

# Why are Family Firms so Small ?

## Theory and Evidence from France

JOB MARKET PAPER

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November 2009

### Abstract

In this paper, I ask whether family firms provide stability to their stakeholders at the expense of economic growth. I build a model where current owners of dynastic firms derive private benefits from keeping the control of the firm within the family over the generations. Because these preferences limit the recourse to external finance, they induce family-minded entrepreneurs to invest in smaller and less risky projects.

Predictions of the model are tested using a newly constructed firm-level panel dataset covering both private and listed French firms for the period stretching from 1994 to 2006. The main finding is that family firms are on average 30% smaller than regular firms in terms of sales. However, these firms also choose significantly less volatile sales and employment growth paths. The empirical pattern of financial management in family firms is consistent with the model : family firms incur less debt and hold more cash than their regular counterparts, and these differences are statistically and economically very significant. The results hold in both cross-sectional and longitudinal analysis, after careful control for potential confounding factors.

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# 1 Introduction

In 1949, David Landes wrote that the sluggish economic growth experienced by France until then had been mainly caused by the dynastic character of its firms. In particular, he argued that family firms favored status quo as long as such an attitude delivered “satisfying” profits. My own data suggests that in recent years, French family firms were smaller than regular firms by about 30%. This has deep macroeconomic consequences as, according to Astrachan and Schanker (2003), family businesses in their broadest sense<sup>1</sup> amounted to 64% of US GDP in 2003.

However, Landes’s characterization of family firms has been heavily challenged : striking examples have been cited in the management literature in order to give a leading role to family firms in modern economic development<sup>2</sup>.

Moreover, since firm-level volatility has substantially increased in the past 30 years in publicly-traded firms<sup>3</sup>, family firms are more and more praised for their ability to deliver security to their close stakeholders, be they suppliers or workers. In the US, the defence of family businesses’ survival is one of the most prominent arguments cited in favor of estate tax reductions<sup>4</sup>. In Europe, in the past 15 years, many public policy measures encouraging the persistence of family firms have been proposed. In 1994, the European Commission<sup>5</sup> was already recommending that heir-managed firms benefit from reduced estate taxation. In 2006, it concluded that 21 out of the 25 European Union States had gone into that direction<sup>6</sup>.

The policies favoring family businesses usually imply reforms in very diverse parts of the legislation : wealth taxation, and especially estate taxation, are the first themes to come to mind, but inheritance law as well as incorporation law are often considered as impediments to family firms<sup>7</sup>. To my knowledge, there has hardly been any economic evaluation of such policy reforms<sup>8</sup> which have quite low direct costs but may have much larger indirect costs due to their potential effects on the allocation of talent and capital.

In this article, I provide a simple model showing how dynastic motives in a family firm lead it to choose small and stable development paths. I test some of the predictions of the model regarding firm growth, risk-taking and financial management, using a unique dataset on French family firms covering both public and private firms.

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<sup>1</sup>That is firms whose controlling shareholder is an individual or a limited set of individuals.

<sup>2</sup>See for example James (2006) for an account of successful dynasties in the iron industry

<sup>3</sup>See Comin and Philippon (2005) for the US, Thesmar and Thoenig (2009) for France.

<sup>4</sup>Among the most important interest groups supporting the repeal of estate taxes in the US is the Family Business Institute. See “Estate Tax Showdown is Splitting the G.O.P.”, *The New York Times*, June 7, 2006.

<sup>5</sup>See European Commission (1994)

<sup>6</sup>See European Commission (2006).

<sup>7</sup>See Ellul et al. (2008).

<sup>8</sup>Except Grossmann and Strulik (2008).

**Contribution** The focus of the theoretical literature on family firms has been on the managerial efficiency or inefficiency of family firms. For instance, the seminal paper by Burkart, Panunzi and Shleifer (2003) assumes that heirs are naturally less able to run a firm than a chosen professional, so that the core trade-off between family firms and regular ones is one between managerial incompetence and agency costs. Caselli and Gennaioli (2005) embed this trade-off in a general equilibrium model and compute the welfare costs of dynastic management only on the basis of family managers' lower ability relative to professional managers. Striking a more positive note, several contributions have insisted on the comparative advantages of family managers. Kimhi (1995) insists on the fact that prior to becoming CEOs family managers, as opposed to professional CEOs, may have more heavily invested in firm-specific managerial capital<sup>9</sup>, which can give them a comparative advantage. In parallel, Sraer and Thesmar (2007) develop the idea that family managers are more prone to make mutually advantageous implicit contracts with workers and/or suppliers.

In respect, my model of family firms does not make any assumption about differences in managerial productivity between family and professional managers. In order to define the specificity of family firms, I prefer to lean on arguments from economic history, such as in Landes (1949) and Murphy (2005) for French firms, or in Chandler (1990) for British firms, insisting on the cultural reluctance of family firms to welcome external investors in the decision-making process. In the economics literature, Morck et al. (2000) and Bertrand and Schoar (2006) also give some anecdotal substance to the idea that "preferences matter" in those firms. With this cultural assumption in mind, the model suggests that rather than being incompetent, dynastic managers are prudent : family firms choose lower scale and risk levels, lower leverage and higher levels of cash holdings. It does not unambiguously predict that family firms have a higher or a lower Return on Assets than average.

These predictions are not jointly and unambiguously supported by theories based on differences in managerial efficiency. In Burkart et al. (2003), the scale of the projects is held constant and there is no prediction on the volatility of family firms. Caselli and Gennaioli (2005) make the prediction that family firms are smaller but in their model the riskiness of projects is constant across manager types. Finally, the ability to write implicit contracts might reduce risk-taking in family firms, but the effect of this quality on production scale and financial management remains unclear.

The predictions of the model have consequences for the shape of firm size distribution within an industry. While Lucas (1979) argues that it is the distribution of managerial ability that determines the distribution of firm size, my analysis suggests that the distribution of preferences for private benefits of control among firm owners will also matter : where

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<sup>9</sup>This is often backed by anecdotal evidence. See for good examples Bertrand and Schoar (2006).

such preferences are strong, firms will be smaller on average. With respect to more recent contributions, such as Luttmer (2006), who model firm size distribution as the result of dynamic entry, exit and stochastic productivity, my contribution is admittedly simplistic but it provides some important insights : past a certain scale, family firms may hit the constraint that their dynastic benefits should be preserved, while regular firms at the same stage may go on growing according to the evolution of their productivity. As a result, Gibrat's law that firm growth rates are independent of initial size may not hold anymore, which in turn may explain why observed firm size distributions have thinner tails than a Pareto distribution at the top (Rossi-Hansberg and Wright (2007)).

This paper also takes part in the growing literature on the determinants of firm-level idiosyncratic volatility. This literature has identified several factors increasing risk-taking by firms : capital market development and the loosening of financial constraints on the one hand<sup>10</sup>, increased competition on product markets on the other hand<sup>11</sup> have been identified as primary causes. In this paper, I argue that large private benefits of control may also have an important and negative effect on firm-level volatility. This idea parallels an intuition of Moskowitz and Vissing-Jorgensen (2002) about what they call the “private equity premium puzzle”, i.e. their empirical observation that the monetary returns to private business holdings are not higher than returns to stocks, even though holders are much less diversified in the former case. The explanation they offer is that entrepreneurs derive a nonpecuniary benefit from being autonomous. This paper thoroughly studies the effects of such preferences on firm-level volatility.

With respect to the empirical literature on family firms, my contribution is threefold. First, the focus is on all firms with a significant number of employees rather than just listed firms as was the case in previous studies<sup>12</sup>. That is an important step for several reasons.

One is purely descriptive : this sample allows me to give a more complete sense of the economic weight of firms run by heirs rather than by professionals. Such aggregate figures have implications above and beyond corporate finance issues. For instance, since becoming the CEO of a significant firm is one of the main ways to climb the income ladder, the degree of inheritability of that precise position is critical for the evaluation of social mobility, and little is known quantitatively about this category of “inherited” top incomes. Indeed, Kaplan and Rauh (2009) estimate that top executives from non-financial public companies represented about 7% of the top 0.01% of the US income distribution. But this figure underestimates

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<sup>10</sup>See Saint-Paul (1992), Acemoglu and Zilibotti (1997), Michelacci and Schivardi (2008), Thesmar and Thoenig (2009) for good examples.

<sup>11</sup>See Gaspar and Massa (2006)

<sup>12</sup>See for good examples Anderson and Reeb (2003), Amit and Villalonga (2006), Miller et al. (2007) for the US, Sraer and Thesmar (2007) for France.

the weight of executives because it does not include private firms, where family businesses are more frequent : even after estimating the contribution of investment bankers, money managers, lawyers and professional athletes, the authors cannot account for about 80% of the top 0.1% and higher brackets of the US income distribution. Part of this “residual” certainly includes a significant share of inherited management positions in private businesses.

Another advantage of looking beyond listed firms is that it avoids two selection biases. First, one can imagine that, given equal firm size, portfolio diversification on the owners’ side is lower among private firms<sup>13</sup>, and one can reasonably expect that this has consequences in terms of corporate growth and risk strategies. In that sense, looking at public firms only will lead to overestimate the degree to which firms are willing to grow and take risks. A second problem is that public companies are not random draws from the pool of private firms : the firms that enlist themselves probably have very different financing needs and growth perspectives than the rest of private firms<sup>14</sup>.

I also use an original definition of the family firm in the sense that I put rather more weight on the family ties of the current *management* than on those of the current *shareholders*. Definitions solely based on blockholding<sup>15</sup> are not a discriminant indicator of a dynastic motive as one takes a look at private firms, because the absence of a liquid market for shares naturally limits the number of potential shareholders<sup>16</sup>. Instead, I define as family firms those firms that have experienced a CEO transition from one member of a family to another, conditional on having already experienced a CEO turnover. The authoritative paper by Astrachan and Shanker (2003) on the prevalence of family businesses in the US offers a very similar definition. Using this concept, I estimate that more than one in five French employees in the private sector work in those firms, which is not significantly different from what has been estimated for the US.

The comparability between the two countries in terms of family firms’ prevalence is comforting since one might have believed that family firms were much more prevalent in France, where shareholder protection is lower (Laporta et al. (1997)), in which case the external validity of the results could have been put into doubt. One should also note here that the empirical work we present in this paper is for now very difficult to replicate on US data, due to the lack of datasets on American private firms for a long enough time span. In particular,

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<sup>13</sup>Moskowitz and Vissing-Jorgensen (2002) find that about 75% of all private equity is owned by households for which it represents more than half of their net worth.

<sup>14</sup>Sraer and Thesmar (2007) try to estimate whether this is a real problem by analysing the firm entry and exit patterns on the French stock market depending on firms’ family status. They do not find significant differences but they also admit that their sample is too small to provide definitive evidence.

<sup>15</sup>Such as the one proposed by Faccio and Lang (2002) : a family firm is a firm for which a direct or indirect controlling stake (more than 20%) is held by an individual or a family.

<sup>16</sup>The lack of relevance of those definitions for most private firms was also emphasized by Bennedsen and Wolfenzon (2000).

it is very difficult for such firms to have reliable financial data and to match them with qualitative variables such as the status of the CEO on a quasi-exhaustive basis. French firm-level data are particularly rich in this concern because there exists a unique identifier for each firm across time and across surveys and administrative receipts<sup>17</sup>.

The second main empirical contribution is that I go beyond the analysis of profit rates. In the empirical literature<sup>18</sup>, these indicators have been mainly chosen in reference to the theoretical literature on family firms, which focuses on the issue of managerial efficiency. While these contributions on listed firms give descriptive evidence that public family firms are smaller than other public firms, firm size has mostly been seen as an impediment to estimating profitability equations rather than a dependent variable to analyze per se as I do here. This may partly be because the most conspicuous aspect of family firms, nepotism, calls for estimating profitability rather than size and volatility differentials. To be fair, some recent papers have made a step towards an evaluation of family firm specificities in terms of volatility. In their study of French listed firms, Sraer and Thesmar (2007) estimate that family firms significantly smooth sectoral business cycles. They attribute this to the presence of implicit risk-sharing contracts with the workforce. However, looking at public firms only may be particularly problematic when one examines volatility : in a recent contribution, Davis et al. (2007) have shown that firm-level idiosyncratic volatility has followed opposing trends in the last 30 years depending on whether firms are listed or not. A second related contribution is Michelacci and Schivardi (2008). Using Italian repeated cross-sectional data on medium-sized firms, they find that productivity growth is much more dispersed among the group of regular firms than among the group of family firms. It is not clear however whether such dispersion captures differences in firm-level idiosyncratic volatility. It might as well be that some stable but unobserved factor of productivity such as, say, managerial ability, is distributed with a smaller variance in family firms. Because the measure of volatility I use is computed using panel data, the results may much more clearly be interpreted as reflecting differences in volatility.

Finally, this paper uses a combination of cross-sectional and longitudinal evidence on family firms. A cross-sectional study is essential because it sums up all the stages in a firm's history in which a trade-off between size and preservation of control occurred : the choice of the initial capital size, the occurrence of new growth opportunities during the founder's tenure and the management style of successors will all add up over time and produce their effect on size at a given point in time, when a full analysis would require deep empirical knowledge on firms' history that I do not have. However, there are many potential selection

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<sup>17</sup>See Bertrand et al. (2007) for an interesting handling of these data.

<sup>18</sup>See for instance Anderson and Reeb (2003), Amit and Villalonga (2006), Bennedsen et al. (2007), Miller et al. (2007), Perez-Gonzalez (2006), and Sraer and Thesmar (2007).

biases associated with a pure cross-sectional study : firms present in the cross-sectional sample are those that survived and managed to attain a significant number of employees. That is why, as a robustness check, I also provide longitudinal evidence on the effect of family CEO successions, following the idea of Perez-Gonzalez (2006) and Bennedsen et al. (2007). I consider the succession stage as one critical moment when dynastic firms and regular firms should diverge in their development paths.

The main results are that 1) in terms of sales, dynastic firms are 30% smaller than regular firms in the cross-section, while dynastic successions entail a reduction in sales growth by about one point a year during the first five years; 2) firm-level sales volatility is about 13% lower in dynastic firms, with a significant reduction of employment volatility at CEO turnover dates; 3) dynastic firms hoard about 15% more cash and 12.5% less debt, with equal significance at both cross-sectional and longitudinal level. Together with the model, these empirical results suggest that dynastic motivations are an essential component in firm development strategies.

**Organisation** The remainder of the article is organised as follows. Section 2 develops the model and its predictions. Section 3 details the process of data collection as well as descriptive statistics on dynastic successions in France. Section 4 describes the econometric methodology. Section 5 comments the results of the estimations and discusses their welfare implications. Finally, section 6 concludes the article.

## 2 A model of firm development with dynastic motives

The main foundation of the model is that entrepreneurs with an intent of founding or continuing a family business are above all reluctant to have their firm go through liquidation at some point in the future. The rationale behind this is that entrepreneurs in family firms give a specific weight in their utility to the preservation of a family tradition that can only be embodied by family descendants owning and/or running the firm in the future. As we will see in this section, this simple difference in preferences bears substantial consequences in terms of growth, risk and financial management.

### 2.1 Model set-up

The model follows the framework proposed by Tirole (2006) in order to analyse investment capacity, corporate liquidity and risk management. There is a continuum of mass one of risk-

neutral entrepreneurial dynasties<sup>19</sup>. In period 0, each dynasty has an investment project, yielding a monetary return  $R(q)$  per unit invested with some probability  $q$  (that the dynasty will choose) in period 1 and 0 otherwise. I assume that all these dynasties have a level of wealth  $A$  in period 0 but they may want to find some external finance in order to undertake their project at an optimal size, so that eventually the project is of size  $I$ . Competitive risk-neutral outside financiers are willing to lend if they break even in expectation. For simplicity, their required rate of return is normalized to zero, and their participation constraint will be saturated in equilibrium.

In order to account for the potential attachment of a dynasty to the continuation of its association with the firm, I assume that a dynasty derives a private benefit equal to  $B$  per unit invested in period  $t = 0$  by external financiers when the project is a success and the firm is able to repay its creditors in period  $t = 1$ , and 0 when the project is a failure and the firm is liquidated. One may see this as a reduced form for the fear of a loss of control rights in case of failure of the project : the more external investors there are within a firm, the likelier it is that failure will lead to control loss for future generations of the family. This fear may in turn be justified by the attachment to a certain management style or to the accrual of some amenity potentials<sup>20</sup> that could not be credibly provided for if the dynasty were not in control anymore.

In period 0, dynasties also have to choose the risk and return characteristics of their project. The latter will yield a monetary return  $R(q) = R - \beta q$  with probability  $q$  and 0 otherwise. I assume that  $q$  is not contractible. We can sum up the pay-off structure as follows :

$$R(q) = \begin{array}{ll} (R - \beta q)I + B(I - A) & \text{with probability } q \\ 0 & \text{with probability } 1 - q \end{array}$$

I make the following assumptions :

$$R > \beta \tag{1}$$

$$2\beta > R > 2\sqrt{\beta} \tag{2}$$

Assumption (1) is a technical assumption that guarantees that in equilibrium both expected output and volatility of the project are strictly increasing with  $q$ . Assumption (2) states that the maximal monetary NPV of the project<sup>21</sup> is positive and guarantees that for  $B$  low enough, the optimal risk level is not a boundary solution.

This modelling choice differs from that of Burkart et al. (2003) in several ways. Firstly,

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<sup>19</sup>One may also consider those as infinitely-lived agents.

<sup>20</sup>See Demsetz and Lehn (1985).

<sup>21</sup>That is when  $q$  is set in such a way as to maximize the expected monetary return.



I assume that the *production technology* is independent from the level of private benefits  $B$  : keeping control of the firm within a dynasty does not involve that managers are less able to run a firm. In my model, it is only because *preferences* are different that family firms are specific, while in Burkart et al. (2003) it is assumed that nepotism involves a less efficient production technology in such firms. In their model, this feature automatically translates into lower monetary returns for such firms, which is not an established fact in the empirical literature : Anderson and Reeb (2003) and Sraer and Thesmar (2007) find that heir-managed firms overperform regular firms while Perez-Gonzalez (2006) and Bennedsen et al. (2007) estimate that heirs underperform professional managers<sup>22</sup>. In contrast and as will be clear in the following discussion, the model I present here is compatible with both of these findings. Secondly, there is no room for separation between ownership and management in the model I present. Again, this comes from the assumption that family managers have no different abilities relative to professional managers : with no obvious benefits at hand, the agency costs of separation between management and ownership will always prevent it from happening. This also reflects the fact that most of the firms in our sample are private small-and-medium-sized businesses : in their study on Danish firms, Bennedsen et al. (2004) report that when a firm is controlled by a family or an individual there are more than 90% chances that the CEO is drawn from the population of shareholders.

## 2.2 Size and Risk decisions

Since the riskiness of the project  $q$  is not contractible, the size of the project and its riskiness are decided sequentially : first the size of the investment  $I$  depends on how much external investors are willing to lend, and then once the project size is decided the dynasty privately chooses a level of risk and return that optimizes its own utility. That is why it is necessary to solve the problem by backward induction. In a first step, I solve for the optimal riskiness  $q$  conditional on the size of the project  $I$ :

$$q^* = \underset{q}{\operatorname{argmax}} q((R - \beta q)I + B(I - A)) - I \quad (3)$$

Equation (3) represents the total NPV of the project : because external investors are behaving competitively, the whole NPV is appropriated by the dynasty. In a second step, I solve for the optimal choice of investment size, which solves the following program :

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<sup>22</sup>One should also mention Bloom and Van Reenen (2007) who find in their sample of medium-sized businesses from the US, the UK, France and Germany that heirs do not use modern management techniques as much as professional managers.

$$\max_I q^*(I) \times ((R - \beta q^*(I))I + B(I - A)) - I \quad (4)$$

$$s.t. \quad q^*(I) \times ((R - \beta q^*(I))I) \geq I - A \quad (5)$$

Equation (5) states that the expected income that is pledgeable to external investors must be greater than the initial outlay required from those investors in period 0. From these assumptions, it is possible to make the following propositions :

**Proposition 1.** *Firms whose owners enjoy higher private benefits of dynastic control have a lower leverage ratio.*

**Proposition 2.** *Firms whose owners enjoy higher private benefits of dynastic control choose a lower production level.*

**Proposition 3.** *Firms whose owners enjoy higher private benefits of dynastic control choose a lower revenue risk.*

**Proofs.** See Appendix A.1.

The intuition for these three results is the following. Increasing a firm’s leverage raises the dynasty’s fear of control loss in period 1. Consequently, dynasties getting a high level of private benefits from keeping the firm reduce risk-taking at the expense of expected returns. This in turn reduces the expected income pledgeable to external investors. For this reason, external investors are unwilling to lend large amounts to dynasties enjoying high private benefits. In consequence, firms with high private benefits have a lower leverage ratio (Proposition 1). Furthermore, because dynasties have limited wealth of their own, this borrowing constraint limits the size of investments (Proposition 2). *Ceteris paribus*, a lower leverage induces family firms to take more risks. However, this indirect effect does not counteract the direct and negative effect of a high preference for firm continuation on risk : eventually, firm owners with such preferences choose a lower level of risk (Proposition 3).

Note that the main existing model regarding family firms, proposed by Burkart et al. (2003), does not make any predictions regarding firm size since they assume that entrepreneurs’ projects have a fixed size. However, the case can be made that managerial ability enhances the marginal productivity of other inputs<sup>23</sup> so that a lower ability of family managers would also translate into a lower size of family firms, as is the case in Caselli and Gennaioli (2005). Regarding firm-level risk-taking, none of these ability-based models make predictions on the specific characteristics of family firms since risk is not a choice variable in these setups. It is indeed not clear what the effect of managerial ability on volatility is : “bad” managers may

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<sup>23</sup>As in a “span-of-control” model of firm size à la Lucas (1978).

choose to follow their predecessors' footsteps out of a lack of creativity, but they might also try to compensate their inability through riskier business strategies; in both cases, expected returns are lower in poorly-managed firms but the effects on volatility may go in opposite directions.

### **The ambiguity of family firms' profitability**

In the preceding version of the model, the profitability of family firms is inferior in expectation to regular firms since lower revenue risk is associated with lower expected return. If firm-level volatility is purely idiosyncratic and insurance markets are complete, then this result means that the risk-adjusted return of family firms is lower than that of regular firms. This is indeed what is predicted by Burkart et al. (2003) following their assumption that heirs are less able than professional managers. Whether this result is backed by the data is subject to debate in the empirical literature, as has already been said.

However, in our model this result crucially hinges on the assumption that returns to scale are constant. Once it is assumed that these returns are decreasing, then it may be that family firms have a higher return per unit invested than regular firms, because they choose a lower production scale, which could counteract the risk reduction effect. In order to demonstrate this, let us now assume that the production technology is the following :

$$R(q) = \begin{array}{ll} (R - \beta q)I^\alpha + B(I - A) & \text{with probability } q \\ 0 & \text{with probability } 1 - q \end{array} \quad (6)$$

with  $\alpha$  between 0 and 1. It is then possible to make the following proposition :

**Proposition 4.** *When returns to scale are decreasing, the effect on the Return to Assets of higher private benefits of dynastic control has an ambiguous direction.*

**Proof.** See Appendix A.2.

The intuition for this result is simple. When returns to scale are constant, the negative effect of private benefits on size does not impact the firm's average profitability. In that case, increasing private benefits have only a negative effect on ROA, through a higher prudence in project choice. However, once returns to scale are decreasing, this disconnection between size and profitability disappears, so that higher private benefits now also have a positive effect on profitability, through a reduction in size. I do not find that the net effect is of a unique sign for all parameters  $B$ ,  $A$ ,  $\alpha$  and  $\beta$ . That is the reason why I do not expect a particular sign for the effect of family status on firm profitability in my regressions.

## 2.3 Liquidity Management

In order to further assess the relevance of the model, I discuss its implications in terms of liquidity management in the form of cash holdings. I slightly change the initial setup in order to address this issue. Investment requires a fixed amount  $I$  and dynasties have no wealth in period 0<sup>24</sup>. Contrary to the previous situation, dynasties do not choose the level of risk of their venture anymore.

I assume, as in Tirole (2006), that there is an interim period  $t = \frac{1}{2}$  where a liquidity shock may occur with probability  $\lambda$ . If there is no liquidity shock, the project delivers a return  $R$  with certainty. If there is a liquidity shock, each dynasty now faces the following alternative : either it incurs an amount  $\rho$  and the project delivers a return 0 with certainty, or it does not pay  $\rho$ , in which case the project is terminated. I assume the following inequality :

$$R < \rho < \frac{R - I}{\lambda} \quad (7)$$

This assumption guarantees that the monetary NPV of a project for which liquidity is provided is positive *ex ante* but negative *ex post* when a liquidity shock occurs in the interim period.

In order to withstand the liquidity shock, dynasties have several options. They may choose a “wait-and-see” attitude, that is strictly borrowing an amount  $I$  in period 0 and try to borrow again in period  $\frac{1}{2}$  when there is a liquidity shock. But they might as well choose a more cautious attitude, i.e. borrow  $I + \rho$  in period 0 and hold an amount  $\rho$  in uninvested funds between  $t = 0$  and  $t = \frac{1}{2}$  in order to be able to withstand the liquidity shock without further recourse to external financiers.

As in Tirole (2006), for a dynasty the “wait-and-see” attitude may not be optimal *ex ante*. This is because dynasties cannot pledge the private benefits they draw from the continuation of the firm, so that *ex post* there might be a conflict of interest between external financiers and the dynasty regarding continuation when a liquidity shock occurs. I formalise this in the following proposition :

**Proposition 5.** *Firms whose owners enjoy higher private benefits of dynastic control choose a higher level of cash holdings relative to their illiquid investments. However, this relationship holds only when firms are exposed to some strictly positive level of uncertainty.*

The proof of this result is straightforward. Because of assumption (7), the income that dynasties can pledge to external financiers in period  $t = \frac{1}{2}$  is not sufficient to convince

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<sup>24</sup>This is without loss of generality.

external financiers to help them withstand the liquidity shock. Thus dynasties will be willing to hoard liquidity in period 0 whenever their private benefit from the continuation of the firm is high enough, that is if :

$$R + B \geq \rho \Leftrightarrow B \geq \rho - R = \underline{B} \quad (8)$$

Assumption (7) then guarantees that external investors will be willing to meet this demand for liquidity *ex ante*. Intuitively, this means that when the liquidity shock is unlikely enough ( $\lambda$  small) and its intensity is small enough, external investors expect a sufficiently high pledgeable income to provide dynasties with liquidity in period 0.

The reason why uncertainty is crucial for this result is the following. If the shock  $\rho$  is certain and greater than  $R$ , then external investors will not fund the project, whatever the private benefits drawn by the dynasty, since the pledgeable income expected in period 0 is strictly smaller than the outlays required from them. If instead the shock  $\rho$  is certain and smaller than  $R$ , then at the interim period dynasties will always be able to convince external investors to reinvest in the project since then the *ex post* monetary NPV of the project in period  $t = \frac{1}{2}$  is positive : for any level of private benefits  $B$ , hoarding reserves in period 0 becomes unnecessary.

This dependence of cash holdings on exposure to risk will help us disentangle cash and debt management in the regressions. This is because in corporate financial practice cash holdings are often seen as just the negative of debt<sup>25</sup>, in the sense that the motives for holding cash and having a low leverage are identical. In our case, the model disproves this hypothesis since the impact of private benefits on debt (as proved in Proposition 1) does not depend on firm exposure to uncertainty while the impact of private benefits on cash holdings does.<sup>26</sup>

The theoretical literature on cash holdings is very large and has established various motives for corporate cash holdings<sup>27</sup>:

- *The transactions motive* : firms hold cash because of the cost of converting non-cash financial assets into cash in order to make payments.
- *The tax motive* : cash holdings reflect the disincentive that multinationals have in repatriating revenues from overseas.

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<sup>25</sup>See Vernimmen (2009).

<sup>26</sup> This identification method has already been suggested by Acharya, Almeida and Campello (2007), albeit in a different context.

<sup>27</sup>See Bates et al. (2009) for a comprehensive list of these motives.

- *The agency motive* : firms retain cash because of the unwillingness of unchecked managers to give cash back to shareholders<sup>28</sup>.
- *The precautionary motive* : firms hold cash when they may experience liquidity needs in the future but are uncertain that they would then be able to find some external source of financing.

We based our explanation of the greater resort to cash holdings in family firms on the precautionary motive. In doing so, have we imparted some distinct explanatory power to our model, or are the the former three motives sufficient to explain this phenomenon ?

The transactions motive has the implication that smaller firms should hold more cash, due to economies of scale in transactions management<sup>29</sup>; if family firms are smaller for a reason other than the one we exposed, this motive might in itself lead to a positive correlation between family status and cash holdings. That is why it will be important to control for size in some of our specifications relating family status to the cash ratio. The tax motive for cash holdings is unlikely to be significant in our sample since most of it is made of SMEs and not big multinationals. Finally, the agency motive should not be strong in our sample, again because separation of ownership and management is rare in private businesses; if this motive did exist, one would expect that it goes in the opposite direction with respect to our model : agency costs are likely to be smaller in family firms, where separation of ownership and management is less frequent, therefore these firms should rather hoard *less* than more cash. Overall, this analysis suggests that the effect of family status on corporate cash holdings we unveil in Proposition 5 can be correctly identified with the data we collected.

## 3 Data description

### 3.1 Data sources

#### 3.1.1 Defining Family Firms

The definition of dynastic firms I use is that these must have experienced a within-family CEO turnover conditional on having experienced at least one CEO turnover. One of this definition's drawbacks is that I cannot properly consider founder-led firms in the analysis, contrary to the previous literature on listed family firms. One reason for this choice is data-driven : in France, it is impossible to gather extensive information on the identity of the

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<sup>28</sup>For example, in badly-governed firms cash may serve as a defence against takeover risk (see Faleye (2004)).

<sup>29</sup>See Mulligan (1997).

original founder of a private firm. A more conceptual argument is that founder-led firms are bound to experience a CEO turnover at some point in their life cycle. Of course, this CEO turnover may happen at very different stages of a firm's development. But I can control for that using my knowledge of any firm's creation date.

This definition allows me to establish both cross-sectional and longitudinal evidence on the characteristics of family firms. The cross-section of firms is designed in order to have both a sufficient amount of CEO turnover prior to the window of analysis and also a sufficient amount of observation time within that window. I have data on CEO changes from 1994 onwards and I have accounting data until 2006. Then, I build the cross-sectional sample using the firms that have experienced a CEO turnover between the years 1994 to 1999, while the window of analysis goes from 2000 to 2006. In parallel, the longitudinal sample is composed of all the CEO successions we observe from 1996 to 2003. I now turn to the methodology I used in order to track CEO successions.

### **3.1.2 Identifying successions**

In a first stage, I collected data on CEO successions happening between 1994 and 2005 for French firms. I identified CEOs' names for every French firm using the DIANE dataset published every month by the Bureau Van Dijk. This dataset compiles all the corporate information to be transmitted to commercial courts : accounts, address, and ID of the CEO. It also gives the SIREN identification number of the corresponding firm, which proves very convenient for matching with other firm-level datasets. All in all, about 90% of firms with more than 100 employees and 75% of firms between 20 and 49 employees are included in that dataset<sup>30</sup>.

Comparing each DIANE dataset from month to month, I was able to identify the time of a CEO succession for a given firm. This strategy is possible in the French case because, for firms with more than 20 employees, a majority of the business transfers involving a CEO change are done through the purchase of the firm's shares, so that the legal entity remains the same and the SIREN identifying number does not change on such occasions.

While this strategy is convenient for French firms, it is problematic in the case of subsidiaries of foreign firms : in these cases, the quality of names' typing is very bad and this leads to a severe overestimation of the number of successions. In order to get rid of this problem, I decided to exclude those firms whom I know, through my ownership data, that they belong to foreign business groups.

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<sup>30</sup>These figures come from a comparison I made between the fiscal dataset BRN and the DIANE dataset. A significant part of the discrepancy comes from the fact that the BRN file includes many non-commercial entities.

As I want to be able to compare the identity of successive individuals, I do not consider cases where individuals were replaced as CEOs by a corporation<sup>31</sup>. I also remove some SARL companies for which there is more than one CEO<sup>32</sup>.

Given the occurrence of a succession, I compared the spouse and maiden names of both the departing and the incoming CEO in order to track the family status of each CEO transition. I defined as family successions those successions where the last name of the incumbent CEO was the same as that of the departing CEO. I should stress here that the DIANE dataset does not allow me to distinguish a son-in-law from a professional manager. Assuming that in-laws' performance as managers ranges between those of regular family members and those of professional managers, this omission should only bias the estimates towards zero. More importantly, it is questionable whether in-laws should be considered as dynastic managers, as one cannot rule out that the marriage market acts as a market for professional CEOs<sup>33</sup>.

### 3.1.3 Ownership data

French firms are likely to belong to a business group and in some cases, this will deprive official CEO transitions from any economic meaning. In particular, I want to avoid firms owned by foreign groups (due to incorrect name typing) or state-owned firms. Furthermore, the meaning of a CEO transition may be very different when a firm is listed or belongs to a listed firm, and when it is not : in the latter case, because separation between management and control is less likely, it is also more probable that a CEO transition to a professional manager is driven by a surrender of control by the initial owners.

That is why it is crucial to get some data on firms' shareholding structure. I retrieve such information from two sources. The first source is the LIFI survey run by INSEE : it gives all the shareholding links (both direct and indirect) between French firms provided one of them is large enough (more than 500 employees or more than 45 million euros). The second source is the DIANE dataset, that we just mentioned in the preceding subsection. This dataset lists shareholding links for smaller firms. I keep firms belonging to foreign or state-owned business groups out of the sample. I can also distinguish firms with subsidiaries and check that these firms do not drive the longitudinal results. I cannot go further than that for the longitudinal sample since good coverage of middle-sized firms in both sources starts from the year 2000. However, since the cross-sectional sample is made of firms alive in 2000, I will be able to use more shareholding details for the cross-sectional analysis, such as the direct or

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<sup>31</sup>As can be the case for the Sociétés par Actions Simplifiée since August 1999, albeit residually in the sample period.

<sup>32</sup>In these cases, the firm is led by several "Co-Gérants". Again, this case is residual in the data I have.

<sup>33</sup>For Japanese listed firms, Mehrotra et al. (2009) give substantial evidence that in-laws are selected according to their managerial abilities.



indirect owning of shares by the current CEO of the firm.

### **3.1.4 Accounting data**

Since the DIANE dataset also contains the national identification number of each firm, I can match the dataset of successions with other firm-level datasets. In order to collect precise information on the firms' characteristics, I use the Bénéfices Réels et Normaux dataset, compiled by the French National Institute of Statistics (INSEE). This dataset is a recollection of all firm-level data collected by the fiscal administration. Therefore, this dataset is exhaustive and contains very detailed and accurate accounting information on French firms<sup>34</sup>. This allows me to obtain yearly variables such as sector, firm size, sales, assets, profits, financing patterns, etc., for any year between 1993 and 2006.

### **3.1.5 Personal Variables**

Kimhi (1995) stresses that CEO changes in family businesses are likely to be more related to the actual CEO's life cycle than to firm characteristics. Unfortunately, there is no centralized source in France detailing CEOs' birth dates. I was however able to collect this information for some of them from three different sources : the DIANE dataset, the individual payroll tax files (INSEE-DADS) and the official company register (SIRENE-INSEE). In the end I could obtain retiring CEOs' birth years in only 30% of the successions. For this reason, I do not use CEO's age in the regressions. However, it will be useful in the estimation of dynastic firms' prevalence because it gives me a rough estimate of differences in CEO tenure between dynastic and regular firms.

### **3.1.6 Estimating Firms' Resale Value**

CEO successions are intimately related to the market for corporate control : many external CEO transitions in the sample probably correspond in fact to firm buy-outs. For this reason, I deemed necessary to have a measure of the buy-out market level of activity, such as Tobin's  $q$ . The problem is that a majority of firms in the sample are private firms so that it is not possible to use traditional methods for that purpose.

However, valuating private firms is the job of private equity funds and tax authorities alike so that it appears reasonable to mimick the methods they use. In particular, the transaction multiples method looks appropriate for this purpose : it consists in constructing value multiples from observed prices in past transactions for comparable firms and then multiplying the relevant accounting indicator for the firm I am interested in by the corresponding value

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<sup>34</sup>See Bertrand et al. (2007) for more details on this dataset.

multiple<sup>35</sup>. I use this method in order to compute estimates of Tobin’s  $q$  for each of the firms in the sample one year before the succession. I provide details on the method in appendix B.

### 3.1.7 Building the Cross-Sectional Sample

For the cross-sectional study, I restrict the sample to firms with more than 20 employees in 2000 that are neither state-owned nor foreign-owned, which means about 46,652 firms. On this sample, I record all the CEO successions that occurred between 1994 and 1999, using the method described above. For 26% of the firms, I detect the occurrence of a CEO change. Among the firms having experienced a CEO change, we distinguish as “dynastic” those that have experienced a CEO transition within the family while we call “regular” those that have only experienced external CEO transitions. We consider that the remaining firms are “undetermined” firms, which includes founder-led firms but also firms whose CEO has been in the position for more than 6 years but yet is not the founder. We keep those firms in the sample because they will be useful reference points in the regressions<sup>36</sup>.

Using these definitions, I find that among firms that have experienced a succession between 1994 and 1999, 26% are dynastic, which represents only about 8% of all firms with more than 20 employees. However, for purposes of describing the prevalence of dynastic firms in the French economy, I also propose a method in order to know more about the group of undetermined firms, which probably includes a significant share of dynastic firms. A detailed presentation of this method is in Appendix C. The main results are that a fourth of all firms with more than 20 employees are in France managed by a relative of the founder, and these firms represent more than a fifth of total employment in the private sector. This is slightly above estimates given by Sraer and Thesmar (2007) who only look at publicly-traded firms : in their case, heir-managed firms represent about 15% of total employment. This figure is also a bit smaller than the figure of 27% proposed by Astrachan and Shanker (2003) for the US. Their estimates are however quite imprecise since they rely on small-sample surveys.

### 3.1.8 Building the longitudinal sample

Focusing on successions themselves as event studies allows to extend the window of analysis, that is over period 1994-2006. However, because the DIANE dataset is patchy, the longitudinal sample requires further data cleaning. Firstly, in order to avoid “fake” successions, i.e. changes in CEO motivated by short-term judicial or fiscal matters with no economic interpretation, I remove any succession preceded or followed within two years by another one from

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<sup>35</sup>See Vernimmen (2009) for a detailed presentation of these valuation methods.

<sup>36</sup>In fact, none of the results change when I exclude those firms.

the sample<sup>37</sup>. This implies that I restrict the final sample of successions to years comprised between 1996 and 2003. Secondly, I require that the firm has had more than 20 employees in the three years prior to the succession. This selection process is proved necessary because the DIANE dataset is not as well updated for smaller firms, which makes the identification of the CEO succession date noisier.

Through this process, I finally obtain a dataset of 15,023 observed successions, 23% of which can be identified as being transitions within a family. Note that this figure is 50% lower than in the Danish case (Bennedsen et al. (2007)) but it is certainly due to the fact that I focus on firms with more than 20 employees while the Danish study covers the whole universe of limited liability firms : because there are more family successions as firm size decreases, this fact can explain the whole discrepancy between the two figures.

A potential problem with the sampling procedure is selection bias : firms experiencing outside CEO transitions may go bankrupt more often, which could bias the estimates if bankruptcy is correlated with the outcome variables. However, in the sample, 6.11% of firms experiencing family successions go bankrupt in the following 5 years, while it is the case for 6.58% of firms experiencing outside successions. Using instead the probability to go bankrupt at some point after the succession, the bankruptcy rate is equal to 9.40% for family successions and 9.21% for outside successions. These differences are clearly not significant, which comforts my sampling strategy.

Another potential confounding factor comes from business groups. Following a CEO turnover, a firm with subsidiaries might be reorganised in such a way that assets, employees or sales are repatriated from the subsidiaries to the parent firm. This could bias the estimates of the effect of successions on firm scale. That is why as a robustness check, I replicate all the regressions in a subsample of firms owning no subsidiaries prior to the succession according to the LIFI survey (about 91% of all successions).

## 3.2 Descriptive statistics

### Cross-sectional sample

Descriptive statistics for the cross-sectional sample are given in Table 1. The striking fact is that dynastic firms are smaller : sales, employment and assets are about twice as small as in regular firms. Though the difference in size is partly driven by firms in top percentiles of the size distribution, differences in logarithm would also confirm the magnitude of the size difference. The size gap holds even though dynastic firms are older by about 4.5 years. The age difference is most probably a consequence of the sampling strategy : since I can define

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<sup>37</sup>Note that this is the procedure followed by Bennedsen et al. (2007).

Table 1: Descriptive statistics for the cross-sectional sample

	Nb. Firms	Mean	Q25	Q50	Q75
PANEL A : REGULAR FIRMS					
<i>Employment</i>	9182	160	32	48	108
<i>Sales (M Eur)</i>	9182	38.68	3.41	7.52	17.68
<i>Economic Assets (M Eur)</i>	9182	21.85	1.25	2.81	7.63
<i>Debt/Assets</i>	9182	0.4	0.23	0.37	0.53
<i>Cash/Assets</i>	9182	0.11	0.01	0.05	0.16
<i>ROA</i>	9182	0.09	0.02	0.08	0.16
<i>Sales Volatility</i>	9182	0.123	0.032	0.072	0.145
<i>Employment Volatility</i>	9182	0.117	0.028	0.065	0.132
<i>Assets Volatility</i>	9182	0.182	0.045	0.104	0.216
<i>Firm belongs to a listed group</i>	9182	0.183			
<i>CEO is a shareholder</i>	9182	0.239			
<i>Firm age (in 2000)</i>	9181	26.7	12	21	35
<i>Age difference with previous CEO</i>	1599	5.8	0	3	13
<i>Actual CEO's age (in 2000)</i>	6771	49.2	44	50	55
<i>Previous CEO's age (in 2000)</i>	1855	55.4	49	55	62
PANEL B : DYNASTIC FIRMS					
<i>Employment</i>	3064	76.4	28	41	66
<i>Sales (M Eur)</i>	3064	12.68	2.72	5.17	11.10
<i>Economic Assets (M Eur)</i>	3064	6.13	1.16	2.26	4.71
<i>Debt/Assets</i>	3064	0.34	0.20	0.30	0.44
<i>Cash/Assets</i>	3064	0.13	0.02	0.09	0.21
<i>ROA</i>	3064	0.09	0.03	0.08	0.14
<i>Sales Volatility</i>	3064	0.106	0.03	0.066	0.129
<i>Employment Volatility</i>	3064	0.097	0.025	0.058	0.114
<i>Assets Volatility</i>	3064	0.148	0.041	0.09	0.177
<i>Firm belongs to a listed group</i>	3064	0.028			
<i>CEO is a shareholder</i>	3064	0.67			
<i>Firm age (in 2000)</i>	3064	31.2	17	28	39
<i>Age difference with previous CEO</i>	811	18.7	5	25	29
<i>Actual CEO's age (in 2000)</i>	2518	44.8	37	43	51
<i>Previous CEO's age (in 2000)</i>	882	63.1	58	65	70
PANEL C : UNDETERMINED FIRMS					
<i>Employment</i>	34406	79.7	28	40	63
<i>Sales (M Eur)</i>	34406	14.99	2.43	4.59	9.92
<i>Economic Assets (M Eur)</i>	34406	6.19	0.93	1.84	3.93
<i>Debt/Assets</i>	34406	0.38	0.23	0.35	0.5
<i>Cash/Assets</i>	34406	0.13	0.02	0.08	0.21
<i>ROA</i>	34406	0.10	0.03	0.09	0.16
<i>Sales Volatility</i>	34406	0.110	0.031	0.069	0.135
<i>Employment Volatility</i>	34406	0.108	0.027	0.063	0.126
<i>Assets Volatility</i>	34406	0.164	0.043	0.098	0.196
<i>Firm belongs to a listed group</i>	34406	0.043			
<i>CEO is a shareholder</i>	34406	0.577			
<i>Firm age (in 2000)</i>	34402	22.5	10	18	30
<i>Actual CEO's age (in 2000)</i>	26463	52.2	46	52	57

*Note* : Economic Assets are computed as Tangible plus Intangible Fixed Assets plus Working Capital. The denominator for ROA, Cash to Assets and Debt to Assets ratios is Equity plus Amortizations plus Total Debt minus Trade Payables. Debt is computed as Total Debt minus Trade Payables. Cash is computed as Current Account deposits plus Liquid Financial Assets. ROA is computed using EBITDA in the numerator. Sales and Employment Volatility are computed using the definition by Castro, Clementi and MacDonald (2008). Sources : BRN, LIFI, DIANE.

firms' status only once they have experienced a succession and CEOs have longer tenures in dynastic firms, it is a mechanical consequence that dynastic firms are older than regular firms in the sample<sup>38</sup>.

These facts about scale have already been described by Sraer and Thesmar (2007) in the context of listed firms. More surprising is the absence of difference in the Return on Assets<sup>39</sup> between the two groups. This seems to be in contradiction with the previous literature stating that family firms are more profitable (Anderson and Reeb (2003), Sraer and Thesmar (2007)). I discuss this point further below.

Regarding financial management indicators, leverage is lower by about 7 points while the cash ratio is higher by about 2 points in dynastic firms relative to regular firms. These differences are completely in line with the predictions of my model.

Ownership statistics are also very revealing. While regular firms are younger, they are about six times more likely to be listed or to belong to a business group in which at least one firm is listed. Consistent with this is the fact that CEOs of dynastic firms are three times more likely to have a significant stake in their firm than CEOs of regular firms. Of course, several stories are compatible with these figures : either dynastic firms are reluctant to relinquish some control by diluting the founding family's shares or it can just be that being widely-held directly prevents a firm from becoming dynastic.

I also present descriptive statistics for the group of firms for whom the dynastic status could not be assessed (Panel C). Again, these descriptive statistics should be seen as weighted averages over firms that should have belonged to Panels A and B and founder firms. In Appendix C, I estimate that about 60% of firms within this group are run by their founder. For this reason, the main characteristic of these firms is that they are younger than firms in panels A and B. This young age should account for a substantial portion of these firms' smaller size. Finally, because this sample includes all firms whose CEO was already in his position in 1994, the average CEO age is higher than in panels A and B.

## **Longitudinal sample**

Descriptive statistics for the succession sample are given in Table 2. The main characteristic of this sample is that dynastic successions occur in smaller firms : these are about 60% smaller in terms of sales and half smaller in terms of number of employees. This is not surprising, as in Bennedsen et al. (2007) Danish firms experiencing dynastic rather than professional CEO successions were more than five times smaller in terms of assets. Note however that

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<sup>38</sup>This age bias makes it necessary to control for firm age as a robustness check in the regressions

<sup>39</sup>Computed as the ratio of EBITDA over Assets (i.e. the sum of equity plus debt plus amortizations minus trade payables).

Table 2: Descriptive statistics for the longitudinal sample

	Nb. Successions	Mean	Q25	Q50	Q75
PANEL A : OUTSIDE					
SUCCESSIONS					
<i>Employment</i>	11586	131.5	31	44.3	90.3
<i>Sales (M Eur)</i>	11586	25.22	3	6.29	13.65
<i>Economic Assets (M Eur)</i>	11586	14.9	1.08	2.19	5.6
<i>Debt/Assets</i>	11586	0.4	0.25	0.38	0.54
<i>Cash/Assets</i>	11586	0.11	0.02	0.07	0.16
<i>ROA</i>	11586	0.1	0.04	0.09	0.16
<i>Estimated MtB ratio (log)</i>					
	11329	0.18	-0.02	0.14	0.36
<i>Sales Volatility</i>	11586	0.115	0.048	0.082	0.140
<i>Employment Volatility</i>	11586	0.113	0.046	0.078	0.137
<i>Assets Volatility</i>	11586	0.174	0.069	0.121	0.211
<i>Firm belongs to a listed group</i>	11586	0.155			
<i>Firm age</i>	11586	26.5	13	21	35
<i>Age difference with previous CEO</i>	2913	8.35	1	8	16
<i>New CEO's age</i>	8866	47.1	41	47	53
<i>Departing CEO's age</i>	3302	55.7	50	56	62
PANEL B : DYNASTIC					
SUCCESSIONS					
<i>Employment</i>	3437	64.5	28.33	39.33	57.33
<i>Sales (M Eur)</i>	3437	9.65	2.57	4.64	9.96
<i>Economic Assets (M Eur)</i>	3437	4.34	1.03	1.96	4.03
<i>Debt/Assets</i>	3437	0.36	0.22	0.34	0.47
<i>Cash/Assets</i>	3437	0.12	0.02	0.08	0.18
<i>ROA</i>	3437	0.1	0.05	0.09	0.14
<i>Estimated MtB ratio (log)</i>					
	3398	0.14	-0.04	0.12	0.30
<i>Sales Volatility</i>	3437	0.101	0.047	0.075	0.124
<i>Employment Volatility</i>	3437	0.097	0.043	0.072	0.119
<i>Assets Volatility</i>	3437	0.138	0.058	0.097	0.161
<i>Firm belongs to a listed group</i>	3437	0.013			
<i>Firm age</i>	3437	30	16	27	38
<i>Age difference with previous CEO</i>	1301	20.3	9	26	29
<i>New CEO's age</i>	2819	42.2	35	40	48
<i>Departing CEO's age</i>	1443	62.2	59	63	68

*Note* : Economic Assets are computed as Tangible plus Intangible Fixed Assets plus Working Capital. The denominator for ROA, Cash to Assets and Debt to Assets ratios is Equity plus Amortizations plus Total Debt minus Trade Payables. Debt is computed as Total Debt minus Trade Payables. Cash is computed as Current Account deposits plus Liquid Financial Assets. ROA is computed using EBITDA in the numerator. Sales and Employment Volatility are computed using the definition by Castro, Clementi and MacDonald (2008). Firm age and CEO's age are computed at the time of the succession while all other indicators are averages over the three years prior to the succession. The Market-to-Book ratio is computed one year before the succession using the transaction multiples method (see details in text). Sources : BRN, LIFI, DIANE

this difference mainly comes from the very top of the distribution : the median employment is roughly similar.

On the other hand, and still not so surprisingly, family successions occur in older firms : on average, dynastic firms are 3.5 years older at the time of succession. One rationale for this is that the pool of potential family managers takes more time to mature than the pool of potential outside CEOs.

Another striking fact is that the Market-to-Book ratio of a firm is significantly higher when there is an outside succession than when a family succession occurs : the difference between family and outside successions represents about 10% of the interquartile range of the Market-to-Book variable. This “market timing” of outside CEO transitions may have two very different explanations : a “rational” view would be that these prices reflect real profit expectations, in which case it will be necessary to control for this measure in the regressions as a robustness check ; but this “market timing” may also reflect some market failures, either because it reflects some time-varying liquidity of the market for private firms<sup>40</sup> or because it is the result of buy-out fads<sup>41</sup>, but in both cases there might be a disconnection between the MtB ratio and future profit expectations of the firm. This difference in market premium is not paralleled by a similar difference in current profitability : for each kind of succession, the ROA prior to succession date is roughly equal to 10%.

In the sample, one can also look at some qualitative characteristics of successions. CEO’s age is a particularly distinctive feature of both kinds of successions : they happen at an older age and the age difference between incumbent and arriving CEO is much higher in dynastic successions. Again, this probably reflects the fact that the timing of CEO transitions in family firms is driven as much by family life cycle considerations as by purely economic considerations<sup>42</sup>.

## 4 Econometric issues

### 4.1 Identifying the effect of dynastic management

#### 4.1.1 Cross-sectional identification

The baseline estimated equation is of the following OLS form :

$$Y_{it} = \alpha_d Dyn_i + \alpha_u Indet_i + \beta X_{it} + \delta_t + \varepsilon_{it} \quad (9)$$

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<sup>40</sup>As may be the case in illiquid stock markets. See Amihud and Mendelson (1986).

<sup>41</sup>In the fashion of what has been observed for IPO timing. See Baker and Wurgler (2002).

<sup>42</sup>See Kimhi (1995).

where  $Dyn_i$  is one if the firm has experienced a family succession and zero if not,  $Indet_i$  is one if the firm has experienced no succession between 1994 and 2000 and zero if not<sup>43</sup>, and  $X_{it}$  is a set of time-varying covariates. Standard errors are corrected for within-firm correlation of residuals. The main parameter of interest is  $\alpha_d$  since it gives the difference between dynastic and regular firms conditional on having experienced at least one CEO turnover between 1994 and 2000.

The identification problem comes from the fact that dynastic firms may differ from regular firms in several systematic ways. First, they may have a competitive advantage in particular sectors, due to intergenerational transmission of abilities and/or implicit contracts<sup>44</sup>. If in turn, these sectors have specific optimal size, volatility or financial management, then there is an omitted variables bias if one simply regresses outcomes on dynastic status. That is why it is essential to control for sector fixed-effects. It is of course a minimal requirement since usual market definitions cannot fully grab the specificities of an industry.

Secondly, non-dynastic and dynastic firms are the result of a long selection process : I do not observe the firms that were about to give way to an outside or a dynastic CEO succession but disappeared before CEO turnover occurred. If such firm exits are correlated with size or profitability and if these firm exits are more probable in one of the two groups, then the cross-sectional estimates suffer from an important selection bias. A simple check of this problem is to look at bankruptcy rates across the two groups. The probability of going bankrupt at some point (i.e. before 2009) is equal to 9.43% for dynastic firms, 9.43% for regular firms and 9.55% for the group of undetermined-status firms. These very small differences suggest that selection is not so much of an issue.

Finally, it may be that the results are driven by the fact that dynastic firms are just firms with a closed ownership. It is not clear whether one should control for that since ownership structure is a highly endogenous variable, and the resulting estimates would be difficult to interpret. I however choose to add a specification where I control for the fact that the actual manager has a stake in the firm and the fact that the firm is listed or belongs to a listed entity.

All in all, cross-sectional results are a good starting point but clearly, selection and omitted variable biases are an issue that can only be roughly tackled. This is why I complement this study with an analysis of CEO successions.

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<sup>43</sup>Note that removing these firms from the sample does not significantly change the results.

<sup>44</sup>For instance, Mueller and Philippon (2006) find that family ownership is more prevalent in labor-intensive industries in countries where labor relations are conflictual.



### 4.1.2 Why successions ?

In addition to Perez-Gonzalez (2006) and Bennedsen et al. (2007) which we have already mentioned, there are now several papers using event studies methodologies to analyze CEO successions. However, this strategy has had several very different interpretations depending on the “control” group that is chosen. Some papers have focused on family successions and have chosen similar firms with no contemporary experience of a family succession as a control group (Cucculelli and Micucci (2008)). Others, on the contrary, have focused on outside successions, usually leverage buy-outs, and have chosen similar firms with no contemporary experience of an outside succession as a control group (Boucly et al. (2009)).

One problem with these one-sided approaches is that there may be something in common to successions, be they external or dynastic, that is unobservable to the econometrician but that is correlated with future outcomes. This is particularly true for small-and-medium-sized firms whose life cycle is very correlated with their founder’s own life cycle (see Kimhi (1995)). In this case, the incumbent CEO’s age is a confounding variable that can bias estimates of either family successions alone or leverage buy-outs alone. Another interpretation of this sampling method is that all firms eventually have to undergo a CEO transition, so that a correct benchmark for one kind of succession can only be the other kind of succession.

The downside of this method is that then one runs regressions on a choice-based sample. This is why as a robustness check, I estimate the same baseline specifications with industry-and-size-adjusted variables. Industry-and-size adjustment consists in computing the annual mean of the outcome within the same 2-digit industry and the same size decile within this industry for each succession firm<sup>45</sup>, and subtracting the obtained value from the value of the outcome for the observation in the sample. I compute these industry-size means across all firms present in the DIANE dataset and having more than 20 employees in the three years prior to the succession date.<sup>46</sup>

### 4.1.3 The differences-in-differences methodology

Differences-in-differences estimation is now standard in the applied economics literature. It usually refers to the analysis of a treatment for which a group of observations suddenly becomes eligible when another group, while very similar, does not see its eligibility status change in the same time. In this case, the general specification I use is :

$$Y_{it} = \alpha_i + \delta_t + \gamma Fam_i \times Post_t + \varepsilon_{it} \quad (10)$$

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<sup>45</sup>Excluding the firm of interest.

<sup>46</sup>Note that this procedure is the one used by Bennedsen et al. (2007).

where  $\alpha_i$  and  $\delta_t$  are firm and year fixed effects respectively,  $Fam_i$  is one if the CEO transition is dynastic and zero if not, and  $Post_t$  is one if the firm is observed more than one year after the succession<sup>47</sup>.

The hypothesis of similarity of the control group must be precised : the control group may not have time-varying unobserved differences with respect to the treatment group. In order to account for serial correlation of errors (see Bertrand et al. (2004)), standard errors are clustered at firm-level, since treatment is defined here at firm-level.

One should also pay attention to the dynamics of the effect of successions. It is likely that the effects of a succession will not be immediate. For that reason, estimates based on the assumption that the effect of successions is constant after the event will underestimate the true effect of successions. This is why instead of estimating (8), the baseline equation is the following :

$$Y_{it} = \alpha Fam_i + \delta_t + \sum_{s=1}^5 \gamma_s Fam_i \times Time_s + \varepsilon_{it} \quad (11)$$

where  $Time_s$  is the time distance between the succession and the firm-year observation. Therefore each  $\gamma_s$  captures the effect of a dynastic succession on the outcome after s years<sup>48</sup>.

One of the robustness checks consists in controlling for trend differences conditional on covariates measured prior to the succession. The specification is then the following :

$$Y_{it} = \alpha Fam_i + \delta_t + \sum_{s=1}^5 \gamma_s Fam_i \times Time_s + \theta X_i \times Post_t + \varepsilon_{it} \quad (12)$$

where  $X_i$  is a time-invariant characteristic of firm i and  $Post_t$  indicates whether the firm is observed after the succession.

A last robustness check is to control for the existence of underlying differential trends in the outcome variable prior to the succession and check whether these ex-ante trends are statistically significant. The corresponding specification is :

$$Y_{it} = \alpha Fam_i + \delta_t + \sum_{s=1}^5 \gamma_s Fam_i \times Time_s + \theta Fam_i \times TimeBefore_t + \varepsilon_{it} \quad (13)$$

where  $TimeBefore_t$  is a variable indicating the time distance relative to the succession if the observation is before the succession and 0 otherwise.

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<sup>47</sup>Because I do not know the exact date of a CEO transition within a calendar year, I exclude from the estimation the year of the succession itself.

<sup>48</sup>This kind of specification has first been proposed in the context of the differences-in-differences analysis of divorce laws by Wolfers (2006)

#### 4.1.4 Endogeneity of succession decisions

There are theoretical reasons why the decision to keep the firm within the family may be endogenous. This choice is likely to be correlated with the prospects of the firm at the time of succession. In particular, owners might be forced to relinquish control of the firm for two opposite reasons. First, as in the theoretical model, if the firm is about to go bankrupt, its owners may be forced to let external investors enter the firm. This in turn reduces the probability that the firm recruits a member of the founding family as the next CEO. Secondly, if conversely the firm has a very good growth potential, it is likely that external investors attempt to make a buy-out offer that the initial owner accepts, thus leading to the recruitment of a CEO unrelated to the founding family. In the former case, external successions are likely to be negatively correlated with growth expectations of the firm; in the latter case, external successions are likely to be positively correlated with growth expectations.

A first answer to that concern is that in the only study for which a credible instrumental variables strategy has been used, that of Bennedsen et al. (2007), it has been found that family successions in Denmark are more likely to happen when profitability prospects are higher. The data I have collected does not allow me to use instruments similar to that study, that is variables describing the family structure of the owning family. However, to the extent that profit expectations are akin to growth expectations, and if family successions follow the same model in France as in Denmark, then my estimates of the effect of family successions on firm size are biased upwards. Therefore, if it naïvely appears that outside successions generate more growth than family successions, then this result will be robust to endogeneity concerns.

A second solution to the endogeneity issue consists of all the robustness checks I have mentioned in the preceding subsections : in some specifications I adjust the outcomes for industry-and-size specific trends, which allows me to control for the component of the time-varying prospects of a firm that is common to firms within the same sector and size group ; in other specifications I allow for differential time trends prior to the succession across succession types. If, in each of those cases, the estimates do not significantly differ from the baseline specification, then it is less likely that endogeneity drives our results.

I also provide an innovative way to control for growth expectations in firms whose shares are not publicly traded, as is the case in most of my sample. It consists in controlling for the implicit Tobin's  $q$  in past buy-outs whose targets are in several respects similar to the firms in the sample<sup>49</sup>. Since for private businesses external successions are mainly triggered by buy-

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<sup>49</sup> I already described the computation method of such a variable in section 3.1.6. and further details are to be found in Appendix B.

outs<sup>50</sup>, this allows me to control for those situations where a founder transfers management to an outsider because the times (reflected by Tobin’s q) are good for a sell-out. One would then use the following specification :

$$Y_{it} = \alpha Fam_i + \delta_t + \sum_{s=1}^5 \gamma_s Fam_i \times Time_s + \theta Fam_i \times MtB_i + \varepsilon_{it} \quad (14)$$

where  $MtB_i$  is the estimated market-to-book ratio for firm i one year before the succession. If results are driven by market timing of outside CEO successions, one would expect the estimates on  $\gamma_s$  to be significantly different from those of the main specification.

One last way to assess endogeneity of the succession decision is to use the fact that CEO changes are probably more reactive to the economic environment when a firm is listed or belongs to a listed group. This is because shares are more liquid, so that it is easier to sell the firm if a decrease or an increase in the outcome is predicted. There is also much more information available on these firms’ perspectives since they have a real-time market price and are much more closely followed by financial analysts. Thus, the results on the effect of CEO successions would be more robust if they were not significantly changed by the removal of listed firms and of firms belonging to listed firms from the sample.

## 4.2 Addressing issues of performance indicators

### 4.2.1 Output variables

Until now, the literature on family firms has focused on profitability indicators such as ROA. From a welfare point of view, it is not clear whether this is the correct estimate. In the theoretical model, the intrinsic managerial efficiency of CEOs is equal across dynastic and non-dynastic entrepreneurs. In addition, profit rates are sufficient statistics for productive efficiency only in presence of constant returns to scale. In particular, as shown in Proposition 4 of this paper, when one makes the reasonable assumption that returns to scale are decreasing, then one also has to look at the effect on the scale of operations within the firm. This echoes the remark made by Landes (1949) that family firms would maximize profitability rather than profits.

More generally, estimates of the efficiency of a firm would ideally require an estimation of Total Factor Productivity. It is a well known fact in the literature on estimation of production functions that this requires stringent identification assumptions (the workhorse model being these days the Olley-Pakes (1996) model). As a result, the analysis is focused here on output

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<sup>50</sup>Recall that in Denmark, according to Bennedsen et al. (2004), 90% of firms with a controlling individual or family are managed by that individual or a member of that family.

level indicators such as sales. For comparability of the results with previous studies, I also present the results from estimations of the effect of dynastic firms on ROA.

#### 4.2.2 Input decisions

One of the predictions of the model is that family firms should choose a lower level of capital expenditures. Therefore, I carefully look at the effect of family successions on that variable. Another decisive input for production is employment, which is critical for the policy debate. We did not explicitly model employment decisions. But it is clear that the effect of family successions on labor should depend on labor's elasticity with respect to capital : the more complementary they are, the more we should observe a reduction in employment following a dynastic succession relative to a non-dynastic succession.

Another problem is that I have nothing but a gross measure of employment : there is no data on workers' abilities. One solution is to directly look at the wage bill, but then one is confronted with the fact that monetary payments are only one part of wage packages since implicit contracts within the firm are not taken into account, even though it is very likely that implicit contracts have a different prevalence in dynastic and regular firms<sup>51</sup>.

#### 4.2.3 Financial management

As emphasized in Proposition 1, family firms' reluctance to resort to external finance should primarily have an effect on debt, especially given that most of them are too small to be able to go public and/or issue minority shares outside the family. Note that some debt patterns in family firms have already been analysed in the contributions of Anderson et al. (2003) and Ellul et al. (2007). Their focus is however on the cost of debt rather than on the level of debt itself : these contributions find a negative effect of family ownership on bond interest rates, except in countries where investor protection is low.

Perhaps more interestingly, Proposition 5 predicts higher cash holdings in dynastic firms, especially when the volatility faced by the firm is important. In order to measure firm-level volatility, I apply the methodology proposed by Castro, Clementi and MacDonald (2008).

The idea is simple and consists in measuring annual volatility as the absolute deviation of firm growth from its conditional expectation. The estimation includes two steps. In the first step, I estimate the following equation :

$$\Delta \text{Ln}(\text{Sales})_{ist} = \alpha_i + \beta_{st} + \gamma_{it} \text{Ln}(\text{Size})_{it} + \eta_{it} \text{Ln}(\text{Age})_{it} + \varepsilon_{it} \quad (15)$$

where  $s$  is the 1-digit sector of firm  $i$  and size is measured in terms of employment. Then I

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<sup>51</sup>This is an issue we address in a companion paper. See Bach and Serrano-Velarde (2009).

compute the absolute value of the estimated residual from equation (13) :  $|\widehat{\varepsilon}_{it}|$ . The measure of exposure to volatility I choose is the median of  $|\widehat{\varepsilon}_{it}|$  in a given 2-digit sector from the years 1993 to 2006. Then I interact the effect of a dynastic status with the degree of sectoral volatility in a new set of estimations.

#### 4.2.4 Risky strategies

Proposition 3 predicts that family firms undertake less risky strategies. Again I use the methodology discussed above for the measurement of firm-level volatility. I take the value  $|\widehat{\varepsilon}_{it}|$  from equation (13) as the outcome variable.

It is expected that the effect of dynastic firms on firm-level volatility is negative. However, when one runs these volatility regressions using within-group variation there is an interpretation issue. Firm volatility is essentially the result of unregular events : a change in ownership or a transition to a CEO outside a family is typically one of these events and they should have a direct and rapid effect on volatility (a fact that is ascertained by studies on CEO's deaths; see Bennedsen et al. (2008) for an example); but this does not necessarily mean that following this specific event, volatility has fundamentally changed, i.e. in the long run. We conclude from this that one should decidedly pay in this case more attention than usual to cross-sectional results and that the timing of the evolution of volatility following a succession should be discussed thoroughly.

## 5 Results

### 5.1 Cross-sectional results

I present in tables 3 to 6 the results from the cross-sectional regressions.

#### Scale variables

Table 3 presents the results from regressions of sales, employment and asset levels on the dynastic status of the firm. The results confirm what one observes in the descriptive statistics : relative to regular firms, dynastic firms are smaller by little less than 30% in terms of sales, and by more than 20% in terms of employment and assets. These results are not affected when I control for firm age and sector fixed-effects.

The size gap is clearly less strong when I add dummies for manager-shareholders and listed firms. The specificity of dynastic firms remains however very significant, both statistically and economically. However, controlling for these variables is problematic : since dynastic status is positively correlated with closed ownership, the reduction of the dynastic effect is

Table 3: The Scale of Dynastic Firms

	Sales Logarithm			Employment Logarithm			Assets Logarithm		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
<b>Dynastic</b>	<b>-0.304**</b> (0.021)	<b>-0.320**</b> (0.021)	<b>-0.157**</b> (0.020)	<b>-0.220**</b> (0.017)	<b>-0.233**</b> (0.017)	<b>-0.096**</b> (0.017)	<b>-0.237**</b> (0.022)	<b>-0.276**</b> (0.022)	<b>-0.093**</b> (0.022)
<b>Undetermined Status</b>	<b>-0.335**</b> (0.013)	<b>-0.314**</b> (0.013)	<b>-0.201**</b> (0.013)	<b>-0.258**</b> (0.011)	<b>-0.242**</b> (0.011)	<b>-0.145**</b> (0.011)	<b>-0.343**</b> (0.015)	<b>-0.293**</b> (0.014)	<b>-0.211**</b> (0.014)
<b>Listed</b>			<b>1.264**</b> (0.026)			<b>0.964**</b> (0.023)			<b>1.301**</b> (0.029)
<b>Owner-Manager</b>			<b>0.055**</b> (0.009)			<b>0.008</b> (0.008)			<b>0.074**</b> (0.011)
<b>Log of Firm Age</b>		<b>0.131**</b> (0.008)		<b>0.101**</b> (0.007)			<b>0.315**</b> (0.009)		
<b>Observations</b>	276619	276599	276619	276619	276599	276619	276619	276599	276619
<b>Sector Fixed-Effects</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note* : Robust standard errors in parentheses (clustered at firm-level). All regressions include year and 4-digit sector fixed-effects. Dynastic firms are those that have experienced a CEO turnover within the same family between 1994 and 1999. Firms with Undetermined Status are those that have experienced no CEO turnover between 1994 and 1999. Assets are defined as Fixed Assets plus Working Capital. \*\*  $p < 0.01$ , \*  $p < 0.05$

driven by non-dynastic firms that are both closely held and small on the one hand, and dynastic firms that are both widely held and big on the other hand. If size causes wide ownership, then the estimates of specifications controlling for close ownership are biased.

## Profitability

In Table 4, I estimate the relative profitability of family firms. The group of firms that includes founder firms (i.e. those with undetermined succession status) is significantly more profitable (by about 0.6 points of ROA) than regular firms in all specifications : this may reflect some positive founder effect, which has been robustly uncovered by Adams et al. (2007) for listed US firms.

However, I do not find any significant difference in profitability between dynastic and regular firms. This may appear in contrast with Sraer and Thesmar (2007) who find that heir-managed firms are more profitable than widely-held firms : however, the group of “regular” firms also includes firms with family shareholders and professional managers while Sraer and Thesmar (2007) had distinguished these from pure widely-held firms.

Table 4: The Profitability of Dynastic Firms

	ROA		
	(1)	(2)	(3)
<b>Dynastic</b>	<b>0.001</b> (0.002)	<b>0.003</b> (0.002)	<b>-0.000</b> (0.002)
<b>Undetermined Status</b>	<b>0.007**</b> (0.001)	<b>0.005**</b> (0.001)	<b>0.006**</b> (0.001)
<b>Sales Logarithm (t-1)</b>		<b>-0.001</b> (0.0005)	
<b>Log of Firm Age</b>		<b>-0.013**</b> (0.001)	
<b>Listed</b>			<b>-0.007**</b> (0.002)
<b>Owner-Manager</b>			<b>0.002*</b> (0.001)
<b>Observations</b>	276619	266985	276619
<b>Sector Fixed-Effects</b>	Yes	Yes	Yes

Note : Robust standard errors in parentheses (clustered at firm-level). All regressions include year and 4-digit sector fixed-effects. Dynastic firms are those that have experienced a CEO turnover within the same family between 1994 and 1999. Firms with Undetermined Status are those that have experienced no CEO turnover between 1994 and 1999. ROA is EBITDA over Equity plus Debt plus Amortizations minus Trade Payables.\*\* p<0.01, \* p<0.05



## Financial management

Table 5 presents the results from regressions of cash and leverage on dynastic status of the firm. Again, the figures from the descriptive statistics are confirmed. Dynastic firms' leverage is lower by about 5 points (about 20% of the interquartile range) while the rate of cash holdings is higher by about 2.5 points (about 15% of the interquartile range). These two results are completely in accordance with the theoretical model.

Another important fact is that the cash difference is highly sensitive to the level of volatility in the sector (column (4)) : the third prediction of my model is thus validated by the data. One should also note that the difference in leverage is not sensitive to sectoral volatility: this suggests that the cash result is not just the negative of the debt result.

Finally, it should be noted that the estimates for cash holdings are barely affected when one controls for firm size. This means that it is not the transactions motive for cash holdings but rather the precautionary motive that drives the result that family firms hold more cash.

## Volatility

Table 6 lists the results from regressions of firm-level volatility on the dynastic status of the firm. The main result is that volatility is much lower in dynastic firms. Sales volatility is lower by about 13% in dynastic firms relative to regular firms. The difference is a bit smaller for employment (-11%) and bigger for assets (-16%). All in all, these results confirm my prediction that dynastic firms take less risks.

## 5.2 Longitudinal analysis

### 5.2.1 Graphical analysis

Graphical analysis usually helps improve the conviction that this identification assumption underlying the differences-in-differences strategy is verified. That is why in figure 1, I present the year-to-year difference in evolution between each kind of CEO successions for the logarithm of sales. These differences are computed with respect to mean sales logarithm in the firm during the three years before the succession.

The evolution of sales prior to the succession is very smooth, and it is only after the succession that I observe a relative drop in the evolution of sales following an outside succession. This means that taking a longitudinal view also confirms the fact that family firms are smaller. The break in trend reinforces belief in the assumption that in the absence of treatment, firms experiencing outside CEO transitions would have followed the same path as firms experiencing family transitions.

Table 5: The impact of Dynastic Firms on Financial Management

	Cash Ratio				Leverage ratio			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
<b>Dynastic</b>	<b>0.030**</b> (0.002)	<b>0.026**</b> (0.002)	<b>0.023**</b> (0.002)	<b>0.003</b> (0.010)	<b>-0.049**</b> (0.003)	<b>-0.037**</b> (0.003)	<b>-0.042**</b> (0.003)	<b>-0.058**</b> (0.014)
<b>Undetermined Status</b>	<b>0.024**</b> (0.001)	<b>0.021**</b> (0.001)	<b>0.018**</b> (0.001)	<b>0.022**</b> (0.005)	<b>-0.018**</b> (0.002)	<b>-0.023**</b> (0.002)	<b>-0.012**</b> (0.002)	<b>-0.032**</b> (0.009)
<b>Sales Logarithm (t-1)</b>		<b>-0.018**</b> (0.001)				<b>0.020**</b> (0.001)		
<b>Log of Firm Age</b>		<b>0.007**</b> (0.001)				<b>-0.064**</b> (0.001)		
<b>Listed</b>			<b>-0.048**</b> (0.002)				<b>0.012**</b> (0.004)	
<b>Owner-Manager</b>			<b>0.001</b> (0.001)				<b>-0.013**</b> (0.002)	
<b>Dynastic*Sectoral Volatility</b>				<b>0.335**</b> (0.128)				<b>0.072</b> (0.177)
<b>Undetermined Status *Sectoral Volatility</b>				<b>0.052</b> (0.067)				<b>0.191</b> (0.104)
<b>Observations</b>	276619	266985	276619	276619	276619	266985	276619	276619
<b>Sector Fixed-Effects</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

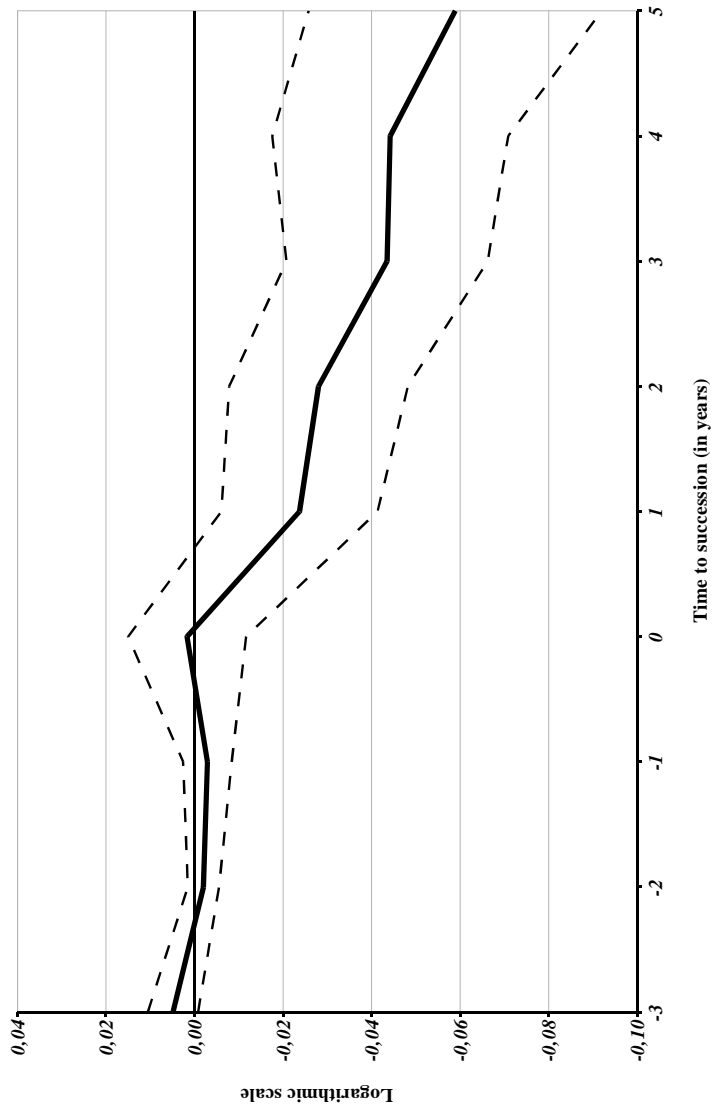
Note : Robust standard errors in parentheses (clustered at firm-level). All regressions include year and 4-digit sector fixed-effects, except for column (4) where I use 2-digit sector classification for comparability with the sectoral volatility measure. Dynastic firms are those that have experienced a CEO turnover within the same family between 1994 and 1999. Firms with Undetermined Status are those that have experienced no CEO turnover between 1994 and 1999. Cash Ratio is Current Account plus Liquid Financial Assets over Equity plus Debt plus Amortizations minus Trade Payables. Leverage Ratio is Debt minus Trade Payables over Equity plus Debt plus Amortizations minus Trade Payables. Sectoral Volatility is the 2-digit sector median of firm-level volatility as computed in Castro, Clementi and MacDonald (2008). \*\* p<0.01, \* p<0.05

Table 6: The Volatility of Dynastic Firms

	Sales Volatility			Employment Volatility			Assets Volatility		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Dynastic	<b>-0.0167**</b> (0.00212)	<b>-0.0180**</b> (0.00213)	<b>-0.0136**</b> (0.00216)	<b>-0.0152**</b> (0.00206)	<b>-0.0164**</b> (0.00206)	<b>-0.0126**</b> (0.00210)	<b>-0.0274**</b> (0.00288)	<b>-0.0335**</b> (0.00284)	<b>-0.0208**</b> (0.00293)
Undetermined Status	<b>-0.0141**</b> (0.00138)	<b>-0.0168**</b> (0.00140)	<b>-0.0113**</b> (0.00142)	<b>-0.0102**</b> (0.00137)	<b>-0.0134**</b> (0.00138)	<b>-0.00794**</b> (0.00141)	<b>-0.0173**</b> (0.00189)	<b>-0.0311**</b> (0.00188)	<b>-0.0115**</b> (0.00196)
Sales Logarithm (t-1)		<b>-0.00587**</b> (0.000793)			<b>-0.00858**</b> (0.000881)			<b>-0.0325**</b> (0.000985)	
Log of Firm Age		<b>-0.00436**</b> (0.000830)			<b>-0.00618**</b> (0.000823)			<b>-0.0143**</b> (0.00119)	
Listed			<b>0.0165**</b> (0.00260)			<b>0.00937**</b> (0.00271)			<b>0.0264**</b> (0.00361)
Owner-Manager			<b>-0.00240*</b> (0.00105)			<b>-0.00357**</b> (0.00106)			<b>-0.00820**</b> (0.00149)
Observations	266985	266985	266985	266985	266985	266985	266985	266985	266985
Sector Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note : Robust standard errors in parentheses (clustered at firm-level). All regressions include year and 4-digit sector fixed-effects. Dynastic firms are those that have experienced a CEO turnover within the same family between 1994 and 1999. Firms with Undetermined Status are those that have experienced no CEO turnover between 1994 and 1999. Volatility is computed using the method introduced by Castro, Clementi and MacDonald (2008). \*\* p<0.01, \* p<0.05

Figure 1: Difference in Evolution of Sales between Dynastic and Outside Successions (relative to firm 3-year average pre-succession)



**Note :** This graph plots the difference in the average evolution of the logarithm of sales between dynastic and external CEO successions. The evolution of sales logarithm for each firm is computed relative to its 3-year average for the period prior to the succession. Dashed lines represent the 95% confidence intervals.

The jump does not completely occur during the first year after the transition but instead gradually evolves up to a before-after difference of about 5% after 5 years. This gradual evolution makes my story more convincing in the sense that a new CEO may only make a gradual difference as regards output. However, I do not uncover a big effect, relative to studies such as that on LBOs by Boucly et al. (2009) who find an increase of about 13% after four years following a private-to-private LBO transaction. This may be due to the fact that LBOs are very special forms of outside transitions, with shorter time horizons requiring that the investment has a quick and decisive effect. Overall, this result confirms the cross-sectional evidence but with a smaller magnitude.

### **5.2.2 Regression results**

I present the results from the differences-in-differences estimation of equation (4) for each of the outcomes of interest in tables 7 to 10.

#### **Scale variables**

As shown in table 7, following an outside succession, and relative to a family succession, sales increase by about 5% after five years and the effect becomes significantly different from zero after 3 years. This confirms the first prediction of the model that family firms tend to choose a lower level of production. The results are not significantly affected by the inclusion of the estimated Market-to-Book ratio of the firm or by the choice of industry-and-size adjusted variables, which makes me confident that the estimates are not affected by an endogeneity bias.

Regarding input decisions, I find that after five years there is a significant relative decline of employment following a family succession (by about 3%) while the effect on economic assets is smaller and significant only after five years. The latter result may be due to the fact that capital is a less mobile factor of production, so that the window of observation is too small to let me observe a significant effect. An interesting feature of the results is that the estimated Tobin's  $q$  comes out very significantly in the capital equation : this makes me confident that the method I chose for computing MtB ratios has a sensible economic interpretation.

#### **Profitability**

Results from the differences-in-differences estimates for the Return on Assets are to be found in table 8. Contrary to Bennedsen et al. (2007), I do not find a strong and steady effect on profitability of outside successions relative to dynastic successions. However after 5 years one

Table 7: The Effect of Dynastic Successions on Firm Scale

	Sales Logarithm					Employment Logarithm					Assets Logarithm							
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Dynastic (t+1)	-0.021* (0.009)	-0.019* (0.008)	-0.017* (0.009)	-0.020* (0.009)	-0.018* (0.008)	-0.013 (0.009)	-0.014 (0.008)	-0.013 (0.007)	-0.012 (0.008)	-0.013 (0.008)	-0.010 (0.007)	-0.006 (0.008)	-0.013 (0.009)	-0.010 (0.009)	-0.013 (0.009)	-0.007 (0.009)	-0.014 (0.009)	-0.006 (0.009)
Dynastic (t+2)	-0.026** (0.010)	-0.029** (0.010)	-0.022* (0.010)	-0.025* (0.010)	-0.023* (0.020)	-0.016 (0.010)	-0.018* (0.009)	-0.020* (0.008)	-0.017* (0.009)	-0.018* (0.009)	-0.015 (0.008)	-0.010 (0.009)	-0.012 (0.010)	-0.011 (0.010)	-0.012 (0.010)	-0.009 (0.010)	-0.012 (0.010)	-0.000 (0.010)
Dynastic (t+3)	-0.038** (0.011)	-0.037** (0.010)	-0.031** (0.011)	-0.037** (0.011)	-0.034** (0.011)	-0.029** (0.011)	-0.028** (0.010)	-0.030** (0.009)	-0.023* (0.010)	-0.023** (0.010)	-0.025** (0.009)	-0.020* (0.010)	-0.015 (0.011)	-0.012 (0.011)	-0.016 (0.011)	-0.012 (0.011)	-0.016 (0.011)	-0.004 (0.011)
Dynastic (t+4)	-0.041** (0.012)	-0.042** (0.012)	-0.032** (0.012)	-0.042** (0.012)	-0.037** (0.012)	-0.033** (0.012)	-0.028* (0.011)	-0.031** (0.011)	-0.021* (0.011)	-0.029* (0.011)	-0.025* (0.011)	-0.021 (0.011)	-0.017 (0.013)	-0.018 (0.013)	-0.020 (0.013)	-0.016 (0.013)	-0.017 (0.013)	-0.008 (0.013)
Dynastic (t+5)	-0.055** (0.015)	-0.057** (0.015)	-0.042** (0.015)	-0.056** (0.015)	-0.051** (0.015)	-0.045** (0.015)	-0.040** (0.014)	-0.045** (0.013)	-0.033* (0.014)	-0.041** (0.014)	-0.037** (0.013)	-0.032* (0.014)	-0.039* (0.016)	-0.040* (0.016)	-0.042** (0.016)	-0.038* (0.016)	-0.040** (0.015)	-0.029 (0.015)
MtB Ratio*Post-Succession				0.024 (0.014)						0.016 (0.013)					0.091** (0.016)			
Dynastic*t*(1-Post-Succession)					-0.004 (0.003)						-0.004 (0.002)						0.000 (0.004)	
Observations	97355	88512	85654	95557	97355	97293	97355	88512	85654	95557	97355	97293	97355	88512	85654	95557	97355	97293
Standalone firms only	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No
Without listed firms	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Industry-and-Size adjustment	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	Yes

Note: Robust standard errors in parentheses (clustered at firm-level). All regressions include year and firm fixed-effects. The sample is made of all observations between 3 years before a succession and 5 years after it, except the year of succession itself. Market-to-Book Ratio is expressed in logarithm and estimated using the transaction multiples method. Assets is Fixed Assets plus Working Capital. \*\* p<0.01, \* p<0.05

Table 8: The Effect of Dynastic Successions on Profitability

	Return on Assets					
	(1)	(2)	(3)	(4)	(5)	(6)
Dynastic (t+1)	<b>0.002</b> (0.002)	<b>0.003</b> (0.002)	<b>0.003*</b> (0.002)	<b>0.003</b> (0.002)	<b>0.001</b> (0.002)	<b>0.002</b> (0.002)
Dynastic (t+2)	<b>0.000</b> (0.002)	<b>0.001</b> (0.002)	<b>0.002</b> (0.002)	<b>0.001</b> (0.002)	<b>-0.001</b> (0.002)	<b>0.000</b> (0.002)
Dynastic (t+3)	<b>-0.002</b> (0.002)	<b>-0.001</b> (0.002)	<b>-0.001</b> (0.002)	<b>-0.001</b> (0.002)	<b>-0.003</b> (0.002)	<b>-0.002</b> (0.002)
Dynastic (t+4)	<b>-0.001</b> (0.002)	<b>-0.000</b> (0.002)	<b>0.001</b> (0.002)	<b>-0.000</b> (0.002)	<b>-0.002</b> (0.002)	<b>-0.002</b> (0.002)
Dynastic (t+5)	<b>-0.005*</b> (0.002)	<b>-0.005*</b> (0.002)	<b>-0.004*</b> (0.002)	<b>-0.005*</b> (0.002)	<b>-0.007**</b> (0.002)	<b>-0.006**</b> (0.002)
MtB Ratio*Post-Succession				<b>0.010**</b> (0.003)		
Dynastic*t*(1-Post-Succession)					<b>0.001</b> (0.001)	
Observations	97355	88512	85654	95557	97355	97293
Standalone firms only	No	Yes	No	No	No	No
Without listed firms	No	No	Yes	No	No	No
Industry-and-Size adjustment	No	No	No	No	No	Yes

Note: Robust standard errors in parentheses (clustered at firm-level). All regressions include year and firm fixed-effects. The sample is made of all observations between 3 years before a succession and 5 years after it, except the year of succession itself. Market-to-Book Ratio is expressed in logarithm and estimated using the transaction multiples method. ROA is EBITDA over Equity plus Debt plus Amortizations minus Trade Payables. \*\*  $p < 0.01$ , \*  $p < 0.05$

can distinguish a statistically significant but economically small negative effect of dynastic successions on ROA. This difference represents only 6% of the interquartile range of ROA in the sample. This result suggests that managerial inefficiency is not the most distinctive feature of dynastic firms. Interestingly, the strong effect of the estimated Market-to-Book ratio on the evolution of ROA suggests that the pricing of privately bought firms takes profit expectations into account to some degree.

### Financial management

As regards financial management (for which results are shown in table 8), outside successions have a strong impact as the cash ratio increases by about two percentage points (15% of the

interquartile range) while leverage is reduced by 2.5 percentage points (10% of the interquartile range). This is clearly in line with Propositions 1 and 5, as well as the cross-sectional results. Again, the effects on cash are stronger in highly volatile sectors. It is notable that the effects are of the same magnitude as cross-sectional results. It may be because financial management styles are precisely chosen for a long period of time at CEO turnover dates.

### **Firm-level volatility**

The longitudinal analysis of volatility (as presented in table 10) does not give statistically significant results regarding sales and assets. This is probably because observing a firm during a maximum of 9 years makes it difficult to distinguish changes in volatility. There is however a significant pattern of relative reduction in employment volatility following a dynastic succession. It is indeed very important to look at the year-by-year evolution of employment volatility : it sharply increases following a dynastic succession in the first year, probably due to more intense restructuring, and then, even though volatility decreases, it stays at a higher level than before the succession<sup>52</sup>. Apart from the first year after the succession, the numbers involved are of a smaller magnitude than the cross-sectional estimates but they go in the same direction : dynastic firms are less volatile.

### **General interpretation**

The results from the analysis of CEO successions generally confirm the results from the cross-sectional sample : following an outside succession, firms' sales increase, cash holdings decrease and volatility increases. As regards the endogeneity of the succession decision, I could check that variables arguably correlated with both the timing and the type of succession do not significantly change the estimates. Specifications including linear trends, using size-and-industry adjusted outcomes, restricted to standalone firms or private firms do not change the main results either. Overall, this makes me confident that the identification strategy is valid.

One may also question the consistency of the longitudinal results with the cross-sectional analysis. To what extent is an annual growth differential equal to one point consistent with a cross-sectional difference equal to 30% ? In Appendix D, I provide a simple model of firm growth, entry and exit where dynastic and non-dynastic firms may differ in terms of entry and growth rates. A calibration made with parameters drawn from the sample makes it clear that that the cross-sectional and longitudinal estimates are broadly consistent.

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<sup>52</sup>A test of joint significance of year-by-year difference in employment volatility after two years rejects the hypothesis that volatility is equal across dynastic and outside successions after two years.





Table 10: The Effect of Dynastic Successions on Firm-Level Volatility

	Sales Volatility						Employment Volatility						Assets Volatility					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Dynastic (t+1)	-0.008 (0.004)	-0.008* (0.004)	-0.008 (0.005)	-0.007 (0.004)	-0.011* (0.005)	-0.009 (0.004)	-0.015** (0.004)	-0.017** (0.004)	-0.016** (0.004)	-0.014** (0.004)	-0.016** (0.004)	-0.017** (0.004)	-0.002 (0.004)	-0.003 (0.004)	-0.003 (0.004)	-0.002 (0.004)	-0.002 (0.005)	-0.000 (0.004)
Dynastic (t+2)	-0.005 (0.004)	-0.004 (0.004)	-0.007 (0.004)	-0.005 (0.004)	-0.008 (0.004)	-0.007 (0.004)	-0.010** (0.004)	-0.011** (0.004)	-0.012** (0.004)	-0.009* (0.004)	-0.011** (0.004)	-0.012** (0.004)	-0.005 (0.005)	-0.006 (0.005)	-0.007 (0.005)	-0.005 (0.004)	-0.003 (0.005)	-0.007 (0.005)
Dynastic (t+3)	-0.003 (0.004)	-0.003 (0.004)	-0.005 (0.004)	-0.003 (0.004)	-0.006 (0.004)	-0.005 (0.004)	-0.006 (0.004)	-0.007* (0.004)	-0.007 (0.004)	-0.004 (0.004)	-0.007 (0.004)	-0.008* (0.004)	-0.002 (0.005)	-0.005 (0.005)	-0.002 (0.005)	-0.002 (0.005)	-0.000 (0.005)	-0.003 (0.005)
Dynastic (t+4)	-0.011** (0.004)	-0.009* (0.004)	-0.011** (0.004)	-0.010* (0.004)	-0.014** (0.004)	-0.011** (0.004)	-0.008** (0.004)	-0.010* (0.004)	-0.009* (0.004)	-0.008* (0.004)	-0.010* (0.004)	-0.010* (0.004)	-0.004 (0.005)	-0.006 (0.005)	-0.003 (0.005)	-0.003 (0.005)	-0.003 (0.006)	-0.006 (0.006)
Dynastic (t+5)	-0.004 (0.004)	-0.004 (0.004)	-0.006 (0.004)	-0.003 (0.004)	-0.007 (0.005)	-0.004 (0.004)	-0.006 (0.005)	-0.006 (0.005)	-0.007 (0.005)	-0.005 (0.005)	-0.008 (0.005)	-0.008 (0.005)	-0.000 (0.007)	-0.002 (0.007)	0.001 (0.007)	0.000 (0.007)	0.002 (0.007)	0.001 (0.007)
MtB Ratio*Post-Succession				0.000 (0.004)					0.009 (0.005)						-0.010 (0.006)			
Dynastic*t*(1-Post-Succession)					0.003 (0.002)					0.001 (0.001)								-0.002 (0.002)
Observations	94634	85979	83156	92880	94634	94574	94634	85979	83156	92880	94634	94574	94634	85979	83156	92880	94634	94574
Standalone firms only	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No
Without listed firms	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No
Industry-and-Size adjustment	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	Yes

Note : Robust standard errors in parentheses (clustered at firm-level). All regressions include year and firm fixed-effects. The sample is made of all observations between 3 years before a succession and 5 years after it, except the year of succession itself. Market-to-Book Ratio is expressed in logarithm and estimated using the transaction multiples method. Volatility is computed using the method introduced by Castro, Clementi and MacDonald (2008). \*\* p<0.01, \* p<0.05

### 5.3 Implications for the welfare debate

In the theoretical model I laid out in section 2, if there are no externalities in the economy, there cannot be any Pareto-improvement on an initial situation where some of the entrepreneurs derive substantial private benefits from keeping the firm within the family. This is because family-minded entrepreneurs always have the choice to behave as regular entrepreneurs. When they do not, it is because their utility as a dynastic entrepreneur is greater than their utility as a regular entrepreneur : then, a social planner would not be able to duly compensate them in exchange for the loss of the private benefit.

However, if the goal of the social planner is to maximize pecuniary output, then an improvement would consist in giving dynastic entrepreneurs incentives to sell their firm. Another way to come to the same conclusion would be to assume that private investment generates a positive externality on the productive efficiency of the economy, as is the case in endogenous growth models. This generation of positive externalities would then overcome the cost of withdrawn private benefits that such policies would entail.

I have however assumed until now that insurance markets were perfect. However, in general, unemployment insurance is provided through taxation due to market failures. Therefore, dynastic entrepreneurs exert a positive externality on the economy through a reduction of the taxation needed to fund unemployment insurance : dynastic firms thus provide partial insurance to their workers without being duly compensated for that; indeed, in the model, it is only distinct preferences that lead those firms to take less risks, not the perspective of being rewarded by other stakeholders for such a prudent attitude.

This is where a trade-off arises on the social planner's side : encouraging family firms may hinder economic growth but it might as well reduce the social insurance burden. The terms of this trade-off have to be precisely evaluated and I provide the results of such an attempt in Appendix E. I calibrate a simple consumption model with the estimates of differences in growth and idiosyncratic volatility between family and non-family firms. The results suggest that it is only for very high levels or micro-level relative risk aversion that the balance between growth and volatility is in favour of family firms.

## 6 Conclusion

Even though family firms have long been considered as a remnant of an earlier stage of capitalism (Chandler (1990)), I find that firms run by heirs of the founder are still very significantly active in France at the beginning of the 21<sup>st</sup> century. This has already been described in previous studies, yet I give a more complete picture of the phenomenon : more than one in five employees working in significant French companies are under the management

of a relative of the founder.

This is a surprising finding given that family firms have long been criticized for their inability to reward talent. In my opinion, this is not the most relevant feature of family firms. The reason why family firms are deemed worthy of a public encouragement in developed countries is that they are supposed to provide stability to its various stakeholders. I give some credence to this belief : firm-level volatility is very significantly lower in family firms. However, there is a downside : family firms are smaller than regular firms; once families leave management, firm size significantly increases. The analysis isolates a specific channel through which these specificities of family firms arise : fears of control loss in the future directly reduce risk-taking as well as the recourse to external finance.

These results call for a more precise evaluation of the reforms that led to taxing family businesses much less than was the case before 1980 in developed countries.

Regarding the efficiency effects of the reforms, the first issue is on whether or not those legislative changes led to a significant increase in the proportion of continued family businesses. In order to answer to that question, one would first need to quantify the effective incidence of these tax reductions on the the decision to pass management on to heirs rather than to outsiders. This should prove difficult because most of these tax reforms reduced tax liabilities in a very gradual way; for instance, in France, from 1983 to 2008, there have been more than ten tax reforms that significantly reduced the tax burden for family businesses. In the US, between 2001 and 2009, the top marginal estate tax rate has been set at seven different levels. Moreover, estate, inheritance and gift taxes distort choices over the whole life cycle : it is unlikely that reduced-form evaluation techniques can precisely measure changes in such long-term decisions. The estimation of more structural models is probably more suited to this kind of problem.

A second reason why family businesses' prevalence may not have increased in spite of a favorable regulatory environment is that simultaneously financial markets have developed techniques to overcome the informational problems that used to make many outside business transfers impossible. According to Kaplan and Stromberg (2009), while the combined value of worldwide private-to-private transactions (i.e. where targets are independent private firms) represented about 16 billion dollars a year between 1985 and 1989, they equalled about 88 billion dollars a year between 2005 and June 2007. However, it is too early to predict what the future of this financial industry will be, since the worldwide financial crisis that started in August 2007 may limit its expansion to ever more informational-intensive target firms, either because investors will be more reluctant to invest in financial engineering-intensive funds or because future regulations will put more constraints on private equity funds. This suggests that the growth-stability trade-off I discussed should not only be viewed in the light of family

business tax reforms but also as a starting base for the policy debate on leveraged buy-outs and private equity funds.

Once the incidence of policies on the relative prevalence of family firms and regular firms is assessed, it is still necessary to go further into the estimation of the externalities generated by each firm type. To be sure, my empirical analysis is perfectible in this regard. For instance, I have considered upside risk and downside risk as equally relevant in terms of welfare, while it is probable that these risks are not symmetric : downside risks may have much fatter tails than upside risks, so that insurers may fail to provide complete insurance against the former kind of risk but not against the latter. Such an analysis probably requires more years of data for each company than I had. It would also be interesting to investigate on other potential external effects of family and outsiders' business strategies : does outsiders' higher growth come from higher investments in R & D ? Are there also differences in terms of investments in human capital ?

Finally, one should keep in mind that part of the policy debate on encouraging family firms does not deal with efficiency but with equity issues. The main political reason why tax reforms for family businesses have been gradual is that these essentially consisted in reducing the tax burden for rich, and often very rich, households. A full-blown evaluation of those reforms should thus put equity into the equation, and empirically this would require to have precise data on the exact value and distribution of private firms' assets. I leave those questions for future research.

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## Appendix A : Proofs

### A.1. Proofs of propositions 1, 2 and 3.

Differentiation of (3) with respect to  $q$  yields the following result :

$$q^* = \min\left[\frac{R}{2\beta} + \frac{B}{2\beta} \frac{I-A}{I}; 1\right]$$

Assumption (2) guarantees that, for low enough values of  $B$ ,  $q^*$  is strictly inferior to 1. In the following, we assume that  $B$  is situated in this range of values.

This formula for  $q^*$  means that the riskiness of the project is negatively correlated with the private benefit of continuation  $B$  as well as with the indebtedness of the firm and thus its size. This is because leverage raises fears that the dynasty will lose control in case of failure of the project. For this reason, indebted dynasties choose smaller risk levels.

Replacing this value of  $q^*$  in (4) and (5), I obtain a modified version of the optimisation programme :

$$\max_I \left[ \frac{1}{4\beta} \left( R + B \frac{I-A}{I} \right)^2 - 1 \right] I \quad (16)$$

$$s.t. \quad \frac{1}{4\beta} \left( R^2 - B^2 \left( \frac{I-A}{I} \right)^2 \right) \geq \frac{I-A}{I} \quad (17)$$

From assumption (2), it is easy to see that (16) is strictly increasing in  $I$ , so that (17) holds with equality. This polynomial in  $\frac{I-A}{I}$  is monotonic and has only one solution in the set of positive values :

$$\frac{I-A}{I} = \frac{\frac{R^2}{2\beta}}{1 + \sqrt{1 + B^2 \frac{R^2}{4\beta^2}}} \quad (18)$$

which leads to :

$$I^* = \frac{A}{1 - \frac{\frac{R^2}{2\beta}}{1 + \sqrt{1 + B^2 \frac{R^2}{4\beta^2}}}} \quad (19)$$

$$q^* = \frac{R}{2\beta} \left( 1 + \frac{\frac{R}{2\beta}}{\frac{1}{B} + \sqrt{\frac{1}{B^2} + \frac{R^2}{4\beta^2}}} \right) \quad (20)$$

From (18), one can compute that  $\frac{d(\frac{I-A}{I})}{dB} \leq 0$ , which proves proposition 1. From (19), one can easily see that  $\frac{dI}{dB} \leq 0$ , which proves proposition 2. Finally, from (20), we can compute that  $\frac{dq}{dB} \geq 0$ . In conjunction with assumption (1), this proves proposition 3 since then  $q(1-q)$  is decreasing in  $q$ .

## A.2. Proof of proposition 4

In order to assess the effect of private benefits of firm continuation on profitability, I replicate the steps of the proof of propositions 1, 2 and 3, except that the technology now has the form laid in equation (6). I then find that :

$$q^* = \frac{R}{2\beta} + \frac{B}{2\beta} \frac{I-A}{I} I^{1-\alpha}$$

So for a given size  $I$ , the expected return is :

$$ROA(I) = \frac{1}{4\beta} \left( \frac{R^2}{I^{1-\alpha}} - B^2 \left( \frac{I-A}{I} \right)^2 I^{1-\alpha} \right) \quad (21)$$

Again, in order to choose investment size, dynasties solve the following programme :

$$\begin{aligned} & \max_I q^*(I) \times ((R - \beta q^*(I))I^\alpha + B(I - A)) - I \\ & s.t. \quad q^*(I) \times ((R - \beta q^*(I))I^\alpha \geq I - A \Leftrightarrow ROA(I) \geq \frac{I - A}{I} \end{aligned} \quad (22)$$

When the level of assets  $A$  is sufficiently low with respect to  $B$ , optimal size  $I^*$  will be such that (22) holds with equality. Because from (21) one can demonstrate that  $\frac{dROA}{dI} < 0$ ,  $\frac{dROA}{dIB} < 0$  and  $\frac{d(\frac{I-A}{I})}{dI} > 0$ , it is then easy to see that  $I^*$  has a unique solution such that  $\frac{dI^*}{dB} < 0$ .

Going back to equation (21), I finally obtain the following equality :

$$\frac{dROA}{dB} = -2B \left( \frac{I-A}{I} \right)^2 I^{1-\alpha} - \frac{dI}{dB} \left[ (1-\alpha) R^2 I^{\alpha-2} + B \left( 2 \frac{A(I-A)}{I^{2+\alpha}} + (1-\alpha) I^{-\alpha} \left( \frac{I-A}{I} \right)^2 \right) \right] \quad (23)$$

The two terms of equation (23) are of opposite sign because while private benefits reduce the expected returns for a given size, they also reduce optimal size which has a positive effect on profitability due to decreasing returns. In consequence, the impact of private benefits on profitability is ambiguous. The precise analysis of (23) is not tractable, but one can easily see that as  $B$  goes towards 0, the negative term also goes towards 0, while this is not the case for the positive term, especially when  $\alpha$  is low, that is when returns to scale are fastly decreasing. Therefore, there exists a non-empty set of parameters for which an increase in private benefits  $B$  does *increase* profitability while, as already seen in Proposition 3, it will *decrease* profitability when  $\alpha = 1$ . It may be interesting to run more precise simulations in order to clarify the set of parameters for which one or the other direction of the effect is true.

## Appendix B : Estimating the market value of private businesses

Because private businesses are not publicly-traded, I do not have any direct estimate of a firm's selling price. Practitioners usually use in these contexts methods consisting in inferring the value of the firm they are interested in from the value of past transactions on similar firms after adjusting for potential differences in size. This is what is called the transaction multiples method.

As is usually said by practitioners, the transaction multiples method is more art than science in the sense that it is difficult to find a comparable match for a given private firm. However, we as econometricians are more comfortable with that problem since it is common in the Evaluation literature : when using propensity score methods, econometricians try to guess what a control observation would have become had it been treated using the outcomes observed for very similar but treated observations. In this case, the treatment consists in being sold on the market and the outcome one wants to guess is the price at which unsold firms could have been sold.

**Obtaining transaction values** From the LIFI survey on business groups, I obtain the transaction value of firms bought each year by another firm, provided the latter firm is big enough either in terms of employment<sup>53</sup>, sales<sup>54</sup> or financial portfolio<sup>55</sup>. In order to retrieve the transaction values from this survey, I use the method proposed by Picart (2002). Each year, the survey asks parent firms about the book value of every firm for which they own shares. Since accounting standards require that the book value of this portfolio be equal to the transaction value, I know the occurrence and the value of a transaction for those cases through comparison of parent firms' holdings from one year to another : when a firm was not part of a parent firm's portfolio in  $t - 1$  and appears in its books in  $t$ , I assume that some of its shares were bought by the parent firm in  $t$ . In order to avoid misclassifications, I only consider target firms that already paid corporate taxes in  $t - 2$  and were not previously owned by a firm belonging to the parent firm's business group.<sup>56</sup>

I only use data from 1995 to 2002 because the sampling of the survey was basically the same in that period and also because I am interested in the state of the buy-out market mainly prior to the CEO successions I observe. Eventually, I have transaction values for about 2,500

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<sup>53</sup>More than 500 employees.

<sup>54</sup>More than 45 million euros.

<sup>55</sup>More than 1.5 million euros

<sup>56</sup>I also eliminate target firms with more than one third of their assets composed of financial holdings, as well as those classified as holdings according to INSEE, and those whose equity is less than 5% of Total Assets.

firms for each year from 1995 to 2002. Then, I match this information on deal values with the corresponding book value of the target firm as registered in the corporate tax files. Since I only have unconsolidated accounting data, it seems relevant to use Market-to-Book ratios rather than Price-Earning ratios<sup>57</sup>.

**Matching procedure** The matching procedure is close to the one used by Boucly et al. (2009) : for each firm in the succession sample, I look for at least 5 firms that were bought in the year previous to the succession; I eliminate firms that do not correspond to the same 4-digit sector provided I still have at least 5 potential matches, and repeat the same elimination for coarser and coarser sector groupings ; once this is done, I eliminate bought firms for which employment is +/- 50% the employment of the firm in the succession sample, provided that I still end up with at least 5 potential matches. Finally, for sample firms still having more than 5 matches, I estimate a propensity score on the probability to be in the sample using the Log of Total Assets, the Debt over Assets rate and the Return on Capital Employed as covariates and then I keep only the 5 nearest neighbors. Once I have identified these comparable firms, I compute the mean of the logarithm of the Market-to-Book across the 5 “twins” of each firm present in the sample. This gives me the final estimate for the market-to-book ratio of a given firm prior to a CEO transition.

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<sup>57</sup>See Picart (2002) for a test of the relative precisions of asset and earnings measures when using unconsolidated accounting data.

## Appendix C : Estimating the prevalence of dynastic management

In order to get an exact sense of the frequency of dynastic management in the economy, one would need to trace the entire history of any given firm, be it publicly traded or not. Because, one usually only has data on firms' past management history for a limited number of years, I propose a method to make do with this limitation.

**Identifying the share of founder-led firms** One can identify the size of the group of founder-led firms if one makes some assumptions on the age of founders at firm entry and retirement. In order to do this, I need to precisely identify at least one sub-population of founder-led firms : the idea is that firms that have the name and surname of the actual CEO are founder-led firms. I have identified in the succession sample 382 firms for which this is the case, which is enough to provide a rough estimate of founders' mean tenure. For this sub-group, I compute an annual founder departure hazard rate  $p_f$ .

This allows me to estimate the probability that conditional on the firm being created in year  $s$ , it is still run by the founder in the year 2001 :  $s_f^s = (1 - p_f)^{2000-s}$ . The total share  $s_f$  of founder-led firms in 2000 is then such that :

$$s_f = \frac{\sum_{s=s_{min}}^{s=s_{max}} n_s s_f^s}{\sum_{s=s_{min}}^{s=s_{max}} n_s}$$

From the data on eponymous firms, I can estimate that the average founder CEO's tenure is 25 years, which yields  $p_f = 0.04$ . Using this estimate for the whole cross-sectional sample I find that the share of founder-led firms is  $s_f \simeq 0.44$ .

**Identifying the share of dynastic and regular firms** The remaining uncharacterised firms are not run by their CEO and should thus be split between the groups of "dynastic" and "regular" firms. The problem is that one cannot simply use the fraction of dynastic firms observed among those that have experienced a family CEO succession between 1994 and 1999, because average CEO tenure is longer in dynastic firms. Conditional on a given window of observation, the probability that one observes a CEO succession in a dynastic firm is then lower than in a regular firm.

Thus, estimation of the real weight of dynastic firms requires further steps. Assume that there are  $d$  dynastic firms and  $r$  regular firms. Assume as well that there is an exogenous annual probability of a CEO turnover,  $p_d$  for dynastic firms and  $p_r$  for regular firms. For a window of observation of length  $l$ , I know that the observed share  $s_{obs}$  of dynastic firms

conditional on a succession being observed during the window of observation is such that :

$$s_{obs} = \frac{(1 - (1 - p_d)^l) * d}{(1 - (1 - p_d)^l) * d + (1 - (1 - p_r)^l) * r}$$

From this, one can estimate that the true fraction of dynastic firms among non-founder-led firms  $s_{real}$  is such that :

$$s_{real} = \frac{d}{r + d} = \frac{(1 - (1 - p_r)^l) \times s_{obs}}{(1 - (1 - p_r)^l) \times s_{obs} + (1 - (1 - p_d)^l) \times (1 - s_{obs})}$$

From this equality, one can check that the observed share of dynastic firms approaches the true share as the window of observation goes to infinity. One can also see that when the annual probability of a CEO turnover is lower in dynastic firms their observed share is underestimated.

Using the data on departing and arriving CEOs' age difference, I can estimate average CEO tenure as being equal to 18.7 years in dynastic firms while it is equal to 5.8 years in regular firms. Thus, I can compute that  $p_r = 0.17$  and  $p_d = 0.05$ . Since I have  $s_{obs} = 0.25$  and  $l = 6$ , I estimate that the share of dynastic firms among firms not run by their founder amounts to  $s_{real} \simeq 0.44$ .

**Employment-weighted estimates** I obtain that among firms with more than 20 employees, 44% were managed by their founder, while 25% were managed by a relative of the founder and 31% were managed by a CEO with no family ties with the CEO. One can compute employment-weighted fractions if one assumes that mean employment is the same across unobserved dynastic and observed dynastic firms as well as across unobserved regular and observed regular firms.

In that case, since average employment in the whole population in 2000 is 88.3, while it is equal to 144.7 in observed regular firms and to 75.4 in observed dynastic firms, I can compute that average employment in founder-led firms is equal to 55.3 employees. As a consequence, the respective employment-weighted fractions of founder, dynastic and regular firms are 28%, 21% and 51% : more than one employee in five works in a firm run by a relative of the founder in the private sector.

This is not far off the findings of Sraer and Thesmar (2007) who find that 16% of employees in French listed firms work under the management of an heir. Remember however that the share of dynastic firms is probably underestimated and the share of regular firms overestimated because I could not define CEO turnovers involving in-laws or nephews as family transitions.



## Appendix D : Reconciling dynamic and static evidence on firm size

I estimate that in the cross-section, dynastic firms' sales are higher by about 30%. In the meantime, I find that annual sales decrease by about 5 % five years after a dynastic succession. The problem with the longitudinal estimate is that one does not know what the steady-state scale differential induced by a dynastic CEO succession is. This difference is probably at least as big as 5%, since this is the difference in size after only 5 years. But then the difference between the cross-sectional estimate and the longitudinal estimate is probably too big, since the shape of the impact of dynastic successions as seen in figure 1 suggests that the scale difference is still growing after  $t + 5$ . Perfectly reconciling those two estimates would in fact require to follow the firms much more than just 5 years after a CEO succession.

What is more, the cross-sectional result sums up the many decisions involving a reduced size for dynastic firms, taken at different stages in the firm's life cycle, so that one should not expect that successions alone drive the difference between dynastic and regular firms. Indeed, as can be seen from the descriptive statistics, firms that will undergo a dynastic succession are already smaller before the succession. According to my model, this may be because those entrepreneurs who eventually left the management to an heir probably have had to refuse to let external investors invest in the firm in the past.

Therefore, in order to make a meaningful comparison of cross-sectional and longitudinal evidence, I propose to estimate the annual growth differential that could lead the two groups of firms I observe in 2000 to differ in cross-sectional size by 30%. Such a task requires to have a sense of the time window over which dynastic and regular firms diverge in their growth path. Because firms in the cross-section come from very numerous birth cohorts, this exercise requires some modelling about firms' entry, exit and growth processes.<sup>58</sup>

**Model set-up** In this model, there is in each period  $t$  a measure of new firms that are created. These new firms represent a fraction  $b_t$  of the number of older firms still alive at the beginning of period  $t$ . Their business model is based on the imitation of the average incumbent firm, whose size is  $\bar{S}_t$ . This imitation process is however imperfect, so that born firms have an optimal initial size equal to  $\delta\bar{S}_t$ , irrespective of the dynastic preferences of the owner.  $\delta$  is a measure of the quality of imitation. In his calibration exercise made for US firms, Luttmer (2006) estimates that this parameter is equal to 0.95.

Once firms are created and their initial size is established, the type  $i$  of each firm's owners

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<sup>58</sup>This exercise is inspired by the literature on firm size distribution. See Luttmer (2006) for a state-of-the-art contribution in this field.

are decided once and for all : a fraction  $d_t$  of firms born in year  $t$  have owners with dynastic preferences (that is  $i = d$ ), while a fraction  $1 - d_t$  have owners with regular preferences (that is  $i = r$ ).

At the end of each period  $t$ , active firms randomly die irrespective of their size, age and type with a probability  $\lambda_t$ . This assumption is critical because it allows to estimate the parameters  $b_t$  and  $d_t$  only from the knowledge of the age and type distribution of firms in 2000. For example, if in 2000 there are still 50 dynastic firms and 100 regular firms born in 1900, then the hypothesis on survival probability ensures that the proportion of dynastic firms among firms born in 1900 is  $d_t = \frac{50}{50+100} = \frac{1}{3}$ . Similarly, if in 2000 there are still 100 firms born in 1800 and 200 firms born in 1850, one can estimate that at any date after 1850 there are twice as many firms born in 1850 as firms born in 1800.

From the beginning of each period  $t$  to its end, firms grow at a constant annual rate  $\gamma_i$ , which depends on the type  $i \in \{r; d\}$  of their owners.

Evaluating the existence of a stationary distribution in this model is beyond the scope of this paper. However, the required ingredients for a stationary distribution are there (see Gabaix (1999)) : exogenous death rates guarantee that firms cannot grow to infinity with positive probability, the imitation process guarantees that the size wedge between old and young firms does not grow without bound.

**Parametric assumptions** Using these assumptions, I try to guess what the average annual growth differential  $\gamma_r - \gamma_d$  should be given my knowledge of the average size differential between dynastic and regular firms in 2000 and my knowledge of the age distribution of dynastic and regular firms alive in 2000.

I assume now that the model begins in  $t_0 = 1670$  which corresponds to the birth date of the eldest firm in the sample, with an initial size set to 100. I also assume that the annual growth rate of regular firms is equal to the average French GDP growth rate over the period 1978-2008, i.e.  $\gamma_r = 0.02$ .

**Simulation procedure** Once one knows the parameters  $d_t$ ,  $b_t$ , and  $\gamma_r$ , there is a perfect correspondence between  $\gamma_d$  and the average scale difference in 2000. However, there is no simple closed form formula between these two figures, so I run simulations for different values of  $\gamma_d$  and pick the one that yields a 30% average difference between dynastic firms and regular firms in 2000.

The simulation runs as follows : starting in  $t_0 + 1$ , I compute the average size of incumbents  $\overline{S_{t_0+1}}$  using my knowledge of  $d_{t_0}$ ,  $\gamma_d$  and  $\gamma_r$ . This allows to compute entry size in period  $t_0 + 1$ .

Since I know the proportion of dynastic firms among those born in  $t_0 + 1$  and set the

imitation parameter  $\delta$  to 0.95, I can compute the average size as well as the density of dynastic and regular firms at the end of period  $t_0 + 1$ . This in turn allows to compute  $\overline{S_{t_0+2}}$ .

The procedure repeats itself until one reaches  $t = 2000$ . Then I compute the ratio of the simulated average size of dynastic firms over the simulated average size of regular firms and compare it to the logarithm of effective ratio I observe in 2000 (Table 3, column (1)), plus and minus the standard error.

**Results** The results are the following :

- In order for dynastic firms to be 30% smaller than regular firms in 2000, it has to be that their annual growth is smaller by 1.27 points
- In order for dynastic firms to be 28% smaller than regular firms in 2000, it has to be that their annual growth is smaller by 1.16 points
- In order for dynastic firms to be 32% smaller than regular firms in 2000, it has to be that their annual growth is smaller by 1.38 points

These estimates are not significantly different from the growth differential observed after a dynastic succession.

## Appendix E : A calibration of the welfare trade-off between growth and volatility

My estimates suggest that the trade-off implied by family-firm-friendly policies is between having 1.07 additional point of annual growth per year versus a reduction by 13% of volatility. It is interesting to make sense of these opposing figures through the calibration of a simple welfare model, along the lines of Levchenko et al. (2008) and Levchenko et al. (2009) who run this kind of exercise for the welfare impact of financial liberalizations. In particular, one would want to know for which degree of risk aversion do family firms dominate regular firms in terms of welfare.

I assume that the social planner maximizes firm employees' welfare. Employees are assigned once and for all to a firm of type  $i$  in period 0: it can either be a dynastic firm (type  $d$ ) or a regular firm (type  $r$ ). Employees are then entitled to a consumption stream entirely dependent on the type of firm  $\tilde{c}_t^i$ . This assumption rules out potential risk diversification by workers : it will thus exert a bias towards favouring less volatile firms. Employees are infinitely-lived and have a CRRA utility function of the form :

$$U(\{\tilde{c}_t^i\}) = E_0 \left\{ \sum_{t=0}^{\infty} e^{-\beta t} \frac{\tilde{c}_t^{i, 1-\gamma}}{1-\gamma} \right\}$$

where  $\gamma$  is the risk-aversion parameter and  $\beta$  is the discount factor. Consumption paths in a firm of type  $i$  are separable in a deterministic trend  $c_t^i$  with a constant growth rate  $\mu_i$  and a stochastic disturbance  $\tilde{\eta}_t^i$  such that :

$$\tilde{c}_t^i = c_t^i \tilde{\eta}_t^i$$

$$c_t^i = c_0 e^{\mu_i t}$$

$$\ln(\tilde{\eta}_t^i) = \rho \ln(\tilde{\eta}_{t-1}^i) + \tilde{\varepsilon}_t^i$$

where  $\rho$  measures the degree of persistence of shocks while  $\tilde{\varepsilon}_t^i$  is normally distributed with zero mean and standard deviation  $\sigma_t^i$ . In the cross-sectional data, the average sales growth over the period 2000-2006 in non-dynastic firms is 0.6% a year.

Subtracting the estimated negative impact of dynastic firms from this number would imply a negative average growth rate for dynastic firms. That is why I choose as a benchmark rate of growth the rate of French GDP growth over the period 1979-2008, i.e.  $\widehat{\mu}_t^r = 0.02$ .

Then, in order to estimate  $\widehat{\mu}_t^d$ , I subtract an estimate of the impact of dynastic status on firm growth<sup>59</sup> from  $\widehat{\mu}_t^r$ .

The benchmark level of volatility is the mean sales volatility observed over the period 2000-2006 in regular firms :  $\widehat{\sigma}_t^r = 0.123$  from which I subtract an estimate of the impact of dynastic status on sales volatility drawn from Table 6 column (1), in order to obtain the value of  $\widehat{\sigma}_t^d$ . As a robustness check, I also add scenarios where the parameters correspond to plus or minus one standard error of the estimates.

I assume that the discount factor  $\beta$  is set to 0.05 as in Levchenko et al. (2008). As regards shock persistence, I do not have a long enough window of observation to provide credible estimates at firm-level. Studies on the persistence of TFP shocks at plant-level are recent (see Abraham and White (2006)) and suggest that this persistence is lower than what is found for consumption. However, at a worker's level it is likely that shocks are more persistent than what one can find at firm-level. For that reason, I choose several scenarios of shock persistence :  $\rho = 0$ ,  $\rho = 0.5$  and  $\rho = 0.92$ , which is the level of consumption shock persistence in the US (as estimated in Reis (2007)).

From these parameters, I determine the level of risk-aversion  $\bar{\gamma}$  such that

$$\gamma = \bar{\gamma} \Rightarrow U(\{\tilde{c}_t^r\}) = U(\{\tilde{c}_t^d\})$$

Assuming log-normality of the shocks, Reis (2007) finds the following closed-form equation for  $\bar{\gamma}$  :

$$\sum_{t=0}^{\infty} \frac{e^{-[\beta+(\bar{\gamma}-1)\mu_d]t} e^{0.5\bar{\gamma}(\bar{\gamma}-1)\sigma_d^2(1-\eta^{2t})/(1-\eta^2)}}{1-\bar{\gamma}} = \sum_{t=0}^{\infty} \frac{e^{-[\beta+(\bar{\gamma}-1)\mu_r]t} e^{0.5\bar{\gamma}(\bar{\gamma}-1)\sigma_r^2(1-\eta^{2t})/(1-\eta^2)}}{1-\bar{\gamma}}$$

The results of the calibration are presented in table 11. The calibrated risk aversion parameters are between 4.8 and 22.1 with a middle scenario at  $\bar{\gamma} = 14.8$ . These levels of relative risk aversion are above conventional estimates<sup>60</sup>, especially since it has been assumed that risk is undiversifiable. I conclude from this exercise that policies helping family firms require unreasonably high levels of risk aversion in order to be justified by a favorable trade-off between growth and stability.

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<sup>59</sup>Drawn from Table 7 column (1)

<sup>60</sup>See Kocherlakota (1996) and Meyer and Meyer (2005) for a discussion of these “conventional” estimates

Table 11: Level of relative risk aversion implied by welfare indifference between dynastic and regular firms

**Volatility of dynastic firms :**  $\sigma_d =$  0.104  $\sigma_d =$  0.106  $\sigma_d =$  0.108

	<b>Shock Persistence :</b>	$\eta = 0$		$\eta =$		$\eta = 0$		$\eta =$		
		0.5	0.92	0.5	0.92	0.5	0.92	0.5	0.92	
<b>Growth of dynastic firms</b>	$\mu_d = 0.0063$	19.8	17.3	9.1	20.9	18.6	10.2	22.1	20.2	11.8
	$\mu_d = 0.0093$	16.3	13.8	6.6	17.2	14.8	7.5	18.2	16	8.4
	$\mu_d = 0.0123$	13	10.7	4.8	13.7	11.4	5.3	14.6	12.3	5.9

Note : These levels of risk aversion are those for which an individual assigned once and for all to a firm of a given type, with no risk diversification opportunities, is indifferent between a dynastic and a regular firm. The time discount rate is equal to 0.05. The annual growth rate of regular firms is set to 0.02 and their annual volatility is set to 0.123. Parameters for dynastic firms correspond to estimates of Table 7 column (1) and Table 6 column (1) plus and minus one standard error.