Incentivizing the Owner:
Why Family Firms offer Pay-for-performance Contracts to their CEOs

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Abstract

We study the incentive mechanisms adopted by family firms to reduce managerial slack, by means of a theoretical model and an empirical analysis. Recent empirical literature finds puzzling evidence about the structure of CEO compensation schemes, some of which showing that, family CEO, despite their inside ownership, reveal higher pay-for-performance sensitivity than external managers. This is in contrast with the fundamental tenets of principal-agent theory under moral hazard. Through a theoretical model, we show that the outcome-related compensation structure of family CEOs might depend on their participation constraint rather than on agency problems. In determining the compensation structure, we account for the type of market mechanisms in which the family firm operates. CEO's payment schemes are related to their performance in markets where the product is differentiated, while following a fixed compensation structure when the product is homogeneous. When we use a panel of Italian listed family firms (2000-2013) to test the main hypotheses, we find evidence in line with the model's predictions.

Keywords: CEO compensation, product market competition, corporate governance, family firms, Family CEO, pay-performance sensitivity

JEL classification: J33, G34, M52, D22, L20

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1. Introduction

One of the fundamental tenets of principal-agent theory is that managers need to be provided with incentives to exert effort, owing to the imperfect monitoring that characterizes their behavior. Competition affects the cost and structure of these incentives in multiple and nuanced ways, which have been the object of study since Hart (1983). The alignment between shareholders and CEOs' interests depends on the shareholders' monitoring ability, on the CEO's risk aversion and on the value of his outside option in case of default, to name only a few.

The type of firm ownership plays a critical role as well. When firms are owned and managed by their founders, or by their heirs, the agency problem is mitigated and a milder use of incentive pay in managerial compensation is to be expected. Or maybe not. Quite surprisingly, the recent evidence on CEOs' compensations in family firms suggests that also family firms offer incentive contracts to their CEOs, even (and especially) when they belong to the family (Schulze et al., 2001; Michiels et al., 2012; Mazur and Wu, 2016; Graziano and Rondi, 2018).

This evidence arises some important questions. The first one is why family firms adopt a pay-for-performance compensation scheme to their inside management, given they they obviously do not suffer from the problem of managerial slack. A possible explanation is that also family firms are susceptible to some kind of agency problem, though the latter may differ in nature from those of firms with dispersed ownership. This specific agency problem has often been associated to the relational and altruistic aspects of managers-owners (Kallmuenzer, 2015). However, another possible explanation is that the pay-for-performance contracts of family CEOs are not actually related to agency problems, but rather follow different mechanisms that cause the CEO's remuneration to vary in accord with the firm's economic result. From a theoretical point of view, the exact source of the need for managerial incentives in family businesses is still an open issue.

A second question is the role of the market mechanisms on family CEOs' compensation. It is a well established fact that firms operating in industries where the product is homogeneous are subject to a stronger competitive pressure than firms whose product is differentiated. These different environments ultimately affect the firm's strategy, payoff and its managers' effort. Given that the agency problem seems to produce opposite effects on family firms relative to non family ones, should we also expect a different impact of the market on the family CEO's pay when family firms are involved?

In this paper we study the role of the market mechanism on managerial compensations in family businesses by means of a theoretical model that we test on a sample of Italian listed family firms over the years 2000-2013.

In a standard moral hazard set up, a family firm faces the choice of hiring a family CEO or an external one. The CEO can exert a non-observable, costly effort which increases the probability of obtaining a profit. The profit level depends on the competitive scenario: in fact, highly competitive industries allow a lower amount of profits even if effort is exerted. For example, exerting effort in advertising and R&D activities allows significant returns only in case of sufficient product market differentiation, while the same activities grant lower returns in industries characterized by more homogeneous products. We also assume that external CEOs have a higher probability of success than family ones. Indeed, the available evidence suggests that the professional ability of non-family CEOs in general is higher than the professional ability of most family CEOs (Bertrand & Schoar, 2006; Bloom & Van Reenen, 2007; Bennedsen et al., 2007).

Despite their greater ability, external CEOs are subject to the classical moral hazard problem owing to the disalignment of entrepreneurs and owners' objective functions. In fact, to induce an external CEO to exert effort, he must be paid with an incentive contract conditioning his remuneration to the outcome of his effort; the compensation in case of success must include an informational rent. Conversely, an internal CEO, who is therefore at the same time manager and shareholder, has an in-

trinsic motivation to exert effort and does not need an incentive rent. However, he is still subject to a participation constraint, which requires that his effort costs are covered. Then, his compensation is high if his effort succeeds, and low in case he fails, thus following the volatility of the firm's results. This shows that the outcome-related compensation structure of family CEOs might depend on their participation constraint rather than on agency problems.

We also find that family CEOs receive a compensation that is lower than external ones, as it does not include the informational rent. However, their remuneration might present a higher volatility, owing to the fact that family CEOs succeed less often than external ones.

Moreover, we find that the optimal shareholders' decision in terms of compensation structure and type of CEO (i.e. family or external) depends on whether profits are low, intermediate or high. In industries characterized by a low profit level, CEOs (either family or external indifferently) are optimally paid with a fixed contract. In fact, the low profits are not sufficient to cover the direct or indirect (i.e., the incentive rent in the case of external CEO) cost of effort: exerting effort is not worthwhile, given the low returns obtained in the case of success. In industries characterized by an intermediate profit level, it is optimal to hire a family CEO, who will receive a variable compensation depending on the outcome of his effort. Indeed, profits are sufficiently high to make the exertion of effort worthwhile, but not so high to justify the recruitment of a highly capable, but costly external CEO. Finally, in industries characterized by a high profit level, it is optimal for shareholders to maximize the probability of success by hiring a highly-experienced external CEO and provide him with the incentive to exert effort.

We test these results on an unbalanced panel of 81 Italian non-financial family firms listed in the Italian exchange and tracked over the period 2000-2013. We define “family” firms as those where the largest individual shareholder or family group has more than 50% of the equity. We collected data about the CEO identity and pay from the companies' annual reports, and identified

his/her parental ties with the controlling shareholder by using information from the financial press, corporate governance reports and professional websites.

Our theoretical predictions match the evidence emerging from the dataset about the role of competition on CEOs' pay. Low return sectors, where competition is stronger, have either family CEO or non-family CEO with a fixed compensation scheme. High return sectors, subject to a lower competitive pressure, have either family CEO or non-family CEO with a pay-for-performance compensation scheme. In low return sectors, the compensation of family CEOs is not significantly different than that of non-family CEOs. Finally, in high return sectors, the compensation of family CEOs has a lower expected value, but higher pay performance sensitivity than the compensation of non-family CEOs.

2. The Model

The analysis relies on the classical moral hazard problem applied to the shareholders-manager relationship. A family firm operates in a risky environment, where profits can either be positive and equal to π, or zero, corresponding to two different states of the world, the good and the bad one. The CEO of a family firm can exert effort so as to affect the probabilities of the two possible state of the world. If effort is exerted, the profits π are obtained with probability p (and zero profits are obtained with probability 1- p_e); conversely, if no effort is exerted, the probability to obtain profits is p_n (and with probability 1- p_n zero profits are obtained), with $p_n \leq p_e$. The CEO's effort is not observable and has a cost $c \in [0, \pi]$. The value of the CEO's outside option is normalized to zero. The effort is not observable, but the state of the world is. The CEO receives a compensation equal to T in case of success (good state with profit π), and is normalized to 0 in case of failure (bad state with zero profits). The firm's shareholder decides whether to hire an external CEO, or be the CEO himself. We assume that a family CEO has a probability to succeed $p_e = p^F$ that is lower than the probability to succeed $p_e = p^O$ of an outsider (i.e., $p^O > p^F \geq p_n$). Indeed, the recent literature suggests that the pro-

fessional ability of non-family CEOs in general is higher than the professional ability of most family CEOs (Bertrand & Schoar, 2006; Bloom & Van Reenen, 2007; Bennedsen et al., 2007).

The timing is as follows. In stage 0, the shareholder decides whether to hire an external CEO, or be the CEO himself. In stage 1, the shareholder commits to the CEO's compensation T in case of success. In stage 2, the CEO takes action (i.e., exerts effort or not), and conditional on his behavior the state of the world is observed.

Let us first examine the optimal contract offered by the shareholder at time 1 in case an outsider manager is hired. In order to induce the CEO to exert effort, the compensation T needs to satisfy the incentive compatibility constraint $p^O T - c \geq p_n T$, i.e.

(1) $$T = \frac{c}{p^O - p_n}.$$

The contract expressed by (1) is an incentive pay, as it is characterized by a state-dependent compensation; indeed, $T > 0$, where 0 is the CEO's pay in case his effort fails. The CEO's remuneration in the case his effort succeed includes an informative rent as $T > 0$.

The expected profit for the shareholder is $\Pi^O = p^O \pi - p^O \frac{c}{p^O - p_n}$.

In case no effort is exerted, the external CEO is optimally paid with $T = 0$, which is in effect a fixed compensation scheme as it entails the same payment (i.e., zero) in both states of the world. In this case, the shareholder's profit is $\Pi^n = p_n \pi$.

The shareholder provides incentives to the outsider CEO only if $\Pi^O \geq \Pi^n$, i.e.

$$\pi \geq \bar{\pi}^O = \frac{p^O c}{(p^O - p_n)^2}.$$

In sectors where the managerial effort allows to achieve sufficiently high profits, the firm's shareholder should optimally adopt a pay-for-performance remuneration and grant an informative rent. Conversely, if profits are low, the shareholder gives up incentives to the external CEO and the lat-

ter receives a fixed compensation scheme. Low profits do not justify the shareholder's cost of inducing the effort.

Let us now examine the case of family-CEO. In particular, we find the optimal contract offered by the shareholder in case he appoints himself as the firm's manager. If the manager exerts effort, the compensation T must satisfy his participation constraint $p^F T - c \geq 0$, i.e.

(2) $$T = \frac{c}{p^F}.$$

The contract in (2) is characterized by a state-dependent compensation. The variability of the CEO's remuneration is due to the riskiness of the environment in which he operates. The level of the pay inlcudes the premium for the risk he takes of wasting a costly effort, but not the informational rent. Indeed, the expected remuneration of the CEO is equal to c. Note that $T > c$ as it must cover the CEO's expected loss $-(1 - p^F)\, c$ in case his effort does not succeed.

The CEO's contract is state-dependent, and in particular it is high in the good state and low in the bad state, because it reflects the participation constraint.

The shareholder's profit is $\Pi^F = p^F \pi - c$.

In case no effort is exerted, the family CEO receives the state-independent payment $T = 0$ and the shareholder's profit is $\Pi^n = p_n \pi$.

The shareholder-manager exerts effort only if $\Pi^F \geq \Pi^n$, i.e.

$$\pi \geq \bar{\pi}^F = \frac{c}{p^F - p_n}.$$

In sectors characterized by low returns, the family CEO receives a fixed compensation scheme; conversely, in sectors characterized by high returns, the family CEO receives a state-dependent compensation scheme.

We now proceed backward and examine the shareholder's decision at time 0 about the type of man-

ager. Figure 1 represents the owner's return Π corresponding to the three alternative solutions (external CEO with the incentive to exert effort, family CEO exerting effort, no effort) in function of the profit π obtained when the good state of the world is realized.

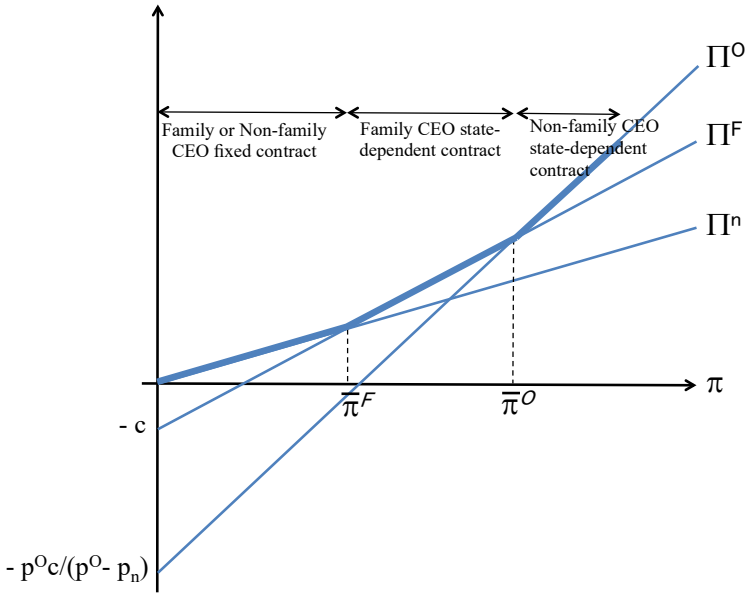

Figure 1: Shareholder's equilibrium choice at stage 0

When the CEO's effort allows a high return (i.e., π is high), the dominant solution for the firm's owner is to hire a non-family CEO with an incentive compensation. Indeed, the high profitability makes it worthwhile to hire a capable CEO, despite having to provide him with a costly incentive rent owing to the imperfect monitoring. For intermediate levels of π, the profitability of the sector is good enough to make the investment in effort worthwhile, but not to pay an informational rent to an external CEO. In this case, the family CEO is the dominant solution, as he does not require an incentive rent, although he may perform worse than a non-family one. For low levels of π, the limited profitability is not sufficient to cover neither for the external CEO's informative rent nor for the family CEO's ineffectiveness. In this case, the owner prefers the no-effort solution, and a fixed compensation scheme is adopted. These results are summarized in the following Proposition.

Proposition 1. The shareholder optimally opts for a family or non-family CEO with a fixed con-

tract if $\pi \leq \bar{\pi}^F$, for a state-dependent contract with a family CEO if $\bar{\pi}^F < \pi \leq \bar{\pi}^O$, and an incentive contract to an external CEO if $\pi > \bar{\pi}^O$.

Proof. See the Appendix.

Proposition 1 suggests an answer to the owner's predicament about the best type of CEO: whether a capable but sluggish manager or a trustworthy but less experienced one. The answer to this dilemma depends on the profit that a successful manager can achieve. If the competitive environment allows sufficiently high profits in case of CEO's successful action, then an external manager is the best solution, because it maximizes the probability to achieve high returns and the payment of the informative rent is worth its while. Conversely, if the competitive environment allows intermediate levels of profits in case of CEO's successful action, a less experienced family CEO is the best option as he solves without (direct) costs the monitoring problem.

We now focus on the case in which the effort is exerted amd we look at the expected level of CEO's compensation. The expected remuneration of an outsider CEO is $p^O \frac{c}{p^O - p_n}$, while the expected remuneration of a family CEO is *c*. Then, we can immediately state the following Proposition.

Proposition 2. The expected remuneration of a family CEO is always lower or equal than the expected remuneration of an outsider CEO.

Proof. See the Appendix.

The variance $(\sigma^O)^2$ of an outsider CEO's compensation scheme is

$$(\sigma^O)^2 = p^O \left(\frac{c}{p^O - p_n} - p^O \frac{c}{p^O - p_n}\right)^2 - (1 - p^O)\left(p^O \frac{c}{p^O - p_n}\right)^2 = p^O(1 - p^O)\frac{c^2}{(p^O - p_n)^2},$$

while the variance $(\sigma^F)^2$ of the remuneration of the family CEO is

$$(\sigma^F)^2 = p^F\left(\frac{c}{p^F} - c\right)^2 - (1 - p^O)c^2 = c^2\frac{1 - p^F}{p^F}.$$

Then, we have that:

Proposition 3. $(\sigma^F)^2 > (\sigma^O)^2$ when p^O is sufficiently high.

Proof. See the Appendix.

Intuitively, if the probability p_e to succeed is high (as in the case of an outsider CEO), monitoring is easier. An external CEO who exerts effort is frequently able to succeed and achieve the high level of remuneration. Moreover, since monitoring is easier, he does not even need a large informative rent, so that the payment *T* that he receives in case of success is not very different from the payment (zero) that he receives in case he fails. Overall, these two factors imply a low variability of his remuneration.

3. Empirical Design

In the theoretical analysis, the choice of the CEO and of the remuneration policy (i.e. the fixed and variable component of the pay) ultimately depends on the competitive environment, under the assumption that the competitive environment ultimately determines the level of the informative rent that the principal has to forgo to the agent and the probability that the agent, by exerting optimal effort will achieve a profit rate high enough to compensate the loss of the informative rent. To operationalize this definition of competitive environment empirically, we turn to the dichotomy between price and non-price competition where the former comprises industries with low entry costs and homogeneous products where managerial effort aims at reducing costs in order to keep profits slightly above marginal costs. In contrast, non-price competition is typically viewed as made up by industries where managers can and do their best to differentiate their products in order to temper

competitive pressure, entry and imitation by rivals so as to sustain a competitive advantage and profitability. Often, the effort to boost consumers' willingness to pay through vertical differentiation requires an escalation in sunk and costly intangible investment – such as research and marketing expenditures (Sutton, 1991) – which in turn must be compensated by higher rates of return.

To design a test of the theoretical predictions of the model, we rely on an industry typology (Davies, Lyons, et al., 1996) that classifies two groups of industries, one including homogeneous product markets (Type 1) and one including differentiated product markets with high R&D and advertising intensity (Type 2). Firms are assigned to Type 1 or Type 2 industry groups on the basis of their primary industry at the beginning of the period, which is assumed not to change over time.

We then proceed to test the model's predictions in the light of the differences between family and non-family CEOs operating in different types of industries either through mean comparisons or via regression analysis that estimates the sensitivity of CEO pay to performance, hence the prevailing of fixed or variables (i.e. incentive) remuneration contracts. We estimate pay-performance sensitivity, in the form of the *semi-elasticity* of managerial compensation to the return on asset (the percentage change in CEO pay associated with a unit change in profitability). The baseline specification is:

$$LogCEO\_Comp_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 FamCEO_{it} + \beta_3 ROA*FamCEO_{it} + \sum \beta_j \overline{X}_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Where *ROA* allows us to test whether the compensation contract has a variable component, the binary variable *FamCEO* allows us to test if the pay level is statistically different for a family CEO while the interaction *ROA*FamCEO* tests the difference in pay sensitivity to performance. **X** is a vector of control variables (see below), μ_i are the firm fixed effects that control for time invariant unobservable characteristics and λ_t are year dummies, which account for time-specific common factors, like the business cycle, changes in foreign competitive pressure or in regulations that may oth-

erwise affect the competitive environment. ε_{it} is the error term. Standard errors are robust to heteroscedasticity and clustered at the firm level.

4. The Data

Our study uses an unbalanced panel of 81 Italian non-financial family firms listed on the Italian exchange and tracked over the period 2000-2013. We define "family" firms as those where the largest individual shareholder (or family group) has more than 50% of the equity, based on information by CONSOB (*Commissione Nazionale per le Società e la Borsa*), the national authority supervising the equity markets, on shareholders with a share larger than 2%.[1] Our dataset includes the entire set of family firms listed in Italian stock market at this time, excluding financial companies, firms with less than four continuous years of CEO compensation data (to ensure long enough time series for panel analysis), and firms object of large merger or divestiture operations interrupting the time series.[2] The starting date is 2000 because in that year CONSOB (Regulation n. 11971, May 14, 1999) ruled that listed companies have to disclose information on managers' compensations in their annual reports. We collected data about the CEO identity and pay from company annual reports and use *Total Compensation* in the regressions because several companies only report the *total* pay and many others do not report the individual items consistently across firms and over time.[3] Starting from the CEO identity, we tracked whether the CEO is also the largest shareholder or a member of the controlling family or family group (based on the CEO's surname or on parental ties as obtained from the press or the news on the web/internet) and we defined accordingly the *Family CEO.* Other

[1] We used 50% as the cut-off value to define a "family" owned firm because ownership is highly concentrated in Italy: in 2011 the share of the first shareholder in listed companies was 44.8%, and 47.1% of non-financial listed companies were controlled by a single shareholder with the majority of the shares (Consob, 2012), typically associated with the firm's founder or a descendant (La Porta, Lopez De Silanes, Shleifer, 1999) .

[2] The original dataset comprises mainly manufacturing firms (73% of firm-year observations), public utilities and building companies. The final sample totaled 117 out of the original 227 listed firms in the "Industrial Companies" segment of Borsa Italiana as of 2012.

[3] We are aware that a comprehensive measure of CEO pay should also cover the values of the CEO's stock and option holdings, disclosure of stock options data became compulsory only in 2012 and the required information was unavailable in the previous years. Instead, we collected information on the presence of stock option plans.

variables cover CEO specific characteristics. *CEO Tenure*, the number of years the CEO has been in charge, controls for CEO experience, but also for potential managerial entrenchment, since a longer tenure may ensure internal power (Bebchuk and Fried, 2004). *CEO_Age,* a dummy equal to 1 when the CEO is more than 62 years old (the 75th percentile in our dataset), proxies the CEO's experience and expertise. *CEO Turnover,* a dummy equal to 1 when there is a change in the CEO, accounts for an event that generates a discontinuity in the time-series of the pay variable. Finally, to supplement further information on firm ownership structure, we include *Institutional Investor*, a dummy denoting the presence of mutual or investment funds, as the corporate governance literature suggests they play a disciplining role on compensation policy (Croci, et al. 2012, Fernando et al. 2013).

We use the return on asset (ROA, the ratio between EBITDA and total assets), accounting ratio of profitability, to measure *Firm Performance* and we include the log of real total sales to measure *Firm Size*, since past research has established that total compensations tend to increase with firm size (Murphy, 1985) and size is likely correlated with ownership, as family-owned firms tend to be small, especially those are still run by a family CEO. Finally, we include *Firm Age*, the number of years since its foundation, because older firms may be more inclined to revert to a professional CEO, if none of the founder's descendants is available to run the family business.

To account for differences in the competitive environment as implied by homogeneous products and differentiated products markets (i.e., "price" and "non-price" competition), we use the industry typology originally constructed by Davies et al. (1996, see Table A2.1, pp. 258-260), classifying 3-digit NACE industries based on UK industry data on R&D and advertising to sales ratios.[4] *Type 1* industries produce homogeneous products, where advertising and R&D intensity is low,

[4] Insofar as cross-industry differences are highly correlated in industrialized countries, we choose UK industry data because Italian data might raise reverse causality concerns.

Type 2 industries produce differentiated products that require high R&D and/or advertising expenditures.

Table 1, Panel A presents summary statistics while panels B and C report the statistics for firm-year observations with family CEOs and non-family CEOs, respectively.

INSERT TABLE 1 HERE

Observations distribute quite evenly across family- and non-family CEOs (and across homogeneous and differentiated product industries), a convenient feature of the data, for the econometric analysis.

Firms run by family CEOs cover 60.8% of the sample, tend to be smaller, older, less profitable and less participated by institutional investors. In contrast, they are more likely to operate in differentiated industries (high R&D and Advertising-intensity) as well as in those subject to foreign competition where import penetration is higher. Family CEOs tend to be older than outside managers, have longer tenure and exhibit a lower turnover rate. All differences between family and non-family CEOs variables in Panels B and C are statistically significant, except for import penetration.

5. *The Evidence*

5.1 Descriptive evidence

In Table 2, we test the significance of mean differences between family and non-family CEOs that operate in homogeneous and differentiated industries and relate such differences to the model's predictions. First of all, we note that the choice to rely on the homogenous vs. differentiated product industries is supported by the evidence in Panel B whereby the average ROA in Type 2 industries is significantly larger than the average ROA in Type 1 industries. Accordingly, we match the "low profit" industries with Type 1 and "high profit" industries with Type 2.

INSERT TABLE 2 HERE

Turning to the model's predictions, Proposition 1 suggests that in industries where managerial effort is not rewarded by high profits (like Type 1 industries where Bertrand competition may prevail) the principal will not have a strong preference for either a family or non-family CEOs. This is in line with what we find in Panel A of Table 2, as within Type 1 industries the observations distribute evenly between family and non-family CEOs. In contrast, when effort becomes more rewarding, making it more likely to achieve intermediate and high levels of profitability, the model predicts that firms should opt initially for family CEO and then, when the levels of skills and effort have to escalate to be successful, opt for external managers. Unfortunately, the Type 2 category does not allow us to distinguish between the two sub-groups, although it is reasonable to presume that, with its wide range of differentiated products, Type 2 includes both intermediate and high profit situations, i.e. the "top profitability case", probably made up of only few industries and firms. This may explain why our data in Type 2 better match only the second part of the proposition, about the significantly higher share of family CEOs (65.7%) in intermediate profit Type 2 industries.[5] As for Proposition 1's predictions about the structure of the compensations – fixed contracts within low profitability industries, stated-dependent for family CEOs in intermediate Type 2 profit sectors and incentive contracts for non-family CEOs in high profit Type 2 industries, we defer the tests to the regression analysis in the next section.

Proposition 2 predicts that the pay level of family CEOs should be significantly lower than the pay of external managers. Panel C supports this prediction, showing that the pay of family CEOs is significantly lower in both Type 1 and Type 2 industries.

[5] In the rest of the analysis we will try to cope with the shortcomings that derive from the oversimplification implied by the dichotomous definition of Type 2 industries, which includes sectors where vertical product differentiation allows very different levels profiles of profitability.

Proposition 3 looks at the variability of CEO pay and states that the variance of family CEOs' pay is higher than that of external managers when the probability for the outside CEO to be successful is sufficiently high. This is consistent with the idea that if, in a difficult competitive environment, a talented external manager is hired, he/she will have a higher probability to succeed (than a family CEO) hence his/her pay will vary less. We have two avenues to test this. First, we may simply (and roughly) look at the standard deviations of the pay of family and non-family CEOs, second, we may rely on pay-performance sensitivity regressions (next section). The data in Panel B of Table 2 shows that standard deviations of family CEOs' pay are always higher, particularly so within Type 2 sectors, where the coefficient of variation of family CEOs' pay is 2.64 vs. 0.99 for external CEOs. Alternatively, we can test if family CEOs' compensations exhibit stronger state-dependent variability, i.e. a higher sensitivity to firm performance.

5.2 Regression results

In this section, we perform regression analyses aimed at testing, in a multivariate context, the differences between the level and sensibility to firm performance of family and non-family CEOs' pay. We report results for the full sample and, separately, for homogenous (Type 1) and differentiated (Type 2) industries. Table 3 reports the results of fixed effect estimation of equation (1), where the control variables included to account for heterogeneity of firm and industry characteristics are described in Section 4.

INSERT TABLE 3 HERE

In Columns (1) and (2), we use the full sample of firms. The coefficients are imprecisely estimated and reveal only a weak correlation between CEO pay and accounting profitability as measured by ROA, not surprisingly, though, as they cannot inform us, by design, on the differences in

compensation policy that the model has highlighted for firms operating in industries where different market mechanisms are at work. The coefficient on Family CEO is negative, suggesting that the pay level of family CEOs is lower, but statistically insignificant. Among the control variables, only firm size and CEO tenure enter with positive coefficients, in line with established evidence in the corporate governance literature. In Column (2), the variable of interest is the interaction between ROA and the dummy Family CEO, designed to capture the difference in sensitivity to performance with respect to non-family CEO pay, but the positive coefficient is insignificant. In the rest of the analysis we separate Type 1 and Type 2 industries.

Columns (3) and (4) show that in homogeneous product industries, that is, where managerial effort is less likely to generate high profitability ratios: i) the levels of family and non-family CEOs' pay does not statistically differ, ii) pay is not related to performance and iii) family CEOs' sensitivity does not differ from that of non-family CEOs. This is consistent with Proposition 1, for the part that predicts no differences in the level of CEO pay between family and non-family CEOs and a fixed contract for both a family and a professional manager, i.e. managerial compensations insensitive to firm performance.

Columns (5) and (6) report the results for Type 2 industries. We find that executive pay is positively related to performance, as predicted by Proposition 1, and that the pay level is significantly lower for family CEOs, consistently with Proposition 2. Finally, Column (6) reveals that in Type 2 industries the sensitivity of family CEO pay is significantly higher than for external CEOs. This evidence appears in line with the Prediction 3 whereby the state-dependent pay of family CEOs is more volatile than the pay of external CEOs who are more skilled and are more likely to obtain steadier results when they are incentivized to provide effort. Hence, the sensitivity of their pay to firm performance appears less strong than that of family managers with more mixed and volatile results.

5.3 Endogenizing the choice of the CEO

We now consider that the choice of the CEO, whether a professional manager or one with parental ties with the controlling shareholder (or even the founder), may be affected by the same factors that also influence the choice of the compensation policy, thus generating a potential self-selection based endogeneity problem. To deal with the self-selection bias, or endogenous treatment, we follow the recent literature[6], which adopts a latent variable approach similar to the Heckman procedure, where we first take into account the decision to hire a family or an external CEO (the treatment, or selection, equation, where the *FamCEO* is the binary dependent variable) and then model the outcome equation for *CEO pay*. We thus have:

$$CEOpay_{ijt} = \boldsymbol{X}_{ijt}\delta + \delta FamCEO_{ijt}\,\varepsilon_{ijt}$$

$$FamCEO_{ijt} = \begin{cases} 1, \text{ if } \mathbf{W}_{ijt}\,\gamma + u_{ijt} > 0 \\ 0, \quad \text{otherwise} \end{cases}$$

Where the vector of variables **X** and **W** are used to model the pay equation and the CEO choice, respectively. Results are in Table 4. The reported standard errors clustered at the firm level. The Wald tests at the bottom of the table test the null hypothesis of no correlation between the treatment assignment (Family CEO) errors and the outcome (CEO Pay) errors. We estimate separately Type 1 and Type 2 industries.

In Table 4, for each estimation, we report two columns, the first one for the linear outcome regression and the second one for the maximum likelihood estimation of the treatment, i.e. the determinants of the choice of hiring a family CEO.

INSERT TABLE 4 HERE

[6] See Clougherty and Duso (2015) for a comprehensive review and an empirical survey of the methodological problems that derive from sample- and self-selection endogeneity.

Columns (1) - (4) focus on firms in Type 1 industries. In Column (1) we look at the difference in pay levels while in Column (3) we add the *ROA*FamCEO* interaction. The probability of choosing or keeping a family CEO (Column (2)) is higher in smaller firms and is lower for firms that trade in the STAR segment of the stock exchange, i.e. including companies that comply with more stringent transparency, visibility and performance criteria. Family CEO seems more likely old and less favored by institutional investors (although the negative coefficient is statistically insignificant). Having controlled for the potentially endogenous choice of the CEO, we turn to the outcome CEO pay equation. Comfortingly, the results are very similar to those in Table 3. Within homogeneous product (Type 1) industries, the level of the pay of family and non family CEOs does not differ and, regardless of parental ties, CEO pay is not significantly related to firm profitability.

Columns (5)-(8) focus instead on Type 2 industries where products are differentiated thanks to costly sunk investments in R&D and advertising. We find that family CEOs are typically more mature and more likely to be found in smaller firms as well as in older firms, suggesting that in these firms, the family CEO may indeed be the founder (we are actually collecting information to account for the differences between the founder and the heirs, see also Bukart, Panunzi and Shleifer, 2003). As for the results for the outcome equation, we find that, having accounted for potential correlation between the factors the influence CEO choice and CEO pay, the level of the pay is similar for family and non-family CEOs, at variance with the model's prediction. However, we also find that sensitivity of CEO pay to firm performance is significantly higher for family CEOs, similarly to Column (6) in Table 3 and consistently with the model's prediction.

6. Conclusions

In this paper, we study the incentive mechanisms adopted by family firms to reduce managerial slack, by means of a theoretical model and an empirical analysis. We are motivated by findings

in the recent empirical literature whereby, in contrast with the fundamental tenets of principal-agent theory under moral hazard, family CEO, despite their inside ownership, reveal higher pay-for-performance sensitivity than external managers. Through a theoretical model, we show that the outcome-related compensation structure of family CEOs might depend on their participation constraint rather than on agency problems. In determining the compensation structure, we account for the type of market mechanisms in which the family firm operates. CEO's payment schemes are related to their performance in markets where the product is differentiated, while following a fixed compensation structure when the product is homogeneous.

The evidence we find from descriptive statistics, regression analysis and endogenous treatment regression models, where the choice of the CEO is endogenized matches our theoretical predictions about the role of competition on CEOs' pay. Low return sectors, where the product is homogeneous and competition is stronger, have either family CEO or non-family CEO with a fixed compensation scheme. High return sectors, subject to a lower competitive pressure, have either family CEO or non-family CEO with a pay-for-performance compensation scheme. In low return sectors, the compensation of family CEOs is not significantly different than that of non-family CEOs. Finally, in high return sectors, the compensation of family CEOs has a lower expected value, but higher pay performance sensitivity than the compensation of non-family CEOs.

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Table 1 - Summary Statistics

	Mean	Std. Dev.	Min	Max	N Obs.
Panel A - Full Sample					
Log (Pay)	1021.939	2081.761	91.42	44972.44	925
ROA	0.091	0.066	-0.16	0.38	889
Firm Sales	1900154.139	7737444.679	7795.50	81136448.00	905
Inst. Investor	0.190	0.393	0.00	1.00	962
Firm Age	49.320	35.463	1.00	270.00	963
CEO Age	0.609	0.488	0.00	1.00	963
CEO tenure	8.464	6.577	1.00	34.00	957
CEO age	55.249	9.751	35.00	86.00	958
CEO turnover	0.084	0.277	0.00	1.00	957
Manufacturing	0.854	0.354	0.00	1.00	963
Type 2	0.593	0.492	0.00	1.00	963
Panel B - with Family CEO					
Log (Pay)	821.432	2109.008	113.66	44972.44	556
ROA	0.086	0.068	-0.16	0.32	547
Firm Sales	761416.432	1366398.484	7795.50	9376961.00	553
Inst. Investor	0.168	0.374	0.00	1.00	585
Firm Age	51.128	38.338	1.00	269.00	586
CEO Age	1.000	0.000	1.00	1.00	586
CEO tenure	9.933	6.618	1.00	30.00	585
CEO age	57.225	10.968	36.00	86.00	586
CEO turnover	0.041	0.199	0.00	1.00	585
Manufacturing	0.906	0.292	0.00	1.00	586
Type 2	0.640	0.480	0.00	1.00	586
Panel C - with Non-Family CEO					
Log (Pay)	1324.058	2005.250	91.42	24043.39	369
ROA	0.099	0.062	-0.10	0.38	342
Firm Sales	3689136.958	12083100.054	38269.25	81136448.00	352
Inst. Investor	0.225	0.418	0.00	1.00	377
Firm Age	46.509	30.298	1.00	270.00	377
CEO Age	0.000	0.000	0.00	0.00	377
CEO tenure	6.153	5.812	1.00	34.00	372
CEO age	52.137	6.300	35.00	69.00	372
CEO turnover	0.151	0.358	0.00	1.00	372
Manufacturing	0.772	0.420	0.00	1.00	377
Type 2	0.520	0.500	0.00	1.00	377

Note. CEO pay and Firm Sales are in Thousands of 2000 constant Euro.

Table 2
Mean differences in share of Family CEO, CEO pay and ROA

Panel A

	Total obser-vations	**Type 1**	**Type 2**	**Difference** (p-value)
% of Family CEO		**53.8%** (49.92)	**65.7%** (47.52)	**-11.84*** ** (0.000)

Panel B

CEO Pay	**Total obser-vations N = 925**	**Type 1 N = 377**	**Type 2 N = 548**	**Difference** (p-value)
Total observations		**878.5 (1852.2)**	**1120.6 (2222.3)**	**-242.1* (0.082)**
Non-Family CEO N=369	**1324.0 (2005.2) 1.51**	1247.1 (2544.3)	1349.2 (1340.2) 0.99	-147.1 (0.482
Family CEO N=556	**821.4 (2019.0) 2.45**	555.7 (748.9)	971.9 (2567.8) 2.64	821.4** (0.025)
Difference (p-value)	**502.6*** (0.000)**	691.4*** (0.000)	422.3** (0.033)	

Panel C

ROA	**Total obser-vations**	**Type 1**	**Type 2**	**Difference** (p-value)
Total observations		**0.079 (0.063)**	**0.100 (0.067)**	**-0.021*** (0.000)**
Non-Family CEO	**0.099 (0.062)**	0.101 (0.056)	0.098 (0.068)	0.003 (0.605)
Family CEO	**0.086 (0.068)**	0.060 (0.064)	0.0101 (0.066)	-0.041*** (0.000)
Difference (p-value)	**0.013*** (0.005)**	0.041*** (0.000)	-0.003 (0.614)	

Note: Standard deviations and p-values in parentheses. CEO pay is in Thousands of 2000 constant Euro. ***, **, * denote significance of the mean differences at 1%, 5% and 10%.

Table 3 –
Level and performance-sensitivity of CEO pay for family and non-family CEOs

Total Compensation	All firms		Type 1		Type 2	
	(1)	(2)	(3)	(4)	(5)	(6)
ROA	1.058*	0.621	0.392	1.072	1.272*	-0.178
	(0.565)	(1.010)	(0.650)	(1.544)	(0.765)	(1.103)
FamCEO	-0.169	-0.212	0.038	0.103	-0.262**	-0.412***
	(0.132)	(0.149)	(0.214)	(0.212)	(0.124)	(0.145)
ROA*FamCEO		0.642		-0.986		2.117*
		(1.148)		(1.731)		(1.201)
Log(Sales)	0.265***	0.266***	0.332***	0.332***	0.198	0.208*
	(0.098)	(0.098)	(0.114)	(0.111)	(0.133)	(0.116)
CEOage 62 dummy	-0.055	-0.056	0.101	0.092	-0.184*	-0.205*
	(0.082)	(0.083)	(0.099)	(0.092)	(0.111)	(0.112)
CEO tenure	0.025*	0.025*	0.008	0.007	0.033**	0.034**
	(0.015)	(0.015)	(0.024)	(0.024)	(0.016)	(0.016)
CEO turnover	-0.013	-0.016	-0.040	-0.035	-0.004	-0.015
	(0.060)	(0.060)	(0.126)	(0.125)	(0.055)	(0.054)
Institutional Investors	-0.208	-0.212	0.125	0.141	-0.392	-0.393
	(0.295)	(0.294)	(0.145)	(0.153)	(0.437)	(0.424)
Firm and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	854	854	346	346	508	508
R-squared	0.172	0.173	0.168	0.170	0.237	0.251
Number of nfirm	81	81	35	35	46	46

Fixed effects estimations. Robust standard errors in parentheses. ***, **, * denote significance of the mean differences at 1%, 5% and 10%.

Table 4 -Level and performance-sensitivity of CEO pay for family and non-family CEOs

	Type 1		Type 1		Type 2		Type 2	
Dependent variable:	Log (Pay)	FamCEO	Log (Pay)	FamCEO	Log (Pay)	FamCEO	Log (Pay)	FamCEO
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROA	0.718		2.149		1.136		-1.042	
	(0.926)		(1.415)		(0.888)		(0.876)	
1.FamCEO	-0.840		-0.568		0.394		0.025	
	(0.599)		(0.797)		(0.260)		(0.307)	
1.Famceo#c.ROA			-2.551				3.332**	
			(1.870)				(1.402)	
Log(Sales)	0.361***	-0.229*	0.372***	-0.224*	0.451***	-0.361***	0.452***	-0.349***
	(0.085)	(0.129)	(0.093)	(0.128)	(0.055)	(0.123)	(0.057)	(0.123)
CEOage 62 dummy	-0.153		-0.183		-0.305**		-0.318***	
	(0.188)		(0.226)		(0.120)		(0.115)	
CEO tenure	0.008		0.007		0.038***		0.038***	
	(0.014)		(0.014)		(0.014)		(0.014)	
CEO turnover	-0.123		-0.091		0.059		0.022	
	(0.140)		(0.136)		(0.097)		(0.098)	
STAR	-0.163	-1.673***	-0.153	-1.665***	-0.185	0.129	-0.188	0.150
	(0.277)	(0.398)	(0.360)	(0.402)	(0.176)	(0.358)	(0.168)	(0.355)
Institutional Investor	-0.137	-0.361	-0.145	-0.359	0.105	-0.514	0.082	-0.517
	(0.192)	(0.508)	(0.206)	(0.528)	(0.157)	(0.362)	(0.155)	(0.360)
CEO_age		0.046**		0.046**		0.032**		0.033**
		(0.019)		(0.021)		(0.014)		(0.014)
Firm_age		0.003		0.003		0.014**		0.013**
		(0.006)		(0.008)		(0.005)		(0.006)
Wald (All) *p-value*	329.50 (0.000)		376.14 (0.000)		494.64 (0.000)		655.77 (0.000)	
Wald test of no corr. between outcome and treatment (p-value)	0.77 (0.381)		0.33 (0.564)		9.23 (0.002)		8.28 (0.004)	
Observations	346	346	346	346	508	508	508	508

Notes. Maximum likelihood estimates of endogenous treatment-regression models. Log of CEO pay is the dependent variable in the outcome equation, and (the probability of) Family CEO is the treatment variable. We report the Wald test of joint significance of all regressors in the outcome regression and the Wald test of the null hypothesis of no correlation between the treatment assignment errors and the outcome errors. Standard errors in parentheses are robust and clustered at the firm. *** $p<0.01$, ** $p<0.05$, * $p<0.10$