Owner–management, firm age and productivity in Italian family firms

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Abstract.
Using Total Factor Productivity (TFP) as a measure of corporate performance, we find that Italian family-run firms are less productive than firms run by outside managers and the result is robust to potential endogeneity of management regime. This difference tends to vanish when the age of the firms is taken into account.

JEL classification: D24, G34
Keywords: TFP, Family firms, Management

1. Introduction

A vast literature studies the behaviour and performance of family firms (Schulze and Gedajlovich, 2010; Miller et al., 2007; Carney, 2005; Chrisman et al., 2010). The evidence has been mixed (Rutherford et al., 2008) and the relationship between family involvement and performance is still controversial. As De Massis et al. (2012) point out, some studies show that family firms outperform non family firms in a variety of environmental settings (Anderson and Reeb, 2003; Andres, 2008; Lee, 2006; McConaughy et al., 2001; Sraer and Thesmar, 2007), whereas others suggest that family firms persistently underperform when compared to their non family counterparts. (Villalonga and Amit, 2006; Cucculelli and Micucci, 2008; Block et al., 2011). Also, a number of studies demonstrates that the relationship between family involvement and

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firm performance is complex, non linear and multifaceted (Barth et al., 2005; Miller et al., 2007), suggesting the influence of various factors, and the empirical results depend very much on the measure of performance used in the analysis (Gómez-Mejía et al., 2007)

The issue connecting the family ownership-management and performance is particularly important in Italy, where the ownership and the control of companies are highly concentrated in the hands of families and individuals. However, despite the relevance of the topic and the number of papers analysing the Italian case (Bandiera et al., 2008; Barba-Navaretti et al., 2008; Bianco et al., 2013; Bloom et al., 2008; Cucculelli and Micucci, 2008; Destefanis and Sena, 2007; Sciascia and Mazzola, 2008; Giacomelli and Trento, 2005; Mengoli et al., 2009), no research has examined the relationship between family management and Total Factor Productivity (TFP). The only exception to this is the work of Lippi and Schivardi (2009) which analyses the link between productivity and process of manager selection. In this paper, we shall try to fill this gap.

The aim of this study is to empirically assess whether firms run by a member of the owning family are more or less productive than firms run by outside managers**,** using TFP as a measure of firm performance, rather than firm value or profitability as in other studies. Following Bertrand and Schoar (2006), by focusing on firm efficiency we aim to contribute to resolving the question whether this particular organisational form – i.e. family business - is inherently inefficient, as some literature assumes, or whether its level of efficiency rather reflects the company life-cycle, driven by entrepreneurial factors. The main idea is that family firms benefit from an age-related learning process that helps them to improve efficiency over time more than non family firms. This is because the (hired) CEOs in non-family firms usually start with a set of competencies and abilities already aligned with conditions facing the company at the beginning of

their tenure, whereas family CEOs do not. Founders and family successors learn how to run the business over time and their experience - conditional on firm survival – grows with age. To our knowledge, no published paper has explored this issue in the context of productivity in family firms, in particular, for the Italian case.

This study makes two other contributions. First, we provide preliminary evidence on the positive impact of firm age on TFP in family-managed firms, consistent with the hypothesis of a progressive improvement of the managerial factor over time**.** Second, we contribute to the debate on the difficulties of the Italian economy by focusing on the role of family management as a potential explanatory factor of the overall performance of the economy. In this sense, this paper adds to the literature on family firms and economic development by disentangling the source of differences in efficiency levels depending on the type of ownership structure, and by providing an economic rationale underlying the process of economic development.

The empirical evidence is based on data from the Xth Capitalia-UniCredit survey (2008) collected through a questionnaire sent to a sample of Italian manufacturing firms and complemented with balance sheet data. TFP is estimated at firm level by using the Levinshon and Petrin (2003) approach. We compare the TFP of family management to that of firms run by outside managers using standard ordinary least squares over the period 2004-2006. We control for sources of heterogeneity and potential endogeneity of management regime (Villalonga and Amit, 2006).

The findings demonstrate that outside managers outperform owner-managers, though the difference between the two is slight. Yet the differences tend to decline when the age of the company is taken into account. Older family firms show a significant improvement in the efficiency levels compared to non-family owned and non-family

managed firms, and this points to the fact that family managers are able to successfully adapt to industry conditions over time.

The work is organized as follows. Section 2 presents the theoretical background. The empirical model and results are presented in Sections 3 and 4. Section 5 concludes, while the Appendix provides information on the methodology used to estimate TFP.

2. Literature and theoretical framework

2.1 Owner management and performance

A number of studies have investigated the impact of family influence on the performance of a firm (for a survey of the literature see Chrisman et al., 2010; Schulze and Gedajlovich, 2010). The relevant literature is, in many ways, divided on the view that concentrated family ownership as well as owner-management may have beneficial economic consequences. Differing perspectives are used - agency theory, stewardship theory and resources based view - each revealing evidence for and against the benefits of family involvement (Chrisman et al., 2005; Habbershon and William, 1999; Miller and Le Breton-Miller, 2006, 2009).

As to the distinction between owner-management and non-owner management, agency theory would predict a positive effect: the firms run by family managers will benefit from lower agency costs as there exists an alignment of interests and minimal information asymmetry between owners and managers (Chrisman et al., 2004; Gomez-Mejia et al., 2001; Jensen and Meckling, 1976). Yet this effect may be offset by the costs of family management.

Researchers applying agency theory to family businesses have proposed both altruism and the tendency for entrenchment as the fundamental forces distinguishing family and nonfamily businesses in terms of agency costs (Chrisman et al., 2004). Family

management generates agency issues such as adverse selection and opportunism, exacerbated by unbalanced, nonreciprocal altruism within the family (Schulze et al., 2003) that could affect the way that these businesses mobilize resources. Specifically, family businesses might hold stronger, more long-term commitments to family-based resources, irrespective of resource fit, thus sacrificing business performance for family stability. If all else were equal between family and nonfamily businesses, many family businesses, given their preference for sourcing management talent and core funding from the family gene pool, could be driven out of business on account of their as honestly incompetence or free-riding, or entrenched family managers may tend to mismanage or undermanage the business (Levie and Lerner, 2009; Schulze et al., 2003; Westhead and Howorth, 2006). This situation generally leads to a lower quality among owner-managers than outsider managers and may reduce productivity. Moreover, family run firms tend to be characterised by prudence in strategic decision-making, due to the close connection between family and firm assets. This risk aversion may prevent owner-managers from adopting new and productivity-enhancing management principles, as they are considered too risky or break with business and family traditions. Therefore:

Hypothesis 1.a: family firms mobilize human and financial resources in a suboptimal fashion, which should lead to weaker performance – in terms of efficiency - when compared to that of their nonfamily counterparts

Other theories have been employed to explain the positive performance of family businesses, including stewardship theory (Donaldson and Davis, 1991; Miller et al., 2008) and the concepts of "familiness" (Habbershon and Williams, 1999) and family capital (Hoffman et al., 2006). These theories focus more on social capital than on

human or financial capital as an explanation of performance, but they fit well with the resource-based view of competitive advantage.

Stewardship theory posits that many leaders and executives identify themselves with the organization (Davis et al., 1997). This attitude will be especially prevalent in family businesses where leaders are either family members or emotionally linked to the family. There may be a strong incentive for family owners and executives, therefore, to act in the long-run interests of the company and all its stakeholders by investing in new processes, products and marketing). The family managers are usually quite secure in their jobs and operate with the expectation that they will be in office for a long time and, because the family name, fortune, and reputation are at stake, family CEOs may be more committed to the business and willing to do whatever is needed to make it strong (Donaldson and Davis, 1991). This may engender a number of strategic outcomes that bring superior returns in the long term. Due to these stewardship concerns, investments in the future, and refusal to be distracted by short-term expedients, family managed firms will have a better chance of developing distinctive core capabilities. Barney (1991), as noted, has argued that firms enjoy competitive advantage when they develop valuable resources for which there are no ready substitutes.

This farsighted, focused investment approach builds on path dependencies that keep a firm's capabilities growing cumulatively, thereby making its learning trajectory especially tough for rivals to imitate (Miller, 2003). Fast-tenure executives will find such programmatic investments more difficult to make. However, other researchers suggest that many of the advantageous attributes can become disadvantages, due to conflicts of interests within the family, or distort incentives due to altruism or kinship behaviour (Gomez-Mejia et al., 2001; Schulze et al., 2002).

The resource-based theory of the firm and the knowledge based view provide a powerful tool for understanding the nature and transfer of knowledge within the family business, which becomes the basis for developing competitive advantage over nonfamily businesses (Barney 1991; Grant, 1991; Peteraf, 1993).

Family firms have been described as unusually complex, dynamic, and rich in intangible resources (commitment, trust, reputation, know-how, and so on), that can bring them competitive success based on the tacit knowledge embedded in these resources (Cabrera-Suarez et al., 2001).

However, possessing valuable, rare, inimitable and non-substitutable resources alone does not automatically lead to a sustainable competitive advantage (over a reasonable period). Rather, the firm's resources "must be managed appropriately to produce value" (Sirmon and Hitt, 2003). Accordingly, Eisenhardt and Martin (2000) suggest new value-creating strategies are generated by the process of recombining resources. This is captured in the dynamic capabilities approach, which examines how entrepreneurial change is promoted and new value created in organizations over time (Teece et al., 1997), including family businesses (Chirico and Salvato, 2008; Salvato and Melin, 2008).

Knowledge creation can be well developed in family firms due to the high level of emotional involvement of family members and the socially intense interactions fuelled by trust not only between family members but also with external parties (Cabrera-Suarez et al., 2001; Chirico, 2008). Tagiuri and Davis (1996) argue that emotional involvement, the lifelong common history and the use of a private language in family businesses enhance communication between family members. This allows them to exchange knowledge more efficiently, and with greater privacy, than non-family firms and to develop specific knowledge and dynamic capabilities for resource-recombination

which remain within the family and the business through the generations (Chirico and Salvato, 2008; Salvato and Melin, 2008). Accordingly, dynamic capabilities are often depicted as learned and stable patterns of collective activity, which materialize from social ties between individuals, that is, through social capital (Nahapiet and Ghoshal, 1998). Even if a number of previous studies have indicated that family firms also face challenges to keep the long term positive relationship between family social capital, dynamic capabilities, and value creation (Salvato et al., 2010), other authors suggest that the family firm is a form of governance that may enable such actions (among others see Arregle et al., 2007; Chirico et al., 2011; Chirico et al., 2010; Sirmon and Hitt, 2003). In other words, high levels of family social capital should support the family firm to generate new value over time. Therefore:

Hypothesis 1.b: "Familiness" induces the family firm to generate new skills over time that can compensate for weaknesses in human and financial capital, hence family firms outperform - in terms of efficiency - non family firms.

2.2 Firm age and performance

Several studies have examined the ways in which age influences strategic choices and company performance over time (Jovanovic, 2001; Levesque and Minniti, 2006; Marshall et al., 2006; Sorensen and Stuart, 2000). This literature shows that firms do not perform uniformly over their life-cycle. On the one hand, experience fosters firm performance, as competence-enhancing activities implied by ageing favour the implementation of established routines (Acemoglu et al., 2006), or allow firms to better recognise and exploit new technological opportunities (Cohen and Levinthal, 1990). On the other hand, ageing can negatively affect firm performance because of inertia (Miller and Shamsie, 2001). Success induces firms to codify their approach with the proper

organization and processes. This behaviour seems to increasingly entangle firms in structural and process-related rigidities that are difficult to shed (Leonard-Barton, 1992) and induces them to ignore innovation signals from the marketplace (Agarwal and Gort, 2002). Moreover, some family firms tend to develop cultures that make their organizations inflexible, resistant to change and inclined to stick to path-dependent traditions, thereby becoming less favourable to new proactive entrepreneurial strategies (Hall et al., 2001). On balance, it is unclear whether the age factor helps firms prosper or not.

The existing empirical evidence suffers from a crucial drawback, which concerns the distinction between founder CEOs and non-founder CEOs. Almost all the empirical studies have examined the different contribution of tenure in firms managed by non-founder CEOs, that is professional managers who join the company for a specific period. When selecting an external CEO, the board of directors "attempts to find someone whose competencies and experience align with conditions facing the firm at the time. As a result, the new leader will typically adopt a paradigm that is more appropriate than a randomly selected executive" (Henderson et al., 2006). In this situation, the impact of ageing on firm performance is expected to decrease with time, unless the hired CEO possesses an exceptional learning ability that allows him to perfectly reshape approach as the external environment changes. Unlike hired CEOs, founders do not usually start their firm with the best paradigm for current conditions. They usually start with a considerable knowledge deficit and steadily learn about their jobs, organisations and environments as they go along (Sorensen and Stuart, 2000). An intense learning process starts after foundation and increases with tenure, bringing the firm into a closer rapport with market conditions, or – in the opposite case - to an early exit. Therefore, learning and adaptation play a crucial role in the case of family firms,

whose management regularly passes from founders to successors over the entire life cycle of the firm.

Age plays a crucial role when a learning process is at work. Industries vary considerably in the degree to which firm performance is determined by learning from direct operating experience or learning-by-doing (Balasubramanian and Lieberman, 2010). In a model of active learning in which firms change their pre-entry strategy choices in response to market feedback, Geroski (1995) argued that the growth- and survival prospects of firms depend on their ability to learn about the environment and to link their on going strategy to the changing environment. Accordingly, ageing does affect the performance of long-standing firms when they need to adjust their production- and financial policies (Reid, 1991), or when they face external turbulence with different degrees of flexibility and speed in strategic decision making (Power and Reid, 2005).

Dynamic effects related to learning and experience play likewise an important role in explaining efficiency differences across firms. Different models emphasize different factors determining firm dynamics: Jovanovic (1982), the learning process about innate efficiencies; Ericson and Pakes (1995), success in R&D expenditures; Cabral (1995), sunk cost in building production capacity. Another relevant distinction within this literature is the difference between active learning – firms actively invest in learning – as in Ericson and Pakes's model, and passive learning – just staying in business increases firms' awareness of their innate efficiency – as in Jovanovic and Cabral models, a distinction examined in Pakes and Ericson (1988). As suggested by passive learning models of competitive selection (Jovanovic, 1982), firms learn about their own efficiency level over time and adjust their scale of operations accordingly, with inefficient firms exiting and more efficient ones thriving. This passive learning model implies systematic differences in efficiency, in the sense that larger firms tend to be

more efficient, once the age factor has been considered. Moreover, as the process of development and effective deployment of technology is an active learning process, older firms should be able to organise production more efficiently over time (Pakes and Ericson, 1998). This is what we can expect from older family firms, that are able to make up for their initial handicap in efficiency due to founder business inexperience. A considerable body of literature on family firms shows how family management can improve over time as new generations of educated and motivated family members join the company and adopt superior managerial tools and practices (Bloom and Van Reenen, 2008). On the other hand, the risk aversion that usually shapes the behaviour of multi-generational family firms may result in unwillingness to grow, dominance of non-economic over economic goals (Gómez-Mejía et al., 2001, 2007) and especially focus on productivity rather than innovation. This is in line with Carney's (2005) argument on the difficulty family firms face in industries where technological development is critical for success. Therefore:

> *Hypothesis 2: Firm age has a positive impact on family firm efficiency vis-à-vis non family firms; hence older family firms outperform non family firms.*

2.3 Performance of family firms and the Italian case

From a theoretical point of view, the effect of family management on firm performance remains an open issue. Conflicting ideas have evoked a number of empirical studies of the relationship between family management and firm performance. Even the empirical evidence provides no uniform answers.

That said, many contributions on different countries show that family firms are more profitable or show higher market valuation when managed by the founder. On the other hand, negative effects emerge when the firm is run by a descendant (Adams et al., 2009;

Anderson and Reeb, 2003; Pérez-González, 2006; Villalonga and Amit, 2006 for US; Bennedsen et al., 2007 for Denmark; Bertrand et al., 2008 for Thailand; Cucculelli and Micucci, 2008 for Italy). Exceptions to this consensus are found in studies on France (Sraer and Thesmar, 2007), Italy (Favero et al., 2006) and continental Europe (Barontini and Caprio, 2006) which find that family owned firms, first or later generations, perform better than firms with widely held ownership structures. Hansson et al. (2011) find for Finland a positive effect associated with a family CEO and this is more likely when the CEO is the founder, but the participation of a larger number of family employees is negatively related to performance.

Some papers have analysed the performance of Italian family firms using market-based and accounting-based performance. Most of these have found that family firms and family-managed firms perform worse (Caselli and Di Giuli, 2010; Sciascia and Mazzola, 2008). Destefanis and Sena (2007) use the technical efficiency as a measure of the performance of Italian firms and find that ownership concentration and membership in a pyramidal group turn out to have a positive impact on technical efficiency. Other studies focusing on the founder effect provide mixed results. Cucculelli and Micucci (2008) find a positive founder effect followed by a marked drop in the post-succession performance. Amore et al. (2011), focusing on the question of succession, found that the appointment of non-family professional CEOs leads to a significant increase in the use of debt to sustain investment needs without incurring any dilution of control associated to equity issuances. On the other hand, Favero et al. (2006) show that family owned firms, first or later generations, perform better than firms with widely held ownership structures when market measures of performance are used. Other papers focus on management practices. Bloom et al. (2008) show that Italian entrepreneurs are reluctant to formally hand over the management of the firm to outsiders and this may have severe

productivity implications. In the analysis of the ways in which managers are hired and incentives offered, Bandiera et al. (2008) confirm these findings. Other works, that focus on firm behaviour, stress how the greater risk aversion of Italian family firms can influence investment decisions (Bianco et al., 2013), the decision to enter foreign markets (Barba-Navaretti et al., 2008) or the ability to seize market opportunities (Cucculelli and Marchionne, 2012).

The few empirical studies that have analysed the impact of family management on productivity have provided mixed results. Palia and Lichtenberg (1999) and Martikainen et al. (2009) find a positive effect for US firms. Barth et al. (2005) document a negative relationship between family management and firm productivity for Norway. As far as the authors are aware, similar studies for Italy have yet to be seen, the only exception being the work of Lippi and Schivardi (2009), who use TFP as a measure of performance. However, their paper tests whether the owners of the firm enjoy returns from a private employment relationship with the managers, regardless of whether or not managers are owners of the company.[1] In this paper, we shall contribute to this strand of the literature by studying whether, and if so to what extent, the family ownership and management affect the firm efficiency – as measured in terms of Total Factor Productivity - and the role played by firm age in shaping the behavior of family managers over time.

[1] Lippi and Schivardi (2009) use a sample drawn from Bank of Italy's annual INVID survey of manufacturing firms that only consider firms with at least 50 employees. In our sample, we consider firms with at least 11 people as this better represent the structure of Italian industry dominated by small businesses. In addition, the authors consider the period 1984-1997 before the legislative changes introduced in the early 2000s to upgrade the legal framework in Italy as regards financial and economic markets.

3. Empirical Analysis

3.1 Data Description

The firm level data used in this paper come from the Xth UniCredit-Capitalia survey (2008) of Italian manufacturing firms. The survey covers a sample of firms with 11-500 employees and all firms with more than 500 employees. The Xth Capitalia-UniCredit survey questionnaire refers to 2004-2006 and contains information on firm structure, ownership, work force and investments in physical and technological capital, as well as the degree of internationalization. Data from balance sheets refer, instead, to 1998-2006. In the literature, there is no single definition of a family business (Astrachan and Shanker, 2003; Chua, 1999; Miller et al., 2007). We define family firms as those controlled or owned by an individual or a family. Our information on owner-management is based on response to the following question included in the Xth Capitalia-UniCredit questionnaire (2008): *If your company is controlled or owned by an individual or a family who runs the company? (1) the person who owns or controls the company or a member of the family that owns or controls the company; (2) a manager hired from outside the company; (3) a manager hired from inside the company*. As regards management, we distinguish three types of firms: (i) *family management*, i. e. family firms run by a family member; (ii) *outside management in family firms*, i.e. family firms run by a manager outside the family; and (iii) *non-family firms* which are evidently run by a manager, (*outside management in non-family owned firms*).

Table 1 presents some descriptive statistics of the sample of firms used in the empirical analysis[2]. In particular, it presents the distribution of firms by ownership (family and

[2] Although the original Capitalia-Unicredit data refer to 5,100 firms, we use a sample of 2,920 firms which is obtained after carrying out a data cleaning procedure. The firms with negative values of value added have been eliminated from the original archive. Moreover, in order to eliminate *outliers*, firms with a growth rate of value added and of employees below the first or above the ninety-ninth percentile of the

non family firms) and for family firms by management type (family management, outside management in family firms). The values are reported on the basis of firm characteristics, such as sector, size, territorial distribution and age. The sample is comprised of 2,920 firms: family firms make up 63% of the sample (1,835 out of 2,920 firms) and 90% of these are run by a family member (1636 out of 1835). This evidence confirms that family firms play an important role in the economy and family members tend to be actively involved in their management (Bank of Italy, 2009; Giacomelli and Trento, 2005), highlighting the difference between Italy and other countries. The difference lies not so much in the importance of family groups within the economy as this phenomenon is common in other countries (La Porta et al., 1999; Faccio and Lang, 2002), but rather in the fact that family management is the dominant form of management (Bianchi et al. 2005; Bloom et al., 2008; UniCredit, 2008). The firms are concentrated in traditional sectors (50% for firms run by family, 44,2% for family firms managed by outside manager, and 46.5% when just considering non family firms) and in highly specialised sectors, while the incidence of high-tech firms is residual. From a regional perspective, two thirds of the sample is located in the North of Italy, and the proportion of small firms is high: the companies run by a family manager show a higher share of small and medium firms (only 6.4% have over 250 employees, while this figure rises to 13.1% and 12.3% for family and non family firms run by outside manager, respectively). Moreover, a higher share is observed for adult firms, i.e. of 20-40 years, (57% for family run firms, 47,2% for family firms managed by outsiders and 50,7% for non-family firms). Only a small number of firms are listed (0.7% for family run firms and 3.5% for firms run by a non-family manager and 3% for non-family firms) which

distribution have also been eliminated. Finally, when building the sample used in estimating TFP, we excluded firms for which at least 7 years data regarding the number of employees was not available.

indicates the preference for control and the consequent reluctance to look for outside investors.

What clearly emerges from table 1 is that the TFP in firms run by a family member is lower both overall and for all the sub-samples of firms considered: listed and non-listed, Pavitt sector, size, location and age. Moreover, for family-managed firms, value added, employees, physical capital, white collar share and labour productivity (value added/number of employees) are, on average, lower than in firms run by outsiders.

3.2 Econometric Specification

Our empirical analysis addresses two main issues. The first is to disentangle the effect of family management on firm productivity; the second is to investigate the impact of the firm's age on efficiency in family firms. To test whether firms run by a member of the owner family are more or less productive than firms run by outside managers, we estimate a TFP equation of the form:

$$\omega = \beta_0 + \beta_1 D_{FM} + \beta_2 Age + \sum_{j=1}^{k} \gamma_j X_j + \sum_{s=1}^{v} \eta_s D_s + \varepsilon \qquad [1]$$

where ω is the firm TFP (in logarithm) estimated over the period 1998-2006 by using Levinsohn and Petrin's approach, D_{FM} is a binary variable taking the value one if the firm is run by a member of the owner family and zero otherwise; *Age* is the log of firm's age in 2006; *X* a vector of firm-level variables highlighted by previous literature as important drivers of TFP and D_s a set of sector dummies, grouping firms according to both the Pavitt taxonomy and the 2-digit level of ATECO classification[3], and territorial area dummies. The parameter β_1 measures whether firms managed by a

[3] ATECO is the classification of economic activities adopted by Italian Statistical Institute. This classification is the national version of the European nomenclature, Nace Rev. 2.

member of the owner family are more or less productive than non-family-managed firms. Firm characteristics include: size measured by the 2004-2006 average employment (in logarithm); a dummy variable equal to one if a firm is listed on the stock market and the share of white collar workers on total employment in 2006 as a proxy for human capital. Correlation coefficients among the firm-level predictors are very low, thus confirming that these variables capture distinct characteristics of firms and that multicollinearity is not a major issue (the correlation matrix is available upon request). Taking into account results from existing empirical literature on firm efficiency and governance (Barth et al., 2005; Barbera and Moore, 2012; Cucculelli and Marchionne, 2012), we control for the capital intensity at firm level (proxied by the assets-per-employee ratio) and for ownership concentration measured as the share of capital of the first shareholder. Equation [1] is estimated by standard ordinary least squares considering average values of 2004-2006 period for TFP.[4] We use TFP and employment in the form of three-year averages over the period of the survey (2004-2006) to limit influence of shocks and measurement errors in specific years. Moreover, the use of the three-year averages limits the extent of missing data., Nevertheless the results using 2006 values (not reported here) are very similar.

4. Results

4.1 Owner-management

Table 2 reports the empirical estimates from the TFP equation on all manufacturing firms. We found that family-managed firms are, on average, 5.2% less productive than

[4] This equation probably suffers from omitted variable problems since unit heterogeneity is not considered. One way to allow for unobserved heterogeneity is the fixed effects model. However, panel data analysis cannot be performed, due to the lack of time series in management variables. Pindado et al. (2011) have the same limitation for ownership information for each company which they overcome by merging ownership data from one single year with data from several years. They assume that the ownership structure of corporations tends to be relatively stable over time. Unfortunately, we cannot adopt this solution in this case since other independent variables also refer to the year 2006 only.

non-family firms when we control for firm size, age, listing on the Stock Exchange, Pavitt sectors and location (model 1)[5]. By adding human capital (model 2), we get a picture of the sensitivity of the relationship between family management and productivity to differences in human capital. The productivity gap decreases by a 1.2 percentage point (b=-0.040; p<0.01) and this could reflect the fact that firms run by a family are less intensive in human capital. This result implies the assumption of equality of human capital parameters for family-managed and non family-managed firms (Barth et al. 2005), an assumption that we have tested by introducing an interaction effect between the white collar share and D_{FM}. Since the coefficient of this interaction is statistically non-significant, we can accept the hypothesis of the equality of human capital parameters. We have omitted this result from table 2 for brevity. In model 3, the family management relationship is not altered by the inclusion of industry dummies at the level of ATECO sub-sections (instead of Pavitt classification). Finally, in model (4) we check the impact of family management on firm efficiency by adding two additional controls: capital intensity and equity concentration. In both cases, the negative impact of family management on efficiency remains significant, albeit slightly lower than that observed in previous estimates (b=-0.036; p<0.01). As the estimates provide statistically significant results for these controls, we decided to include these two variables in the subsequent analysis.

At this stage, the estimated results show that family management has a negative impact on efficiency – as measured by TFP – which ranges from -3.5% to -5.2% according to the different specifications, and that is slightly lower than estimates from Barth et al. (2005) and Martikainen et al. (2009).

[5] Percentage differences in TFP can be obtained as $\left[\exp(\beta_1)-1\right]*100$, where β_1 is the estimated coefficient associated to the management regime dummy

When it comes to the impact of firm age, model 5 clearly shows that the negative effect of family management on TFP vanishes with age, since family-managed firms become more and more efficient as they mature. The interaction variable between family management and age is positive and highly significant ($b=0.066$; $p<0.01$), and points to the crucial role of age in explaining TFP levels by management type. This effect is statistically significant and also economically relevant, thus implying a time-dependent ability of family managers to improve firm efficiency compared to outside managers. In model 6 of table 2, we fit a quadratic function of age but the coefficient of age-squared is not significantly different from zero.

Table 3 tests the impact of age on efficiency by firm ownership and management separately. The total sample is split in three sub-samples: 1,389 family-owned and managed firms, 166 outside managed family firms and 873 professionally managed non-family firms. Models (1) to (3) test the linear impact of age on TFP; models (4) to (6) present separate estimates by management types with classes of age (cohorts) entering the model as a dummy. The missing class is that of younger firms (<20 years old) which are highly likely to be run by the founder, at least in the family managed firms.

Model (1) - table 3 shows that age has a positive and significant impact on family owned and managed firms ($b=0.043$; $p<0.05$), thus suggesting that the improvement in the age-performance relationship maintains a linear upward slope. Moreover, model (4) in table 3 shows that the positive age-dependent effect is more likely to be observed in older family firms ($b=0.059$; $p<0.05$). Therefore, well-defined routines and processes appear to be a crucial target for late-generation family managers, who aspire for efficiency when they address the organizational fits of the company with the economic environment. These results are in accordance with the idea that firms and managers

discover over time what they are good at and learn to be more efficient (Arrow, 1962; Jovanovic, 1982; Ericson and Pakes, 1995). They specialize and find ways to standardize, coordinate, and speed up their production processes, as well as to reduce costs and improve quality. All these time-dependent processes are more likely to be observed in those firms which are able to reap the benefits of the continuity of managerial factor over time, such as family run firms. This is also consistent with the view that older family firms focus more on productivity than on innovation, as they are less concerned in seizing market opportunities than their non-family counterparts (Cucculelli and Marchionne, 2012).

The estimates for outside managed family firms (n = 166) in model (2) do not show any significant relationship between age and firm performance. However, model (5) shows that a negative impact of outside management is found in firms in the 20-40 year range: this implies the existence of trigger events – such as succession - which induce, or are induced by, a decline in firm performance, thus generating a U-shaped relationship between firm age and performance.

Finally, the significant decline in efficiency as the firm ages (-0.031, p=0.10) found in professionally managed non-family firms (model 3) suggests a progressive decline in managerial performance over time, supported by negative - albeit not significant - coefficients in older age cohorts. These results are in accordance with the hypothesis of a decline in the alignment of hired CEO competencies and abilities with conditions facing the firm at the time of initial involvement, or with the hypothesis of a preference for maximizing sales - as the managerial theory of the firm would predict – rather than following a profit maximization approach driven by efficiency, as family shareholders would prefer.

4.2 Robustness

If the decision to run the firm or to hire an outside manager in family firms is correlated with unobservable variables that affect TFP, a problem of endogeneity could arise and standard regression techniques could lead to biased and inconsistent estimators. To check the potential bias in the management-performance relationship, we estimated a treatment effect model that allows us to consider the effect of an endogenously choice binary treatment on another endogenous continuous variable, conditioned two sets of independent variables (Greene, 2000).[6] We estimated a model where the sample is divided into treated (owner managed family firms) and untreated firms (family firms run by outside managers), and the treatment (family management) is an endogenous process (see Cong and Drukker, 2000, for details). In the first step, we estimated a probit model for the probability of a firm being managed by a family (the treatment equation). In the second step, we estimated the TFP as a function of the "treatment" variable and the other independent variables. For the probit model, the regressors include all the variables used as controls in the OLS estimates, plus a dummy variable which is equal to one if, in the survey, the first stockholder claims to participate in an agreement to vote. We consider this variable as a proxy for the family's preference for control and, thus, a determinant of the family's decision to keep the management in their hands. In the data set, 1008 family-owned firms participate in an vote agreement, and 91.6% of these are managed by a member of the family. In table 4 we present the treatment effect model along with lambda parameter that verifies the presence of endogeneity in the original model[7]. Since the lambda coefficient is not significant, we

[6] We used the treatreg subroutine of the Stata package (see Cong and Drukker, 2000, for details). Miller et al (2007) use the same procedure to correct for endogeneity different measures of family businesses.

[7] The lambda parameter is $\lambda = \sigma\rho$ where ρ is the correlation between error term of equation [1], ε, and the error term of the probit model. If the correlation between the error terms ρ is zero, then

cannot reject the OLS model. The evidence presented in this paper, therefore, is not driven by endogeneity of family management status. This finding is also consistent with empirical evidence that Italian family firms stick with their management even in hard times (Brunello et al., 2003; Volpin, 2002; Lippi and Schivardi, 2009).[8]

Besides, an age-related effect on efficiency can also be observed if innovation or involvement in international markets is considered. Table 4, columns (3) to (5) report the results of an extended model where dummies for innovation (product, process and organisational innovation) and export activity are included in the main regression and confirm the robustness of our result: age positively affects TFP only in the case of family management. Moreover, only organisational innovation related to process innovation has an impact on TFP, positively in the case of family managed firms and negatively in the case of outside management in family firms.

5. Conclusions

This study analyses the performance of a sample of Italian manufacturing firms over the period 2004-2006. We compare the efficiency level – as measured by TFP – by ownership and management by splitting the sample according to the type of ownership (family v non family) and management (family or outside management). We also test the role of the firm age in explaining the differences in efficiency levels for family firms *vis-à-vis* non family firms.

$\lambda = 0$ and the problem is reduced to one estimable ! by OLS; if ρ is positive (negative), $\lambda > 0$ $(\lambda < 0)$ and OLS overestimates (underestimates) the treatment effect.

[8] Brunello et al. (2003) show that the probability of a change of Chief Executive Officer (CEO) after poor performance is reduced when the CEO owns some shares of the company or is a member of the owner family. Volpin (2002) provides evidence that the probability of top management replacement and the sensibility of this change to the company results are significantly lower if the manager belongs to the family that controls the company. Lippi and Schivardi (2009) find owner of family firms select managers almost only on the basis of the private benefits: they retain all the managers with whom they have developed a relationship, regardless of ability, and fire all the others. This mechanism completely undermines the selection effect based managerial ability.

The econometric analysis shows that family managed firms are about 3.5% to 5% less productive than non-family managed firms, after controlling for sector, area, as well as other characteristics, such as age, listing on the Stock Exchange, human capital, capital intensity and ownership concentration.

These results are consistent with previous studies on efficiency in family firms that show that family run firms perform worse than non-family managed firms: however, our findings show that, in the case of Italy, the productivity gap is narrower than that observed in other cases (Barth et al., 2005 for the Norwegian case). Furthermore, we show that when considering family owned firms only, there is no difference in performance between outside managers and family managers. This result is robust to potential endogeneity of management regime.

Finally, the difference between family and outside managers tends to vanish when the time-related ability of family managers is taken into account.

Appendix - Measure of Total Factor Productivity

The TFP used in this paper has been estimated in Aiello et al. (2012). TFP at firm level is estimated by using Levinshon and Petrin's (2003) approach. Productivity was estimated using the following log-linear specification of a production function:

$$y_{it} = \beta_0 + \beta_K^{MAT} k_{it}^{MAT} + \beta_l l_{it} + u_{it} \qquad \text{(A1)}$$

with $i = 1,\ldots\ldots N$ firms, t = 1998, ……2006 and where y represents the value added, l the number of employees, k^{MAT} the stock of physical capital, β_0 measures the average efficiency and u_{it} represents the deviation of firm i from this average at time t. The error term can be decomposed into two parts:

$$u_{it} = \omega_{it} + \eta_{it} \qquad \text{(A2)}$$

where the term ω_{it} represents the productivity of firm *i* at time *t* and η_{it} is a stochastic term which includes not only the measurement error, but also the shocks which are unobservable to firms, and, therefore, do not correlate with inputs.

Productivity ω_{it} is known to the firm which, therefore, in the case of positive shocks to productivity, can decide to increase production by raising the level of inputs. This determines a problem of simultaneity which Levinshon and Petrin (2003) resolved by identifying in the demand for intermediate goods a proxy related to the variations in TFP known to firms.

In order to include m_{it} in the final equation to be estimated, Levinshon and Petrin (2003) assume that m_{it} depends on k_{it} and ω_{it}, namely $m_{it}=f(\omega_{it}+k_{it})$. In addition, if this function is invertible, then ω_{it} may be expressed in terms of observable variables, that is $\omega_{it}=h(m_{it}+k_{it})$. After substitutions, one obtains:

$$y_{it} = \beta_0 + \beta_l l_{it} + \beta_k k_{it} + h(m_{it}, k_{it})_{it} + \eta_{it}$$
$$= \beta_l l_{it} + \phi_{it}(m_{it}, k_{it}) + \eta_{it} \qquad \text{(A3)}$$

with

$$\phi_{it}(m_{it}, k_{it}) = \beta_0 + \beta_k k_{it} + h(m_{it}, k_{it}) \qquad \text{(A4)}$$

The estimates of β_l and β_k are obtained by applying a two-step procedure, proposed by Levinsohn and Petrin (2003)

From a empirical perspective, the analysis has been carried out by utilising the tangible fixed assets as a proxy for the stock of physical capital and the demand for intermediate goods has been measured by using operating costs. The value added has been deflated by using the ISTAT production price index available for each ATECO sector. As regards the tangible fixed assets, data have been deflated by using the average production price indices of the following sectors: machines and mechanical appliances, electrical machines and electrical equipment, electronics and optics and means of

transport. For the operating costs, we adopt the intermediate consumption deflator calculated by using data from ISTAT.

References

Acemoglu, D., P. Aghion, C. Lelarge, J. Van Reenen, and F. Zilibotti (2006). Technology, Information and the Decentralization of the Firm, NBER Working Paper No. 12206.

Adams, R. B., H. Almeida, and D. Ferreira (2009). "Understanding the relationship between founder-CEOs and firm performance," *Journal of Empirical Finance 16*, 136-150.

Agarwal, R. and M. Gort (2002). "Firm and Product Life Cycles and Firm Survival,"*American Economic Review* 92(2), 184-190.

Aiello, F., V. Pupo, and F. Ricotta (2012). "A territorial analysis of TFP in Italy," *Scienze Regionali - Italian Journal of Regional Science* 11(2), 23-46.

Amore, M.D., A. Minichilli, and G. Corbetta (2011). "How do managerial successions shape corporate financial policies in family firms?,"*Journal of Corporate Finance* 17, 1016–1027.

Anderson, R. C., and D. Reeb (2003). "Founding-family owner and firm performance: evidence from the S&P500," *Journal of Finance* 58, 1302-28.

Andres, C. (2008). "Large shareholders and firm performance. An empirical examination of founding-family ownership," *Journal of Corporate Finance* 4, 431-445.

Arregle, L., M. Hitt, D. Sirmon, and P. Very (2007). "The development of organizational social capital: Attributes of family firms," *Journal of Management Studies* 44, 73-95.

Arrow, K. J. (1962). "The Economic Implications of Learning by Doing," *Review of Economic Studies* 29, 155-173.

Astrachan, J. H., and M. C. Shanker (2003). "Family businesses' contribution to the U.S. economy: A closer look," *Family Business Review* 16, 211–219.

Balasubramanian, N., and M.B Lieberman (2010). "Industry learning environments and the heterogeneity of firm performance," *Strategic Management Journal* 31(4), 390–412.

Bandiera, O., L. Guiso, A. Prat, and R. Sadun (2008). *Italian managers: Fidelity or performance?* mimeo: London School of Economics,.

Bank of Italy (2009). Rapporto sulle tendenze nel sistema produttivo italiano, Questioni di Economia e Finanza, n. 45.

Barba-Navaretti, G., R. Faini, and A. Tucci (2008). *Does family control affect trade performance? Evidence for Italian firms*. Centre for Economic Policy Research (CEPR), Discussion Papers n. 7082.

Barbera, F., and K. Moores (2012). "Firm ownership and productivity: a study of family and non-family SMEs," *Small Business Economics*, Online First™, 18 November.

Barney, J. (1991). "Firm resources and sustained competitive advantage," *Journal of Management* 17, 99–120.

Barontini, R., and I. Caprio (2006). "The effect of family control on firm value and performance: Evidence from continental Europe," *European Financial Management* 12, 689-723.

Barth, E., T. Gulbrandsen, and P. Schøne (2005). "Family ownership and productivity: The role of owner-management," *Journal of Corporate Finance* 11, 107-127.

Bennedsen, M., K. Nielsen, F. Perez-Gonzales, and D. Wolfenzon (2007). "Inside the family firm: The role of families in succession decision and performance," *Quarterly Journal of Economics* 122(2), 647-691.

Bertrand, M., and A. Schoar (2006). "The Role of Family in Family Firms," *Journal of Economic Perspective* 20(2), 73–96.

Bertrand, M., S. Johnson, R. Samphantharok, and A. Schoar (2008). "Mixing family with business: A study of Thai business group and the families behind them," *Journal of Financial Economics 88*, 466-498.

Bianchi, M., M. Bianco, S. Giacomelli, A.M. Pacces, and S. Trento (2005). *Proprietà e controllo delle imprese in Italia*, Il Mulino, Bologna.

Bianco, M., M.E. Bontempi, R. Golinelli, and G. Parigi (2013). "Family firms' investments, uncertainty and opacity," *Small Business Economics*, 40, 1035-1058.

Block, J., R. Jaskiewicz, and D. Miller (2011). "Ownership versus management effects on performance in family and founder companies: A Bayesian reconciliation", *Journal of Family Business Strategy* 2(4), 14 232–245.

Bloom, N., R. Sadun, and J. Van Reenen (2008). "Measuring and explaining management practices in Italy," *Rivista di Politica Economica* March-April, 15-56.

Brunello, G., C. Graziano, and B.M. Parigi (2003). "CEO turnover in insider-dominated boards: The Italian case," *Journal of Banking and Finance 27*, 1027-1051.

Cabral, L. (1995). " Sunk Costs, Firm Size and Firm Growth", *The Journal of Industrial Economics* 43(2) 161-172.

Cabrera-Suarez, K., P. De Saa-Perez, and D. Garcia-Almeida (2001). "The succession process from a resource and knowledge-based view of the family firm". *Family Business Review* 14(1), 37–47.

Carney, M. (2005). "Corporate Governance and Competitive Advantage in Family-Controlled Firms," *Entrepreneurship Theory and Practice* 29(3), 249–265.

Caselli, S., and A. Di Giuli (2010). "Does the CFO matter in family firms? Evidence for Italy," *The European Journal of Finance* 16(5), 381-411.

Chirico, F. (2008). "Knowledge accumulation in family firms: Evidence from four case studies". *International Small Business Journal* 26(4), 433–462.

Chirico, F., and C. Salvato (2008). "Knowledge integration and dynamic organizational adaptation in family firms," *Family Business Review* 21(2), 169–181.

Chirico, F., M. Nordqvist, C. Colombo, and E. Mollona (2011). "Simulating Dynamic Capabilities and Value Creation in Family Firms: Is Paternalism an Asset or a Liability?," *Family Business Review* 25(3) 318–338.

Chirico., F., and M. Nordqvist (2010). "Dynamic capabilities and trans-generational value creation in family firms: The role of organizational culture," *International Small Business Journal* 28(5), 487–504.

Chrisman, J. J., F. W. Kellermanns, K. C Chan, and K. Liano (2010). "Intellectual foundations of current research in family business: An identification and review of 25 influential articles," *Family Business Review 23*, 9-26.

Chrisman, J. J., J.H. Chua, and P. Sharma (2005). "Trends and directions in the development of a strategic management theory of the family firm," *Entrepreneurship Theory and Practice 29*, 555-575.

Chrisman, J. J., J.H. Chua, and R.A. Litz (2004). "Comparing the agency costs of family and non-family firms: conceptual issues and exploratory evidence," *Entrepreneurship Theory and Practice* 28, 335-354.

Chua, J. H., J. J. Chrisman, and P. Sharma (1999). "Defining family business by behavior," *Entrepreneurship Theory and Practice 23*, 19-39.

Cohen, W.M., D. Levinthal (1990). "Absorptive capacity: a new perspective on learning and innovation," *Administrative Science Quarterly* 35(1), 128-152.

Cong, R., and D. M. Drukker (2000). "Treatment effects model," *Stata Technical Bulletin*, *May*.

Cucculelli, M., and F. Marchionne (2012). "Market opportunities and owner identity: Are family firms different?," *Journal of Corporate Finance 18,* 476-495.

Cucculelli, M., and G. Micucci (2008). "Family succession and firm performance: Evidence from Italian firms," *Journal of Corporate Finance 14*, 17-31.

Davis, J. H., F. D. Schoorman, and L. Donaldson (1997). "Toward a stewardship theory of management," *Academy of Management Review 22*, 20-47.

De Massis A., P., Sharma, J. Chua, and J. Chrisman (2012). *Family Business Studies. An annotated bibliography*, Edward Elgar, Cheltenam UK.

Destefanis, S., and V. Sena (2007). "Patterns of Corporate Governance and Technical Efficiency in Italian Manufacturing," *Managerial and Decision Economics 28*, 27-40.

Donaldson, L., and J. Davis (1991). "Stewardship theory or agency theory," *Australian Journal of Management* 16, 49–64.

Eisenhardt, K.M., and J.A. Martin (2000). "Dynamic capabilities: What are they?," *Strategic Management Journal* 21, 1105–1121.

Ericson, R., and A. Pakes (1995). "Markov-perfect industry dynamics: A framework for empirical work," The Review of Economic Studies 62 (1), 53-82.

Faccio, M., and L. Lang (2002). "The ultimate ownership of Western European corporations," *Journal of Financial Economics* 65, 365-395.

Favero, C., S. Giglio, M. Honorati, and F. Panunzi (2006). *The performance of Italian family firms*. Centre for Economic Policy Research (CEPR), Discussion Papers n.5786.

Geroski, P.A. (1995). "What do we know about entry?," *International Journal of Industrial Organization* 13, 421-440.

Giacomelli, S., and S. Trento (2005). Proprietà, controllo e trasferimenti nelle imprese italiane. Cosa è cambiato nel decennio 1993-2003? *Banca d'Italia, Temi di discussione*, n.550.

Gómez-Mejía, L. R., K. T. Haynes, M. Núñez-Nickel, K. J. L. Jacobson, J. Moyano-Fuentes.(2007). "Socioemotional wealth and business risk in family-controlled firms: Evidence from Spanish olive oil mills". *Administrative Science Quarterly* 52, (1) 106–137.

Gómez-Mejía, L. R., M. Núñez-Nickel, and I. Gutierrez (2001). "The role of family ties in agency contracts," *Academy of Management Journal 44*, 81–95.

Grant, R. M. (1991). "The resource-based theory of competitive advantage: Implications for strategy formulation." *California Management Review*, 17, 114-135.

Greene, W. H. (2000). *Econometric Analysis*. 4th ed. Upper Saddle River, NJ: Prentice–Hall.

Habbershon, T. G., and M.L. Williams (1999). "A resource-based framework for assessing the strategic advantages of family firms," *Family Business Review 12*, 1-25.

Hall, A., L. Melin, , and M. Nordqvist (2001). "Entrepreneurship as radical change in the family business: Exploring the role of cultural patterns," *Family Business Review* 14(3), 193–208.

Hansson, M., E. Liljeblom, and M. Martikainen (2011). "Corporate governance and profitability in family SMEs," *The European Journal of Finance 17*, 5–6, 391–408.

Henderson A.D., D. Miller, and D.C. Hambrick (2006). "How quickly do CEOs become obsolete? Industry dynamism, CEO tenure, and company performance," *Strategic Management Journal* 27: 447–460.

Hoffman, J., M. Hoelscher, and R. Sorenson (2006). "Achieving sustained competitive advantage: A family capital theory," *Family Business Review* 19, 135-145.

Jensen, M. C., and W.H. Meckling (1976). „Theory of the firm: Managerial behavior, agency costs and ownership structure," *Journal of Financial Economics 3*, 305-360.

Jovanovic, B. (1982). "Selection and evolution of industry," *Econometrica* 50(3), 649–670.

Jovanovic, B., (2001). Fitness and age. Review of Carroll and Hannan's *Demography of Corporations and Industries*, *Journal of Economic Literature* 39 (1), 105– 124.

La Porta, R., F. Lopez-de-Silanes, and A. Shleifer (1999). "Corporate ownership around the world," *Journal of Finance 54*, 471–517.

Lee, J. (2006). "Family Firm Performance: Further Evidence," *Family Business Review* 2, 103-114.

Leonard-Barton D. (1992). "Core capabilities and core rigidities: a paradox in managing new product development," *Strategic Management Journal* 13(S1), 111–125.

Levesque M., and M. Minniti (2006). "The effect of aging on entrepreneurial behaviour," Journal of Business Venturing 21, 177-194.

Levie, J., and M. Lerner (2009). "Resource mobilization and performance in family and nonfamily businesses in the United Kingdom," Family Business Review 22,25-38.

Levinshon, J., and A. Petrin (2003). "Estimating production functions using inputs to control for unobservables," *Review of Economic Studies 70*, 317-341.

Lippi, F., and F. Schivardi F. (2009). *Corporate ownership and managers' selection.* Centre for Economic Policy Research (CEPR), Fourth BI-CEPR Conference on Money, Banking and Finance.

Marshall, P.J., R. Sorenson, K. Brigham, E. Wieling, A. Reifman, and R. S. Wampler, (2006). "The paradox for the family firm CEO: Owner age relationship to succession-related processes and plans", *Journal of Business Venturing* 21, 348–368.

Martikainen, M., J. Nikkinen, and S. Vahamaa (2009). "Production functions and productivity of family firms: Evidence from the S&P500, *The Quarterly Review of Economics and Finance 49*, 295-307.

McConaughy, D., C. Matthews, and A.S. Fialko (2001). "Founding family controlled firms: Efficiency, risk, and value," *Journal of Small Business Management* 39(1), 31–50.

Mengoli, S., F. Pazzaglia, and E. Sapienza (2009). "Effect of governance reforms on corporate ownership in Italy: Is it still pizza, spaghetti, and mandolino?," *Corporate Governance: An International Review 17*, 629–645.

Miller, D. (2003). "An asymmetry-based view of competitive advantage," *Strategic Management Journal* 24, 961–976.

Miller, D., and I. Le Breton-Miller (2006). "Family Governance and Firm Performance: Agency, Stewardship, and Capabilities," *Family Business Review 1*, 73-87.

Miller, D., and I. Le-Breton-Miller (2009). "Agency vs. Stewardship in public family firms: A social embeddedness reconciliation," *Entrepreneurship Theory and Practice* 3(6), 1169–1191.

Miller, D., and J. Shamsie J. (2001). "Learning across the Life Cycle: Experimentation and Performance among the Hollywood Studio Heads," *Strategic Management Journal* 22(8), 725-745.

Miller, D., I. Le Breton-Miller, and B. Scholnick, (2008). "Stewardship vs. Stagnation: An empirical comparison of small family and non-family business," *Journal of Management Studies* 45, 51–78.

Miller, D., I. Le Breton-Miller, R. Lester, and A. Cannella, (2007). "Are family firms really superior performers?," *The Journal of Corporate Finance 13*, 829–858.

Nahapiet, J., and S. Ghoshal (1998). "Social capital, intellectual capital, and the organizational advantage," *Academy of Management Review* 23(2), 242–266.

Pakes, A. and R. Ericson (1998). "Empirical Implications of Alternative Models of Firm Dynamics," *Journal of Economic Theory* 79(1), 1-46.

Palia, D., and F. Linchtenberg (1999). "Managerial ownership and firm performance: A re-examination using productivity measurement," *Journal of Corporate Finance 5*, 323-339.

Perez-Gonzales, F. (2006). "Inherited control and firm performance," *American Economic Review 96*, 1559-1588.

Peteraf, M. A. (1993). "The cornerstone of the competitive advantage: A resource-based view," *Strategic Management Journal* 14, 179-191.

Pindado, J., Requejo, I., and de la Torre, C. (2011). "Family control and investment–cash flow sensitivity: Empirical evidence from the Euro zone," *Journal of Corporate Finance*, 17, 1389–1409.

Power, B. and C.G. Reid (2005). "Flexibility, firms specific turbulence and the performance of the long-lived small firms," *Review of Industrial Organisations*, 25, 415-443.

Reid, C.G., (1991). "Staying in business," *International Journal of Industrial Organisations*, 9, 545-556.

Rutherford, M., D. Kuratko, and D. Holt (2008). "Examining the link between "familiness" and performance: can the F-PEC untangle the family business theory jungle?," *Entrepreneurship Theory and Practice* 32(6) 1089–1109.

Salvato, C., and L. Melin (2008). "Creating value across generations in family controlled businesses: The role of family social capital," *Family Business Review* 23(3): 259–276.

Salvato, C., F. Chirico, and P. Sharma (2010). "A farewell to the business: Championing exit and continuity in entrepreneurial family firms," *Entrepreneurship and Regional Development: An International Journal* 22(3–4), 321–348.

Schulze, W. S., and E.R. Gedajlovic (2010). "Guest editors' introduction. Whither family business?," *Journal of Management Studies 47*, 191-204.

Schulze, W. S., M.H. Lubatkin, and R. N. Dino (2002). "Altruism, agency, and the competitiveness of family firms," *Managerial and Decision Economics 23*, 247-259.

Schulze, W. S., M.H. Lubatkin, and R. N. Dino (2003). "Toward a theory of agency and altruism in family firms," *Journal of Business Venturing 18*, 473-491.

Sciascia, S., and P. Mazzola (2008). "Family involvement in ownership and management: Exploring nonlinear effects on performance," *Family Business Review 21*, 331-345.

Sirmon, D., and M. Hitt (2003). "Managing resources: Linking unique resource management and wealth creation in family firms," *Entrepreneurship Theory and Practice 27*, 339–358.

Sorensen, J. and T. Stuart (2000). "Aging, obsolescence and organisational innovation," *Administrative Science Quarterly* 45, 81-112

Sraer, D., and D. Thesmar (2007). "Performance and behavior of family firms: Evidence from the French Stock Market," *Journal of the European Economic Association 5*, 709-751.

Tagiuri, R., and J.A. Davis (1996). "Bivalent attributes of the family firm," *Family Business Review* 9(2), 199–208.

Teece, D.J., G. Pisano, and A. Shuen (1997). "Dynamic capabilities and strategic management," *Strategic Management Journal* 18(7), 509–533.

UniCredit-Capitalia (2008). *Decima indagine sulle imprese manifatturiere italiane*. Rapporto Corporate, n.1.

Villalonga, B., and R. Amit (2006). "How do family ownership, management and control affect firm value?," *Journal of Financial Economics 80*, 385–417.

Volpin, P. (2002). "Governance with poor investor protection: Evidence from top executive turnover in Italy," *Journal of Financial Economics 64*, 61-90.

Westhead, P., and C.. Howorth (2006). "Ownership and management issues associated wirh family firm performance and company objectives," *Family Business Review 19*, 301-316.

Tab. 1 Descriptive Statistics

	Family firms						Non-family firms	
	All	% of firms	Family management	% of firms	Outside management	% of firms	All	% of firms
TFP	845		833		950		934	
Listed	1268	1%	1132	0,7%	1449	3,5%	1533	3%
By Sector								
Supplier dominated	765	49,9%	756	50,6%	854	44,2%	809	46,5%
Scale intensive	921	19,1%	898	19,1%	1104	19,6%	1071	18,9%
Specialised suppliers	910	26,8%	902	26%	965	32,7%	989	29,4%
Science based	1026	4,3%	1016	4,3%	1116	3,5%	1241	5,2%
By Size								
Small (11-50)	720	57,3%	715	58,8%	776	45,2%	764	53%
Medium (50-250)	955	35,5%	948	34,8%	1007	41,7%	997	34,7%
Large (>250)	1326	7,1%	1316	6,4%	1365	13,1%	1530	12,3%
By territorial area								
North	864	74,8%	849	74,9%	988	74,4%	958	75,2%
Center	848	15,6%	843	15,3%	884	18,1%	872	15%
South	692	9,5%	691	9,8%	700	7,5%	838	9,8%
By Age								
Young (<20)	769	29,5%	748	29,0%	909	34,2%	884	34,1%
Adult (20-40)	823	56,0%	815	57,0%	901	47,2%	899	50,7%
Mature (>40)	1021	14,5%	1029	14,0%	973	18,6%	1072	15,2%
Value added	54406		53881		86651		92764	
Employees	95		86		167		136	
Physical Capital	52744		47207		98679		71836	
Age	33		33		33		32	
White collar share	37,9		38,2		35,2		43,6	
Labour productivity	550		548		572		584	
N. observations	1835		1636		199		1085	

All variables are computed for 2006. Data in value are deflated and expressed in thousands of Euros.
Shares of firms are computed with respect to the total of the column.
Source: elaborations on data from UniCredit-Capitalia (2008)

Tab. 2 Family management and productivity – Total sample

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	5.799***	5.622***	5.785***	5.733***	6.642***	6.636***
	(121.26)	(109.37)	(104.45)	(101.18)	(885.84)	(760.97)
Family management	-0.053***	-0.040***	-0.037***	-0.036***	-0.042***	-0.031*
	(-3.46)	(-2.63)	(-2.49)	(-2.92)	(-2.71)	(-2.02)
Family management*age					0.066***	0.055**
					(2.74)	(2.25)
Age	0.015	0.018	0.010	0.011	0.0121	0.019
	(1.27)	(1.55)	(0.88)	(0.90)	(0.98)	(1.54)
Age2						0.013
						(1.18)
Number of employees	0.195***	0.209***	0.210***	0.208***	0.205***	0.203***
	(24.98)	(26.34)	(26.36)	(24.25)	(26.26)	(25.95)
Listed firm	0.161***	0.128**	0.128**	0.127**	0.165**	0.162**
	(2.67)	(2.17)	(2.07)	(2.11)	(2.34)	(2.31)
White collar share		0.283***	0.269***	0.264***	0.269***	0.266***
		(8.81)	(8.39)	(8.91)	(8.16)	(8.13)
Capital intensity				0.062***	0.062***	0.061***
				(6.44)	(6.95)	(6.86)
Equity concentration				0.001***	0.001***	0.001***
				(4.62)	(4.50)	(4.38)
Sectors	yes	yes	Yes	Yes	yes	yes
	(Pavitt)	(Pavitt)	(ATECO)	(ATECO)	(Pavitt)	(Pavitt)
Territorial area	yes	yes	Yes	Yes	yes	yes
R^2	0.282	0.311	0.345	0.348	0.366	0.368
F-statistics	121.12***	120.69***	70.85***	72.11***	95.72***	89.37***
Observations (1)	2802	2795	2795	2795	2,428	2,428

Dependent variable: log of TFP (average values for 2004-2006 period). Robust t-values in parentheses. Level of significance: *** 1%, ** 5%, * 10%.
(1)The number of observations differs from table 1 and for the different models because some cases have missing values on some or all of the variables in the analysis.

Tab. 3 Family management and productivity – Total sample by management type

	Only Controls	Family management in family owned firms	Outside management in family owned firms	Outside management in non-family owned firms	Family management in family owned firms	Outside management in family owned firms	Outside management in non-family owned firms
		(1)	(2)	(3)	(4)	(5)	(6)
Intercept	5.231***	5.118***	5.565***	5.268***	5.243***	5.671***	5.185***
	(80.43)	(57.11)	(26.39)	(46.84)	(66.83)	(32.77)	(53.55)
Age	-	0.043**	0.003	-0.031*	-	-	-
	-	(2.46)	(0.07)	(-1.66)	-	-	-
Dummy Age 20-40	-	-	-	-	-0.001	-0.146**	-0.017
	-	-	-	-	(-0.04)	(-2.08)	(-0.57)
Dummy Age >40	-	-	-	-	0.059**	0.007	-0.046
	-	-	-	-	(2.04)	(0.08)	(-1.25)
Number of employees	0.203***	0.200***	0.215***	0.208***	0.200***	0.208***	0.208***
	(25.93)	(17.91)	(7.86)	(17.09)	(17.81)	(7.65)	(16.88)
Listed firm	0.151**	-0.027	0.163	0.201**	-0.043	0.112	0.200**
	(2.26)	(-0.16)	(1.51)	(2.30)	(-0.26)	(1.00)	(2.29)
White collar share	0.274***	0.276***	0.369***	0.240***	0.271***	0.328**	0.241***
	(8.37)	(6.11)	(2.79)	(4.77)	(5.99)	(2.44)	(4.79)
Capital intensity	0.068***	0.066***	-0.005	0.075***	0.067***	-0.003	0.075***
	(7.24)	(6.55)	(-0.20)	(6.22)	(6.65)	(-0.11)	(6.18)
Equity concentration	0.001***	0.001	0.001*	0.002***	0.001	0.002*	0.002***
	(2.26)	(2.26)	(2.25)	(2.24)	(1.56)	(1.88)	(4.27)
Sectors	yes	Yes	Yes	yes	yes	yes	Yes
	(Pavitt)	(Pavitt)	(Pavitt)	(Pavitt)	(Pavitt)	(Pavitt)	(Pavitt)
Territorial area	yes	Yes	yes	yes	yes	yes	yes
R^2	0.322	0.293	0.455	0.385	0.293	0.479	0.384
F-statistics	117.1	52.33	17.06	49.03	48.60	16.47	44.69
Observations (1)	2,493	1,389	166	873	1,389	166	873

Dependent variable: log of TFP (average values for 2004-2006 period). Robust t-values in parentheses. Level of significance: *** 1%, ** 5%, * 10%.
(1)The number of observations differs from table 1 and for the different models because some cases have missing values on some or all of the variables in the analysis.

Tab. 4 Robustness – Total sample by ownership and management type

	Family Firms		Family management in family owned firms	Outside management in family owned firms	Outside management in non-family owned firms
	OLS	Treatment effect			
	(1)	(2)	(3)	(4)	(5)
Intercept	5.234***	5.492***	6.591***	6.696***	6.696***
	(48.63)	(20.97)	(296.78)	(86.67)	(223.08)
Age	0.035**	0.042***	0.046***	0.016	-0.012
	(2.20)	(2.53)	(2.63)	(0.37)	(-0.61)
Number of employees	0.201***	0.198***	0.196***	0.242***	0.210***
	(19.60)	(14.20)	(16.86)	(8.77)	(16.26)
Listed firm	0.059	-0.031	-0.033	0.129	0.202**
	(0.57)	(-0.21)	(-0.21)	(1.13)	(2.37)
White collar share	0.286**	0.299***	0.275***	0.398***	0.233***
	(6.66)	(7.21)	(6.08)	(3.01)	(4.56)
Capital intensity	0.053***	0.052***	0.066***	-0.008	0.075***
	(4.37)	(6.97)	(6.45)	(-0.32)	(6.18)
Equity concentration	0.001**	0.001**	0.001*	0.002**	0.002***
	(2.24)	(1.21)	(1.67)	(2.11)	(4.01)
Family management	-0.025	-0.277			
	(-0.81)	(-1.14)			
Rho	-	0.363			
Sigma	-	0.367			
Lambda	-	0.133			
New product			0.018	-0.058	-0.030
			(0.86)	(-0.82)	(-1.08)
New process			-0.002	0.038	0.003
			(-0.06)	(0.59)	(0.09)
Organisational innovation-process			0.051*	-0.199***	-0.044
			(1.84)	(-2.73)	(-0.98)
Export			0.010	0.002	-0.024
			(0.47)	(0.02)	(-0.81)
Sectors	yes (Pavitt)	yes (Pavitt)	yes (Pavitt)	yes (Pavitt)	yes (Pavitt)
Territorial area	yes	yes	yes	yes	yes
R^2	0.303	0.310	0.296	0.486	0.390
F-statistics	59.19***	113.42***	36.49	14.43	34.58
Observations (1)	1555	1555	1,389	166	873

Dependent variable: log of TFP (average values for 2004-2006 period). Robust t-values in parentheses. Level of significance: *** 1%, ** 5%, * 10%.
(1)The number of observations differs from table 1 and for the different models because some cases have missing values on some or all of the variables in the analysis.