627	10.04	2,311	1.02	22.96
No. Obs.	3,142	3,142	3,142	3,142	3,142
Panel C: Non-Family Firms					
Mean	0.0689	12.72	2,091	1.38	15.11
Std. Dev.	0.0605	9.81	4,019	0.85	8.20
No. Obs.	7,046	7,046	7,046	7,046	7,046
Panel D: Family Firms in Countries with Strict Inheritance Laws					
Mean	0.0674	12.07	1,077	1.61	41.82
Std. Dev.	0.0610	10.48	1,978	0.98	20.25
No. Obs.	2,126	2,126	2,126	2,126	2,126
Panel E: Family Firms in Countries with Permissive Inheritance Laws					
Mean	0.0782	12.94	1,480	1.64	32.08
Std. Dev.	0.0650	9.07	2,915	1.05	15.62
No. Obs.	1,016	1,016	1,016	1,016	1,016
Panel F: Family Firms in Countries with Low Investor Protection					
Mean	0.0694	12.28	1,184	1.59	41.05
Std. Dev.	0.0627	10.44	1,411	0.92	16.07
No. Obs.	1,635	1,635	1,635	1,635	1,635
Panel G: Family Firms in Countries with High Investor Protection					
Mean	0.0729	12.78	1,388	1.64	34.91
Std. Dev.	0.060	9.55	2,951	1.09	21.83
No. Obs.	1,507	1,507	1,507	1,507	1,507

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

This table presents the estimates of a cross-sectional regression model for 10,188 firms from 37 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 two 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 Creditor Rights Index of Djankov et al. (2007) in column 4. Standard errors are corrected for clustering at the country and sector level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	1	2	3	4
Family Firm	0.0018	0.0016	0.0018	0.0020
	(1.24)	(1.20)	(1.25)	(1.29)
Family Firm × Investor Protection	0.0026*	0.0151*	0.0041	0.0014
	(1.85)	(1.91)	(1.61)	(1.35)
Family Firm × Inheritance Law Permissiveness	0.0143**	0.0126**	0.0122**	0.0138*
	(2.08)	(2.18)	(1.98)	(1.92)
Family Firm × Inheritance Law Permissiveness ×	0.0037*	0.0218*	0.0032	0.0044
Investor Protection	(1.80)	(1.92)	(1.62)	(1.64)
Family Firm × Log of Initial Market-to-Book	0.0011	0.0009	0.0010	0.0014
	(0.51)	(0.44)	(0.48)	(0.62)
Family Firm × Log of Initial Assets	0.0005	0.0004	0.0005	0.0006
	(0.22)	(0.18)	(0.20)	(0.21)
Log of Initial Market-to-Book	0.0548**	0.0602**	0.0551**	0.0601**
	(2.27)	(2.39)	(2.29)	(2.41)
Log of Initial Assets	0.0058***	0.0052***	0.0055***	0.0048***
	(2.72)	(2.67)	(2.70)	(2.60)
Country and Industry effects	YES	YES	YES	YES
Adjusted R^2	0.2401	0.2590	0.2477	0.1820
Number of Observations	10,188	10,188	10,188	10,188

Table 5. Regressions of Family and Non-Family Firms' Investment With Financial Dependence

This table presents the estimates of a cross-sectional regression model for 10,188 firms from 37. 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 4. 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 two 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 and sector level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	1	2	3	4
Family Firm	0.0011	0.0010	0.0010	0.0014
	(0.72)	(0.70)	(0.71)	(0.81)
Family Firm × Financial Dependence × Investor Protection	0.0070	0.0392*	0.0080	0.0045
	(1.62)	(1.76)	(1.65)	(1.29)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0509**	0.0521**	0.0472**	0.0457*
	(2.04)	(1.99)	(1.98)	(1.87)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0072*	0.0711*	0.0134	0.0098
	(1.70)	(1.82)	(1.60)	(1.62)
Financial Dependence × Investor Protection	0.0130**	0.0561**	0.0110*	0.0097*
	(1.99)	(2.16)	(1.94)	(1.70)
Financial Dependence × Inheritance Law Permissiveness	-0.0092	-0.0089	-0.0081	-0.0070
	(-0.64)	(-0.58)	(-0.49)	(-0.40)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.0015	0.0091	-0.0012	-0.0019
	(-0.40)	(0.62)	(-0.31)	(-0.25)
Family Firm × Log of Initial Market-to-Book	-0.0019	-0.0020	-0.0021	-0.0018
	(-0.59)	(-0.61)	(-0.64)	(-0.55)
Family Firm × Log of Initial Assets	-0.0001	-0.0001	-0.0002	0.0001
	(-0.22)	(-0.28)	(-0.36)	(0.19)
Log of Initial Market-to-Book	0.0398***	0.0402***	0.0418***	0.0429***
	(2.68)	(2.72)	(2.65)	(2.79)
Log of Initial Assets	0.0032**	0.0031**	0.0034**	0.0038**
	(2.21)	(2.19)	(2.32)	(2.38)
Country and Industry effects	YES	YES	YES	YES
Adjusted R^2	0.2611	0.2902	0.2656	0.2307
Number of Observations	10,188	10,188	10,188	10,188

Table 6. Regression Analysis for Family Firms With Succession and Without Succession

This table presents the estimates of a cross-sectional regression model for 2,455 family firms for which we can determine whether succession has taken place or not. The sample does not include the 561 family firms for which we cannot determine whether succession has taken place or not, and the 126 family firms where control has been passed to a professional 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. Succession is a dummy variable that equals 1 for family firms that have experienced succession and 0 otherwise. 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. The other control variables are the following: Log of Initial Market-to-Book and Log of Initial Assets. Standard errors are corrected for clustering at the country and sector level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	1	2	3	4
Succession	0.0009	0.0010	0.0009	0.0008
	(0.72)	(0.81)	(0.74)	(0.65)
Succession × Financial Dependence × Investor Protection	0.0085**	0.046**	0.0109**	0.0059*
	(2.07)	(2.15)	(2.16)	(1.74)
Succession × Financial Dependence × Inheritance Law Permissiveness	0.0657**	0.0695**	0.0639**	0.0644**
	(2.19)	(2.37)	(2.08)	(2.10)
Succession × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0085**	0.0802**	0.0157**	0.0129*
	(2.27)	(2.21)	(2.14)	(1.78)
Financial Dependence × Investor Protection	0.00229	0.0109	0.0018	0.0024
	(1.60)	(1.58)	(1.45)	(1.18)
Financial Dependence × Inheritance Law Permissiveness	0.0149	0.0159	0.0145	0.0142
	(1.44)	(1.48)	(1.40)	(1.32)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0062	0.0188	0.0039	0.0041
	(1.42)	(1.50)	(1.38)	(1.05)
Country and Industry effects	YES	YES	YES	YES
Other Control Variables (see table legend)	YES	YES	YES	YES
Adjusted R^2	0.3491	0.3410	0.3382	0.3197
Number of Observations	2,455	2,455	2,455	2,455

Table 7. Capital Expenditure in Family Firms Around Succession

This table presents the estimates of a cross-sectional regression model for 948 family firms from 37 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 Period 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 Period × Investor Protection is the interaction between the Succession Period dummy variable and Investor Protection; Succession Period × Inheritance Law is the interaction between the Succession Period dummy variable and the maximum share that can be given to a child in the presence of a spouse and two children; Succession Period × 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. Standard errors are corrected for clustering at the company level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	1	2	3	4
Succession Period	-0.0120***	-0.0124***	-0.0125***	-0.0121***
	(-2.52)	(-2.65)	(-2.68)	(-2.47)
Succession Period × Investor Protection	0.0027*	0.0147*	0.0045*	0.0019
	(1.76)	(1.80)	(1.69)	(1.18)
Succession Period × Inheritance Law Permissiveness	0.0141**	0.0144**	0.0127*	0.0181*
	(1.98)	(1.99)	(1.89)	(1.84)
Succession Period × Investor Protection × Inheritance Law Permissiveness	0.0037*	0.0189*	0.0030	0.0021
	(1.71)	(1.87)	(1.52)	(1.20)
Log of Market-to-Book	0.0168**	0.0161**	0.0179**	0.0160**
	(2.05)	(1.98)	(2.08)	(2.00)
Log of Assets	0.0042	0.0041	0.0046	0.0040
	(1.50)	(1.46)	(1.55)	(1.47)
Fixed firm effects	YES	YES	YES	YES
Calendar year effects	YES	YES	YES	YES
Adjusted R^2	0.1585	0.1581	0.1502	0.1418
Number of Observations	9,407	9,407	9,407	9,407

Table 8. Regression of Family and Non-Family Firms Sales Growth

This table presents the estimates of a cross-sectional regression model for 6,080 firms from 37 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	-0.4150	-0.4284	-0.4216	-0.4419
	(-0.50)	(-0.52)	(-0.53)	(-0.55)
Family Firm × Financial Dependence × Investor Protection	0.2418	3.5914	0.2791	0.2011
	(1.55)	(1.62)	(1.44)	(1.19)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	6.7764*	7.1982**	7.0448**	7.8305*
	(1.92)	(2.08)	(2.02)	(1.82)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.7402*	5.7981	0.9021	0.8552
	(1.81)	(1.61)	(1.59)	(1.41)
Financial Dependence × Investor Protection	1.0294**	4.2714**	0.9018**	0.8624**
	(2.28)	(2.40)	(2.07)	(2.01)
Financial Dependence × Inheritance Law Permissiveness	0.6471	0.5911	0.6242	0.5725
	(0.54)	(0.47)	(0.50)	(0.44)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.0831	-0.6452	-0.1428	-0.1817
	(-0.39)	(-0.44)	(-0.35)	(-0.30)
Family Firm × Log of Initial Market-to-Book	-0.0371	-0.0388	-0.0361	-0.0392
	(-0.21)	(-0.31)	(-0.20)	(-0.32)
Family Firm × Log of Initial Assets	-0.0518	-0.0511	-0.0541	-0.0506
	(-0.80)	(-0.74)	(-0.89)	(-0.68)
Log of Initial Market-to-Book	0.7982	0.9014	0.8571	0.8462
	(1.15)	(1.28)	(1.22)	(1.20)
Log of Initial Assets	0.3188**	0.3209**	0.3094**	0.3511**
	(2.29)	(2.35)	(2.16)	(2.42)
Country and Industry effects	YES	YES	YES	YES
Adjusted R^2	0.1651	0.1547	0.1593	0.1511
Number of Observations	6,080	6,080	6,080	6,080

Table 9. Robustness Checks

This table presents robustness checks of the estimates reported in Table 5, expanding the specification of that table or restricting its sample. Variables are also defined as in Table 5. In Panel A, explanatory variables include Inheritance Tax, defined as the top marginal transfer rate from parent to children, drawn from the Coopers and Lybrand International Tax Summaries. In Panel B estimation is restricted to companies incorporated in Civil Law countries, as defined by Djankov et al. (2008). In Panel C the explanatory variables include a measure of "family values", defined as the negative of the weakness of family ties, which in turn is the first principal component of the answers given to three separate questions in the World Value Surveys. In Panel D we use a more stringent definition of family firms, by requiring that family blockholders own at least a 20 percent share and participate in the firm's management. In Panel E the Family Firm dummy is replaced by the actual percent of cash flow rights held by the family blockholder, as a measure of the extent to which the firm is family controlled. In Panel F we repeat the estimation with a size-dependent measure of Financial Dependence, obtained splitting U.S. companies 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 F 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 (not reported for brevity) are: Family Firm; Log of Initial Market-to-Book; Log of Initial Assets; Family Firm × Log of Initial Market-to-Book; and Family Firm × Log of Initial Assets. All regressions include country and industry dummies. Standard errors are corrected for clustering at the country and sector level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level respectively).

Panel A. Controlling for Inheritance Taxes

	1	2
Family Firm × Financial Dependence × Investor Protection	0.0068*	0.0358*
	(1.67)	(1.70)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0491**	0.0489**
	(1.97)	(1.99)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0068	0.0688*
	(1.62)	(1.69)
Family Firm × Financial Dependence × Inheritance Tax	-0.0076	-0.089
	(-1.38)	(-1.31)
Financial Dependence × Inheritance Tax	-0.0160	-0.0150
	(-1.02)	(-0.98)
Financial Dependence × Investor Protection	0.0110*	0.0484*
	(1.71)	(1.82)
Financial Dependence × Inheritance Law Permissiveness	-0.0055	-0.0049
	(-0.59)	(0.39)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0009	-0.0009
	(0.18)	(-0.10)
Country and Industry effects	YES	YES
Other Control Variables (see table legend)	YES	YES
Adjusted R^2	0.3197	0.3219
Number of Observations	10,188	10,188

Table 9, continued

Panel B. Civil Law Countries Only

	1	2
Family Firm × Financial Dependence × Investor Protection	0.0039	0.0322*
	(1.41)	(1.68)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0470*	0.0422**
	(1.88)	(1.97)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0048*	0.0655*
	(1.68)	(1.74)
Financial Dependence × Investor Protection	0.0085	0.0404*
	(1.58)	(1.71)
Financial Dependence × Inheritance Law Permissiveness	-0.0074	-0.0078
	(-0.29)	(-0.31)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.0010	-0.0080
	(-0.14)	(-0.21)
Country and industry effects	YES	YES
Control Variables (see table legend)	YES	YES
Adjusted R^2	0.1565	0.1577
Number of Observations	6,347	6,347

Panel C. Family Values vs. Inheritance Law

	1	2
Family Firm × Financial Dependence × Investor Protection	0.0061	0.0307*
	(1.52)	(1.70)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0484**	0.0492**
	(1.97)	(2.01)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0062	0.0682*
	(1.55)	(1.70)
Family Firm × Financial Dependence × Family Values	0.0064	0.0072
	(0.91)	(0.98)
Financial Dependence × Family Values	0.0192	0.0201
	(1.02)	(1.11)
Financial Dependence × Investor Protection	0.0118*	0.0480*
	(1.74)	(1.79)
Financial Dependence × Inheritance Law Permissiveness	-0.0072	-0.0068
	(-0.41)	(-0.37)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.0010	-0.0062
	(-0.19)	(-0.24)
Country and industry effects	YES	YES
Control Variables (see table legend)	YES	YES
Adjusted R^2	0.2214	0.2249
Number of Observations	10,188	10,188

Table 9, continued

Panel D. More Stringent Definition of Family Firms

	Blockholder owns at least of 20% and present in management	
	1	2
Family Firm × Financial Dependence × Investor Protection	0.0098*	0.0441**
	(1.92)	(2.11)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0688**	0.0651**
	(2.35)	(2.30)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0110**	0.1011**
	(1.97)	(2.08)
Financial Dependence × Investor Protection	0.0109*	0.0599**
	(1.82)	(2.09)
Financial Dependence × Inheritance Law Permissiveness	-0.0088	-0.0082
	(-0.79)	(-0.70)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.0009	-0.0080
	(-0.22)	(-0.44)
Country and industry effects	YES	YES
Control Variables (see table legend)	YES	YES
Adjusted R^2	0.3099	0.3107
Number of Observations	10,188	10,188

Panel E. Replacing the Family Dummy with the Family Stake

	1	2
Family Stake × Financial Dependence × Investor Protection	0.0154*	0.0886*
	(1.90)	(1.88)
Family Stake × Financial Dependence × Inheritance Law Permissiveness	0.0977**	0.0982**
	(2.27)	(2.34)
Family Stake × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0349**	0.1706**
	(2.02)	(2.07)
Financial Dependence × Investor Protection	0.00197	0.0099
	(1.51)	(1.47)
Financial Dependence × Inheritance Law Permissiveness	0.0140	0.0136
	(1.38)	(1.34)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0052	0.0170
	(1.35)	(1.40)
Country and industry effects	YES	YES
Control Variables (see table legend)	YES	YES
Adjusted R^2	0.3487	0.3455
Number of Observations	10,188	10,188

Table 9, continued

Panel F. Different Definitions of Financial Dependence

	1	2
Family Firm × Financial Dependence × Investor Protection	0.0078*	0.0344*
	(1.72)	(1.81)
Family Firm × Financial Dependence × Inheritance Law Permissiveness	0.0618**	0.0629**
	(2.27)	(2.30)
Family Firm × Financial Dependence × Inheritance Law Permissiveness × Investor Protection	0.0089**	0.0688*
	(1.99)	(1.81)
Financial Dependence × Investor Protection	0.0140**	0.0492*
	(2.07)	(1.90)
Financial Dependence × Inheritance Law Permissiveness	0.0010	0.0011
	(0.11)	(0.15)
Financial Dependence × Inheritance Law Permissiveness × Investor Protection	-0.0010	-0.0018
	(-0.20)	(-0.25)
Country and industry effects	YES	YES
Control Variables (see table legend)	YES	YES
Adjusted R^2	0.3007	0.3082
Number of Observations	10,188	10,188

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	27	Mexico	35	42
Australia	367	117	Netherlands	64	39
Austria	56	32	New Zealand	30	10
Belgium	62	32	Norway	144	53
Brazil	70	101	Peru	14	15
Canada	327	75	Philippines	60	56
Chile	96	40	Portugal	39	34
Colombia	12	16	South Africa	34	20
Denmark	58	41	South Korea	172	192
Finland	104	88	Spain	291	243
France	420	329	Sweden	161	106
Germany	514	364	Switzerland	135	97
Greece	16	29	Taiwan	68	72
Iceland	7	2	Thailand	40	130
India	30	57	U.K.	1,270	206
Ireland	82	20	U.S.A.	822	102
Israel	82	34	Uruguay	5	8
Italy	104	141	Venezuela	18	9
Japan	1,219	163			

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)	53	160	Other industries (390)	610	170
Basics ex. fert. (3511)	62	58	Paper products (341)	53	84
Beverage (313)	134	48	Petroleum and coal products (354)	147	19
Drugs (3522)	372	27	Petroleum refining (353)	162	27
Electric machinery (383)	381	148	Plastic products (356)	293	118
Food products (311)	410	289	Pottery (361)	148	112
Footwear (324)	45	50	Printing and publishing (342)	170	132
Furniture (332)	140	128	Professional goods (385)	460	68
Glass (362)	119	97	Pulp paper (3411)	201	155
Iron and steel (371)	331	72	Radio (3832)	95	37
Leather (323)	88	101	Rubber products (355)	89	106
Machinery (382)	224	86	Ship (3841)	117	65
Metal products (381)	251	91	Spinning (3211)	50	68
Motor vehicle (3843)	119	35	Synthetic resins (3513)	114	34
Non-ferrous metal (372)	137	89	Textiles (321)	187	152
Non-metal products (369)	203	77	Tobacco (314)	74	11
Office and computing (3825)	120	78	Transportation equipment (384)	261	32
Other chemicals (352)	428	51	Wood products (331)	198	67

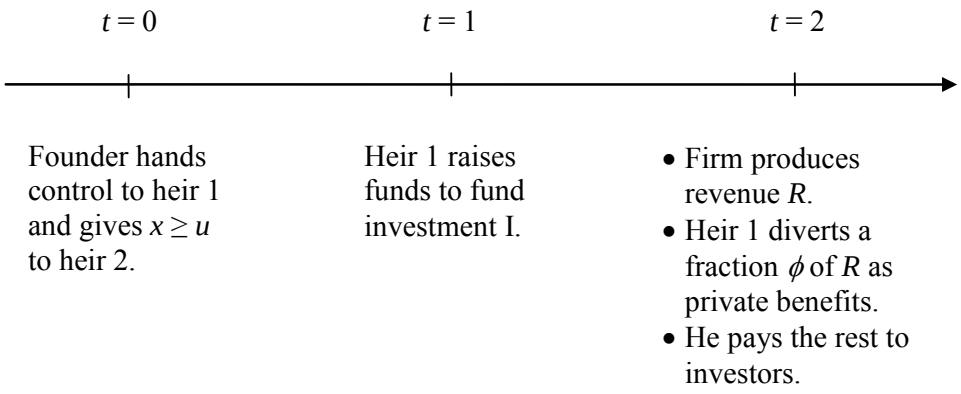

Figure 1. Time line of the model

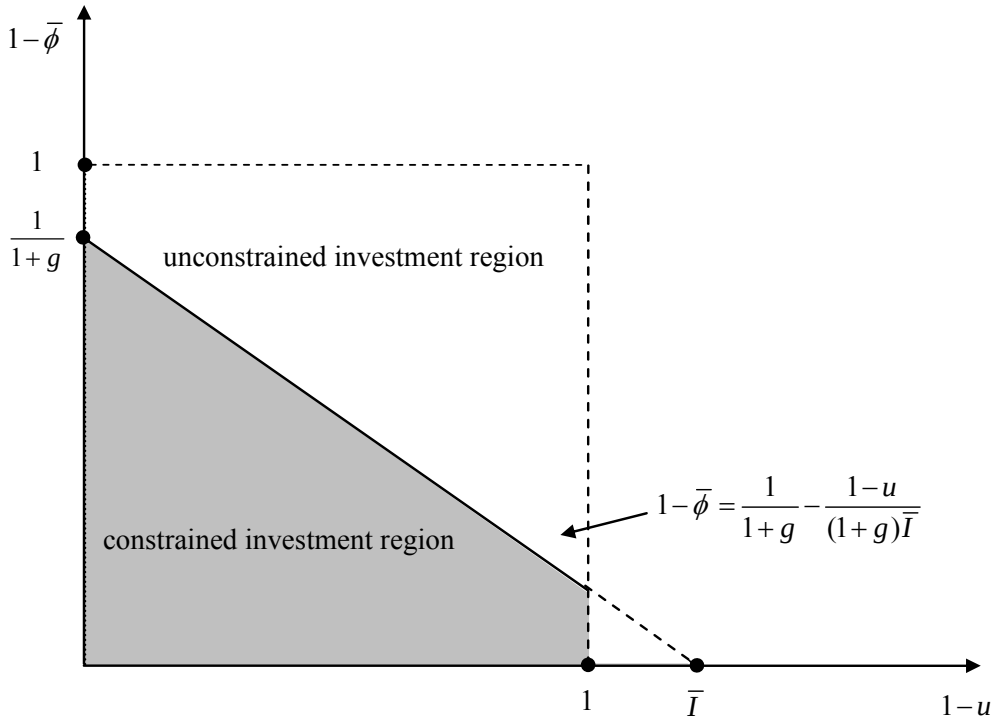

Figure 2. Family firm investment, investor protection ($1-\bar{\phi}$) and permissiveness of inheritance law ($1-u$)

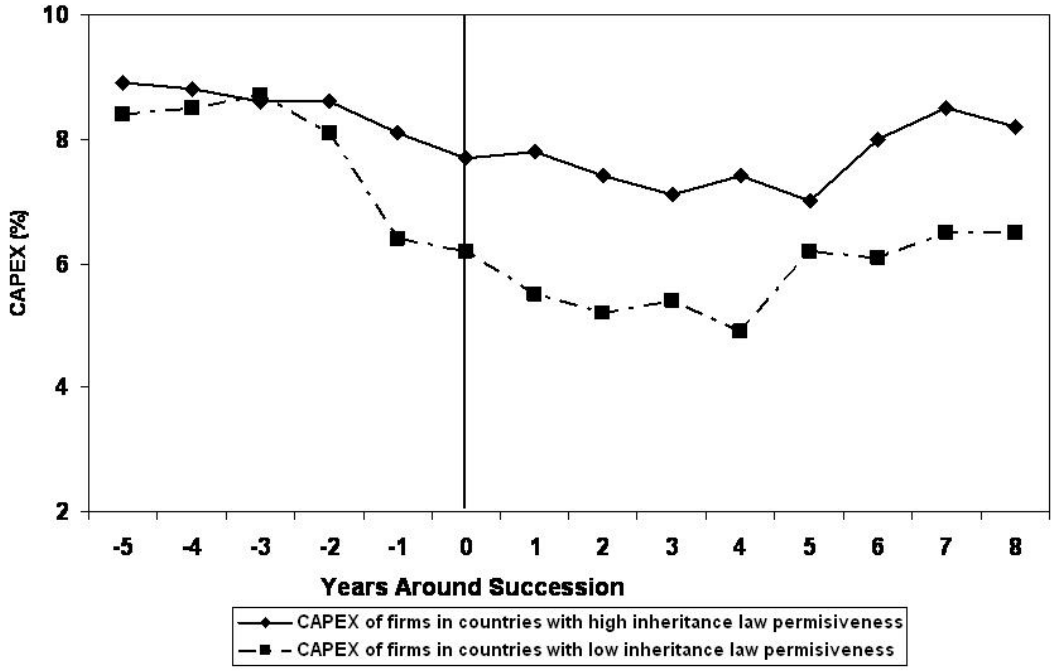

Figure 3. Investment (ratio of Capex to Total Assets) in family firms around the succession year