Family firms and labour productivity: the role of enterprise-level bargaining in the Italian economy

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Abstract

We investigate the role of Italian firms in labour productivity performance. We find that family-owned firms have lower labour productivity than their non-family counterparts. In a second step, we estimate the role of firm-level bargaining (FLB) to determine whether family-controlled firms that adopt this type of bargaining may partially close the gap in terms of labour productivity with their non-family competitors. Our results, obtained through IV estimation to control for endogeneity bias, suggest that enterprises under family governance achieve significant labour productivity gains — greater than those achieved by their non-family counterparts — when they adopt firm-level bargaining.

JEL Classifications: G32, G34, D24.
Keywords: Family firms, corporate governance, labour productivity

Introduction

Despite the rich literature on family-controlled firms, limited empirical research has addressed the role of these firms in productivity performance (Barbera and Moores, 2013), and no conclusive results have been obtained. On theoretical grounds, the debate on family businesses has involved conflicting arguments about the role of family involvement. The stewardship view suggests that family members have a strong attachment to the firm; they pursue aims that benefit all stakeholders and place the firm's objectives ahead of their own personal aims. By contrast, the agency cost perspective suggests that family members have detrimental effects on firm value because they act based on private purposes that lead them to extract resources to obtain personal interests (Le Breton-Miller and Miller, 2009). Neither approach has clearly identified, as noted by Martikainen et al. (2009, p. 296), the specific 'microeconomic mechanism' through which family firm involvement may affect firm performance and labour productivity.

The work in this paper proposes to address this theoretical gap in the agency-stewardship debate by showing that one difference between family and non-family firms is represented by their different abilities to productively exploit, through firm-level bargaining (FLB), a set of strategic choices on issues such as working time, incentive pay, training programmes and labour organization. These choices, which are included within practices of human resources

management (HRM), are of paramount importance, especially for countries such as Italy that are dominated by small enterprises whose ownership and control are mainly concentrated in families (Cucculelli et al. 2014).

In this paper, our preliminary purpose is to determine whether the predominance of firms that are owned and managed by families rather than professional managers plays a role in explaining the unsatisfactory productivity results recorded by the Italian economy. Our estimates, which are in line with the few studies that explore this issue (see Cucculelli et al. 2014), suggest a negative role for ownership and for a 'mode of governance' characterized by the leadership of families rather than qualified outside managers. We then address our key research question: whether FLB may provide a specific microeconomic mechanism through which family leadership may be conducive to labour productivity gains[i].

FLB, which provides an important element of flexibility in industrial relations, may allow family firms to adopt labour and wage practices that are more closely tailored to their specific needs and that favour the implementation of more productive strategies. Indeed, FLB may induce 'relational governance', which fosters strategic commitments to employees and helps family firms reduce the gap in labour productivity with their non-family competitors.

To test these hypotheses, we use a unique and rich dataset for the Italian economy provided by ISFOL (Istituto per lo Sviluppo della Formazione Professionale dei Lavoratori – Institute for the Development of Workers Professional Training) that covers a nationally representative sample of Italian firms. We focus on the conditional mean model with OLS estimates and adopt the Koenker and Basset (1978) estimator to study the productivity impact of FLB along the entire conditional productivity distribution. This approach allows us to shed light on the heterogeneous effects of FLB and to determine whether firms at the bottom of the productivity distribution benefit from FLB differently than their peers at the top.

In addition, we employ instrumental variable approaches in quantile regressions, approaches that are not straightforward in quantile regression models. We adopt the Two-Stages Least Absolute Deviation Estimator (IVQR_2LAD) of Amemya (1982) and the Quantile Treatment Effect Estimator of Abadie et al. (2002) (IVQR_AAI) to address the likely endogeneity of FLB.

The remainder of the paper is organized as follows. Section 1 briefly discusses the related literature. Section 2 presents the data used and descriptive statistics. Section 3 describes the econometric framework employed, and section 4 presents our estimation results. Section 5 concludes.

Literature Review

The effects of family firms on productivity are ambiguous because opposing effects are conceivable. In literature reviews by Le Breton-Miller and Miller (2009), and Chirico and Bau (2014), two contradictory perspectives on family enterprises have been proposed, sometimes called the 'agency' and 'stewardship' views.

In the agency perspective, family members act on the basis of self-interest, and their conduct leads to a misalignment of objectives between those of family members and those of other firm actors (minority owners and firm stakeholders). Thus, enterprises run by families are exposed to specific forms of agency costs because the strategies of their owners are mainly oriented toward pursuing the private benefits of control (such as related-party transactions, special dividends, excessive compensation for family management, and the redistribution of rents from employees to family members, Shleifer and Vishny 1997). Additionally, family firms usually suffer from mismanagement due to the inefficient selection of executives, who are frequently chosen from among family members rather than from a pool of external and talent managers. One related aspect is that family firms, especially if they are run by second-generation or later family managers, frequently underperform with respect to firms run by founding owners (Villalonga and Amit, 2006).

Concerning our key variable, labour productivity, we may posit that the long-term objectives that characterize family firms manifest their role in the production process. The objective of ensuring the long-term survival of their businesses may induce family firms to forego investment strategies that could enhance productivity but that might also yield uncertain returns. Concentration of ownership, which produces limited risk diversification (Demsetz and Lehn, 1985; Michelacci and Schivardi, 2013), characterizes small, closely held firms that prefer less risky activities because "business failure may imply the loss of all returns", as shown by Gomez-Meja et al. (2001). Such caution may hinder adequate investments in R&D and discourage the introduction of productivity-enhancing technologies (Barth et al. 2005).

Second, neither the level of capital nor its use may be homogenous across firms because the output contributions of inputs might differ in family and non-family firms. Demsetz (1983, p. 378) argues that the owner-manager is "guided by utility maximization, not simply the pursuit of profit" and that the owner-manager may finance his amenities by misallocating resources from profitable projects to non-pecuniary consumption. Thus, as shown by Barbera and Moores (2013) using a sample of privately held Australian small and medium-sized firms, capital elasticities in the production processes of family enterprises might be significantly lower than in non-family firms.

Another potential source of inefficiency is the quality of management itself. Bloom and van Reenen (2007), in one of the most comprehensive studies of management practices and productivity, find

that half of the substantial cross-country differences in the quality of management disappear when they control for the greater incidence of family firms managed by descendants of founders and the intensity of product market competition. These results are confirmed in the Italian case by Cucculelli and Mannarino (2008), who find that family firms run by second-generation and later family managers frequently underperform compared with firms run by founding owners.

However, economic research has also identified positive aspects of family firms. In these enterprises, less efficient use of capital may be balanced by a more efficient use of labour, as shown by Barbera and Moores (2013). As this study suggests, various explanations for this finding are possible. The high level of 'emotional involvement' of family members may enhance communication, the transmission of tacit knowledge and the mobilization of human resources (Tagiuri and Davis, 1996). Goffee and Scase (1985) argue that family firms encourage informal, adaptive and flexible work practices, and, as confirmed by Kirchhoff and Kirchhoff (1987), there may be a significant positive correlation between productivity and the use of family labour, both paid and unpaid[ii].

Other positive effects on productivity are suggested by the stewardship perspective, which portrays family firms as organizations in which family owners are 'stewards' of the firm. As shown by Mueller and Phillipon (2011, p. 219), family firms are 'a natural response' in countries where the climate of working relations is hostile. As the authors write, "due to their longer time horizons, family owners may have a comparative advantage at sustaining implicit labour contracts, which may be reciprocated by workers with cooperative behavior." Furthermore, Habberson et al. (2003) consider a set of idiosyncratic traits, such as the firm's potential for trust, leadership development and human resource policies, that create a pool of resources and capabilities unique to the family unit.

This brief discussion suggests that the relationship between family involvement and productivity performance is complex and multifaceted. Our main hypothesis, tested below, is that positive idiosyncratic traits of family firms, such as trust and superior human resource policies, are activated when favourable firm-level institutional settings emerge. Such settings may be forged by agreements recommended by the European Commission (2011) that adapt wages and working conditions to the specific needs of companies and their employees.

It is known that "a standard argument in favour of decentralized vs. centralized bargaining structures is that plant-level agreements allow to link more closely productivity and pay. This should improve the allocation of labour by both providing better incentives within the firm and promoting reallocation of workers across firms" (Boeri, 2014, p. 16). Firm-level bargaining is attractive for various reasons, summarized by Andréasson (2014) as follows. First, in local

negotiations, enterprises have more precise knowledge of the characteristics and abilities of their workers than central negotiators. Second, FLB offers greater discretion in wage setting, enabling enterprises to adopt incentives that enhance firm productivity through wage premiums offered for recruiting, motivating and retaining employees. Third, when job tasks become more heterogeneous, centralized agreements become increasingly inefficient, whereas FLB allows firms greater functional flexibility and leaves more space for agreements on issues such as training and outsourcing as economic conditions change.

We expect that these general motivations will be especially valid for family firms and that enterprises under family governance will achieve significant labour productivity gains—greater than those achieved by their non-family counterparts—when they adopt firm-level bargaining. Family firms might exploit their competitive advantages that arise from deeper knowledge of their workers, greater ability to discipline and monitor family managers and greater capacity to exploit fruitful opportunities provided by bargaining flexibility. Additionally, small family firms, which usually do not make substantial use of external sources of recruitment, such as employment agencies, may take advantage of wage incentives negotiated under FLB to recruit and retain their employees (Deshpande and Golhar, 1994).

In summary, the agency theory and the stewardship view have proposed opposite predictions on the role of family involvement. Our working hypothesis is that family control and management may be of strategic importance when firms negotiate agreements with their workforces on issues such as performance-related pay, employee training and team-based production systems. Indeed, within human resource management practices, these issues involve strategic choices adopted through firm-level bargaining that may activate the competitive advantages of family firms that the stewardship theory emphasizes. This paper attempts to bridge the gap between the two views (agency and stewardship theories) and takes a step forward by showing the potential effectiveness of FLB for family firm efficiency.

In testing these hypotheses, we assume that institutional characteristics of the setting in which family firms operate are relevant, as discussed next.

The Italian institutional setting

In Italy, governance structures are founded on family capitalism (more than 75 percent of listed firms are family controlled), the predominance of small businesses (the incidence of firms with less than 10 employees is 14 percentage points above the European average), the

widespread use of pyramidal groups (family-controlled pyramids represented 20 percent of market capitalization at the end of the 1990s) and the limited role of banks and other financial companies, which do not hold significant stakes in industrial companies (Bianco and Casavola, 1999, Aganin and Volpin, 2005, Bianco et al. 2013). Furthermore, the lack of supervisory boards or work council-type bodies leads to the absence of formal rights of employees to influence key managerial strategies. Thus, a central role is ultimately assigned to family governance, and the impact of firm level bargaining aimed at increasing the flexibility of working conditions and wages appears particularly relevant for labour relations. Therefore, a study of the Italian case provides an opportunity to determine the role that actors' decisions play in shaping the form and use of FLB, whereas related literature has poorly explored the conditional role of different modes of governance in implementing local agreements between employers and employees (Poutsma, Blasi and Kruse, 2012).

Within the Italian context, we examine whether family leadership, through its involvement in FLB, manifests a form of commitment to labour and wage agreements oriented towards productivity improvements rather than extracting resources for family aims (Le Breton-Miller and Miller, 2009).

Since the early 1990s, Italy has been characterized by a two-tier bargaining regime, set up by the July 1993 Agreement. Under this regime, first-level contracts are intended to guarantee the purchasing power of wages, whereas decentralized bargaining distributes wage premiums, linked to productivity or firm results. In addition, decentralized bargaining (at the firm or territory level) addresses several other matters, such as working time, employee training, labour organization and union relations. In these negotiations, which may foster reorganization and innovation of productive processes, employees and management are expected to co-operate in acquiring all of the specific and detailed information needed to evaluate the firm's economic performance and its prospective competitiveness.

Data and Descriptive Statistics

Data

Our empirical analysis is based on information obtained through the Employer and Employee Surveys (RIL) conducted by ISFOL in 2007 and 2010 on a representative sample of partnerships and limited liability firms that operated in the non-agricultural private sector. The ISFOL-RIL surveys collect a rich set of information about employment composition, personnel organization, industrial relations and other workplace characteristics.

In 2010, an additional section was inserted into the RIL questionnaire to collect information about some characteristics of corporate governance, ownership/control and management structure. We define family firms (FF) as those controlled or owned by an individual or family, and we define non-family firms (NFF) as all other firms[iii]. Thus, we created a dummy variable that equals one if a firm is owned/controlled by a family (family firms, FF) and 0 otherwise (non-family firms, NFF). Furthermore, in the ISFOL-RIL questionnaire, each firm was asked whether the person who manages the enterprise is *i*) a member of the family that owns or controls the company, *ii*) a manager hired from *inside* the company, or *iii)* a manager hired from *outside* the company. We thus divided family firms into two types of firms: family management (FM) (answer *i*) and non-family management (NFM) (answers *ii* and *iii*)[iv]. Finally, we selected the sub-sample of firms not involved in mergers and acquisitions to limit our analysis to enterprises whose ownership and control structure remained unchanged during the observation period.

With respect to our key explanatory variable, in the RIL questionnaire, each firm was asked whether a firm-level bargaining agreement (FLB) had been adopted. Such firm-level agreements in Italy cover several issues, such as working time, variable pay, employee training, labour organization and union relations. Thus, we created a dummy variable that indicates the presence or absence of an FLB contract for each year under study.

In addition, we collected information on the occupational composition of the labour force within the firm (executives, blue-collar workers and white-collar workers), gender, type of contract (long-term/short-term) and other firm strategies (innovation and export). We also controlled for the sectors and regions (NUTS 1) in which firms were located.

To link information concerning workers' characteristics to indicators of firm performance and accounting variables, a sub-sample of the RIL dataset was merged with balance-sheet information from the AIDA archives.

The longitudinal RIL-AIDA merged sample was then restricted to those limited liability companies that disclosed detailed accounts in accordance with the scheme of the 4th Directive CEE. We also

excluded firms with fewer than five employees to retain only firms characterized by a minimum level of organizational structure. This criterion for selection, which is consistent with the focus of our paper, allowed us to avoid excluding all micro-firms (those with fewer than 10 employees) whose incidence in Italy, as stated above, is the highest in Europe; in 2008, their share of total value added was approximately 33 percent, well above the European average of 19 percent (Bank of Italy, 2013, p. 5). Furthermore, we excluded firms with missing data for the key variables. Therefore, the sample that we used in the first specifications was an unbalanced panel of approximately 7,700 firms for 2007 and 2010[v]. Note that our longitudinal dataset, which contains information for two different years, is strongly unbalanced as the large number of missing observations does not permit us to follow many firms for more than a single year. In addition, the time-invariant characteristics of our key binary variables (family firm, family management and firm-level bargaining) severely undermine our ability to use the fixed effect estimator, as we will discuss below.

The AIDA data set provides information on our dependent variable, the labour productivity (the value added per employee, taken in log). This indicator is the single most frequently computed productivity statistic, for its ease of measurement and readability. Labour productivity, based on value added, reflects not only the influence of changes in capital inputs but also technical, organizational and efficiency changes. This indicator is also important as a reference statistic in wage bargaining (OECD, 2001, p 15), which is one of the key issues included in FLB.

The AIDA data set also provides information on an important control, the log of capital per employee.

Finally, we collected information from AIDA to set up our instrumental variable quantile regression approach, which is discussed thoroughly below. This instrument is a measure of the sales volatility that firms have experienced in the past (the standard deviation of sales over the 1998-2000 period) that we transformed into a binary variable in accordance with the quantile treatment effect technique (Abadie et al., 2002). Information on lagged sales volatility, used as an instrument for FLB (1 when this volatility is above the median value recorded in the firm's industry and 0 otherwise), is available only for a restricted sub-sample of firms (approximately 4,700 observations in the total pooled sample). Detailed definitions of the variables are reported in Table A1.

Descriptive statistics

Table 1 presents the descriptive statistics for the pooled sample for 2007-2010. We find that approximately 80 percent of firms are owned by families (FF) and that the large majority of these firms, 92 percent, are under family management (FM). Thus, the main characteristic of the Italian case, in both the manufacturing and service sectors, is not the prevalence of family-owned

firms, which is common in many other countries, but the predominance of family-managed firms, which represent only a minority in other economies (one-third in Spain and only one-fourth in France and Germany; Accetturo et al. 2013).

The data reported in Table 1 also show the limited diffusion of FLB (15 percent of the entire sample), a higher diffusion (29 percent) among non-family firms (NFF), a lower diffusion (11 percent) among family firms under family management (FM), and a diffusion of 17 percent among family firms under external management (NFM). Interestingly, there is a correspondence between FLB diffusion and the magnitude of sales volatility that firms experienced in the past. Indeed, the highest value of sales volatility (standard deviation of log sales) is among NFF firms (13.55), which are the firms that adopt FLB in the largest numbers[vi].

[Table 1 about here]

Additional information concerning the statistical significance of the difference between the means (or proportions) of the two main groups (i.e., FF and NFF) is reported in the Appendix (Table A.2).

In terms of labour productivity, measured by the log of value added per employee, NFF firms are more efficient (11.02) than FF firms (10.74) (see Table 1). This difference (-0.28) is significant at the 1 percent level (Table A.2). In terms of representation in international markets as exporters, the difference between FF and NFF is negative (-0.02) but not significant. Other information on innovation shows that disparities between FF and NFF are not significant. Interestingly, we find that significant differences among these two groups relate to workforce characteristics. Thus, the proportion of executives in FF firms is half of that recorded in non-family firms (-0.03 less than NFF), and the former hire fewer white-collar employees (a difference of -0.11) but make more use of fixed-term contracts (+0.01). All these differences are significant at the 1 percent level (see Table A.2).

Finally, the sectoral distribution of firms shows some significant differences between the two groups, with a higher presence of FF firms in Constructions (+ 0.13) and Textiles (+0.15). On the contrary, we observe a lower presence of FF in Intermediation and other business services (-0.05), in Transports and Communications (-0.03) and in Education and other personal services (-0.04).

In summary, the overall portrait of family firms is unambiguous: they are less successful in terms of per capita value added, more active in traditional sectors and not heavily involved in incentive strategies or in high-quality personnel policies determined through bargaining with their workforce in firm-level negotiations.

Figure 1 depicts the distribution of labour productivity (log of value added per employee) among FLB firms (those that adopt firm-level bargaining) and other firms (those that do not adopt firm-level bargaining). The comparison is performed for all sub-samples, distinguished on the basis of ownership and management. We find that the distribution for FLB firms is slightly to the right of that for other firms (firms without FLB) for all typologies of family firms. By contrast, among non-family firms, there are more firms without FLB (other firms) at the end of the upper tail. These initial comparisons encouraged us to further explore possible differences in the relationships between FLB and enterprise performance among family and non-family firms.

Econometric strategy and results

Estimation strategy

In this section, we present the empirical strategy used to estimate the role of family-involved firms. We begin our empirical analysis by estimating the relationship between labour productivity and governance variables. In particular, the relationship between labour productivity and family ownership and control may be formalized by a production function augmented by a dummy variable that captures the role of family ownership and by including a set of controls for firm characteristics and workforce composition.

We first estimate the following equation:

(1) $ln\left(\frac{P}{L}\right)_{i,t} = \alpha \cdot ln\left(\frac{K}{L}\right)_{i,t} + \beta \cdot D_{FF,i,t} + \vartheta \cdot F_{i,t} + \mu_s + \gamma_j + \eta_t + \varepsilon_{i,t} \quad t=2007,2010$

where $\ln\left(\frac{P}{L}\right)_{i,t}$ is the (log of) valued added per employee, $\ln\left(\frac{K}{L}\right)_{it}$ is the (log of) physical capital per employee, and D_{FF} represents a dummy variable that takes a value of 1 if the firm is owned and/or controlled by a family and zero otherwise (1). The parameter associated with D_{FF} indicates whether firms owned/controlled by a family are more or less productive than non-family firms are. Put differently, the coefficient on D_{FF} may be interpreted as the labour productivity gap between the two categories of firms. The vector F_{it} denotes controls for firm characteristics and workforce composition. The parameter μ_s denotes sector-specific fixed effects, γ_j denotes regional (NUTS1_level) fixed effects for macro-areas, η_t represents year fixed effects, and ε_{it} is an error term capturing the idiosyncratic component of labour productivity.

Furthermore, we restrict our analysis to family firms and include among the regressors a dummy variable, D_{FM}, that equals 1 if the firm is managed by a member of the owner/controlling family and zero otherwise. Thus, we estimate the following equation:

(1') $ln\left(\frac{P}{L}\right)_{i,t} = \alpha \cdot ln\left(\frac{K}{L}\right)_{i,t} + \beta \cdot D_{FM,i,t} + \vartheta \cdot F_{i,t} + \mu_s + \gamma_j + \eta_t + \varepsilon_{i,t} \quad t=2007,2010$

Analogously to equation (1), the coefficient on D_{FM} indicates whether firms managed by a family member are more or less efficient, in terms of labour productivity, than all family firms. With respect to other controls, we replicate the estimation strategy of equation 1.

In a further step, our key aim is to estimate the effect of FLB on labour productivity for different groups of firms; thus, we include a dummy variable that captures the incidence of FLB, and we include all controls for firm characteristics and workforce composition. The following equation is estimated:

(2) $ln\left(\frac{P}{L}\right)_{i,t} = \alpha \cdot ln\left(\frac{K}{L}\right)_{i,t} + \beta \cdot FLB_{i,t} + \vartheta \cdot F_{i,t} + \mu_s + \gamma_j + \eta_t + \varepsilon_{i,t} \quad t=2007,2010$

where FLB is a dummy variable indicating the presence of firm-level bargaining.

We began with a pooled cross-section analysis of equations (1), (1') and (2), controlling for time fixed effects (this OLS estimation is performed with clustered standard errors). We prefer pooled sample estimates because both the key explanatory dummy variables of equations (1) and (1'), that is, D_{FF} *and* $D_{FM,}$ are time invariant. In addition, we analyse the between and within variation of FLB, our key explanatory dummy variable in equation (2). We find that 90.10 percent of firms that introduced FLB utilized this type of agreement during the full period covered by the panel (two years); this percentage increases to 98.13 percent for firms that never introduced FLB[vii]. In summary, FLB appears to be close to a time-invariant variable, and this seriously limits the use of fixed effect regressions (Cameron and Trivedi, 2010).

However, we may address the importance of *between*-firm variability by taking into account the differing effects of FLB along the labour productivity distribution. We began with the classical Koenker and Basset (1978) estimator

(3) $$(\beta^{\tau}, \boldsymbol{\delta}^{\tau}) = argmin \sum \rho_{\tau} \cdot \left(ln\left(\frac{P}{L}\right)_{i,t} - \beta \cdot FLB_{i,t} - \boldsymbol{\delta} \cdot \boldsymbol{X}_{i,t} \right)$$

where β is the coefficient of interest, $\boldsymbol{\delta}$ is a vector of coefficients for all control variables now included in the matrix $\boldsymbol{X}$, τ is the specific conditional quantile to be estimated, and ρ_{τ} is the asymmetric loss function $\rho_{\tau}(u) = 1(u > 0) \cdot \tau|u| + 1(u \leq 0) \cdot (1 - \tau)|u|$.

We estimated five quantile regressions, with $\tau = 0.1, 0.25, 0.5, 0.75$ and 0.9. In addition, following Cameron and Trivedi (2010), we addressed heteroskedasticity by means of bootstrap standard errors (400 replications). The QR approach is more robust to outliers and provides information about the relationships between FLB and the dependent variables at different points of their conditional distribution.

However, the Koenker and Basset (1978) estimator does not allow us to distinguish between causal effects *and* the spurious correlation between FLB and productivity that would typically arise

if more productive firms are more likely to adopt FLB agreements. Thus, if unobserved factors influence the adoption of FLB, the estimated effect on productivity will be biased, and the issue of endogeneity must be taken into account. It may be argued that FLB is expensive to implement; it requires high-quality personnel policies and is more likely to be affordable for top-performing firms with highly capable managers (unobserved factor). Thus, higher-productivity firms may have a higher probability of adopting an FLB agreement.

The volatility of sales at the firm level recorded in the past (over the 1998-2000 period) may be a valid instrument because it is a proxy for uncertainty. At the same time, using more than a one-year lag for this instrument, it is plausible to assume that it is orthogonal to labour productivity observed several years later. Thus, our instrument is expected to randomly affect sample firms and to influence the probability that firms will introduce FLB. The rationale behind this is that unstable market conditions, captured by sales volatility, increase the probability of decentralized agreements that typically enhance the flexibility of work organization and pay. This hypothesis receives support in the Italian case, where FLB, which includes negotiations on labour flexibility (job rotation, provision of training, changes in working hours), is most widely adopted by Italian companies as a strategy for adapting to fluctuating demand and as a response to variable and uncertain external pressures (see the EIRO report, 1997)[viii].

A first objection is that previous sales volatility is potentially related to components of productivity. It is likely that different propensities to export and technology and innovation strategies may affect the volatility of sales. For instance, firms that export into geographically diverse markets or that operate in (high-tech) sectors and employ superior technology may experience sales volatilities that differ from those of other firms. However, in our estimates, we control for internationalization and innovation strategies related to technical change (process innovation) or market diversification (product innovation). In addition, the potential biases mentioned above are mitigated by including industry dummies that capture sector-specific technological factors.

Furthermore, note that FLB also includes agreements on wage flexibility, such as provisions that link pay levels more closely to an enterprise's performance. Thus, a second objection is that sales volatility may lead to a lower, not higher, adoption of FLB agreements because risk-averse employees will be reluctant to accept such agreements (Prendergast, 1999). However, in the Italian institutional setting, workers benefit from an incentive contract in any state of the world because the variable wage component is *added* to the base wage, set in the first sectoral level, and could be zero

if the firm does not achieve positive results. Thus, risk-averse employees do not face a trade-off as a result of variable pay.

The binary nature of our key explanatory variable (FLB) led us to address endogeneity via treatment effect techniques. As discussed below, under the instrumental variable quantile method used in our estimates, we compared the performance of both treated firms (firms adopting FLB schemes) and the control group (firms not adopting FLB schemes) to undertake a counterfactual analysis.

With respect to our estimation strategy, we used two methods: i) the Quantile Treatment Effect Estimator of Abadie et al. (2002) (IVQR_AAI) and ii) the traditional Two-Stages Least Absolute Deviation Estimator (IVQR_2LAD) of Amemya (1982).

The IVQR_AAI estimator, which allows us to examine the impact of FLB throughout the labour productivity distribution by resolving endogeneity issues, reveals some specific characteristics. The estimator is based on a binary endogenous variable and a binary instrument. Thus, we transformed the past sales' volatility of the firm into a dummy variable that equals 1 when the firm experienced a volatility above the median volatility and 0 otherwise. The Abadie et al. (2002) conditional quantile treatment effects estimator (IVQR_AAI) can be applied only if both the endogenous variable and the instrument are binary variables. Furthermore, the causal effect is identified only for the sub-population of compliers. In our case, the compliers are firms whose estimated probability of adopting a FLB scheme is correlated with a higher estimated probability of having experienced past volatility of sales above the median. In our sample, these compliers are approximately 72 percent of all firms that adopt FLB. Following Abadie et al. (2002), the conditional quantile treatment effect for compliers can be estimated consistently by the following weighted quantile regressions:

$$(\beta_{IV}^{\tau}, \boldsymbol{\delta}_{IV}^{\tau}) = argmin \sum W_{i,t}^{AAI} \cdot \rho_{\tau} \cdot \left(ln\left(\frac{P}{L}\right)_{i,t} - \beta \cdot FLB_{i,t} - \boldsymbol{\delta} \cdot \boldsymbol{X}_{i,t} \right) \quad (4)$$

$$W_{i,t}^{AAI} = 1 - \frac{FLB_{i,t} \cdot (1 - SV_{i,t})}{1 - Pr(SV = 1 | \boldsymbol{X}_{i,t})} - \frac{(1 - FLB_{i,t}) \cdot SV_{i,t}}{Pr(SV = 1 | \boldsymbol{X}_{i,t})} \quad (5)$$

where SV is the binary instrument for volatility of sales, and the weights $W_{i,t}^{AAI}$ combine the endogenous variable and the instrument [ix]. As stated above, the instrument is assumed to hit the sample firms randomly, and the conditional probability of having a volatility above the median, $Pr(SV = 1 | \boldsymbol{X}_{i,t})$, is estimated by means of a non-parametric regression, specifically, a local logit estimation, as suggested by Frölich and Melly (2013).

The IVQR_2LAD estimator consists of using the fitted values, obtained from estimates performed in a first step, and then inserting the fitted values for FLB as a covariate to yield the IVQR_2LAD estimator of $ln\left(\frac{P}{L}\right)_{i,t}$ in a second step. In our case, as noted above, the first step is a probit regression of FLB (our endogenous binary variable) on the binary instrument (sales volatility, *SV*) at the firm level.

(6) $P\left(FLB_{i,t} = 1 \middle| SV_{i,t}, \boldsymbol{X_{i,t}}\right) = \boldsymbol{\Phi}\left(\boldsymbol{\xi} \cdot SV_{i,t} + \boldsymbol{\delta} \cdot \boldsymbol{X}_{i,t}\right)$

where $\boldsymbol{X}_{i,t}$ are the firm-level controls mentioned above**.**

To obtain consistent standard errors, we bootstrapped them in both the first-stage and second-stage regressions (Arias et al. 2001; Bosio, 2009). Notice, however, that this approach relies on the symmetry of the composite error obtained in the second stage (see Wooldridge, 2010). Furthermore, Chernozhukov and Hansen (2005) show that this estimate is not consistent when the coefficients differ across quantiles, and it is precisely in that case that the quantile regression method is of interest (see also Melly, 2005 and Bosio, 2009). For this reason, we retain the IVQR_2LAD estimator only as an IV conditional median estimator that permits us to show the significance of the instrument (sales volatility) in the first stage.

Results

Labour productivity and family-influenced firms

Table 2 presents OLS and quantile estimates that permit us to verify the role of family firms on labour productivity, obtained by introducing as a key regressor the dummy variable D_{FF}, as indicated in equation (1). The results we obtain show that the coefficient associated with the dummy variable D_{FF} is negative and significant. Both OLS and quantile estimates also control for other firm and employee characteristics. In the OLS estimates, we find that family-owned firms are, on average, 20.8 percent less efficient in terms of labour productivity than their non-family counterparts (Table 2). We also restrict the analysis to the FF sub-sample and test the presence of a productivity gap between family-managed and other family firms with managers hired from outside, as we explain in equation (1')[x]. For the sub-sample of family firms, our results (not reported here for reasons of space) show that family management negatively affects labour productivity by -9.8 percent.

Using quantile regression (QR), we can also examine the effect of family ownership along different points of the productivity distribution.

[Insert Table 2]

In Table 2, we observe that the coefficients for FF are negative, statistically significant at the 1 percent level and increasing across the productivity distribution in the range from -0.15 in the 10th quantile to -0.29 in the 90th quantile. These results suggest that Italian firms that are owned and controlled by families are less productive than non-family firms, particularly high performers (-29 percent), confirming that owners often pursue family aims and private benefits of control[xi].

With respect to other firm characteristics, we find, as expected, a positive association of labour productivity with the capital stock per capita and, in line with other studies of Italian firms (see Hall et al. 2009), with the propensity to export and firm size.

We also control for firm age, which may be related to the quality of management and firm performance (see, among others, Levesque and Minniti, 2006). Opposite effects are also conceivable. First, it is likely that ageing enhances experience and competence, induces the implementation of routines and allows management to improve over time, as recently found for the Italian case (Cucculelli et al. 2014). However, ageing can negatively affect firm performance, inducing inertia, process rigidities, reluctance to innovate and obsolescence of initial endowments (Agrawal and Gort, 2002). Furthermore, firm ageing might be associated with a higher probability that a firm's founder is no longer present in the firm and that the enterprise's control has passed to his descendants, which is usually destructive to firm value (Villalonga and Amit, 2006)[xii]. Our results suggest that the positive aspect dominates the negative one, at least for median and best-performing firms (Table 2), whereas for other quantiles, no significant coefficients are obtained.

The estimations also control for worker heterogeneity, including a number of other potential determinants of productivity, such as the socioeconomic characteristics of individuals (e.g., gender) and three occupational groups (managers/supervisors, white-collar workers and blue-collar workers). The heterogeneity of workers (differentiated by gender, tenure and skills) may influence the relationships we test, as confirmed by our results. We find that employment position plays a role; the coefficients for executives and white-collar workers are positive and significant across the entire distribution relative to the omitted category, blue-collar workers. A plausible explanation for this finding is that managerial and more highly skilled employees are more important determinants of productivity than are blue-collar workers.

We also obtain a negative coefficient for the effect of fixed-term workers on labour productivity, but the QR analysis reveals evidence of heterogeneous effects. The negative coefficients for fixed-term contracts are significant across the entire productivity distribution with an absolute magnitude that decreases at higher quantiles. The higher coefficient at the lower end of the distribution suggests that especially in low-performing firms that use temporary contracts as a cost-cutting

strategy, these forms of job instability reduce investment in training and workers' motivations, ultimately undermining productivity growth (Belot, Boone and van Ours, 2007).

Finally, the estimates in Table 2 appear to confirm that lower productivity gains are achieved when the proportion of women in the workforce is higher. This finding is in line with other studies that find that female employees, on average, prefer activities that allow for greater flexibility between job and family and feature less interdependence with other workers, rendering female employees less involved in participative, more efficient work forms (Zwick, 2004).

All estimates are obtained by including time, sector and regional (NUTS) dummies to control for time-varying, sector-specific factors and geographical disparities that are likely to influence the dependent variables and cannot be captured by the controls included in our analysis.

Labour productivity and FLB: OLS and QR estimates

With respect to the role of firm-level bargaining, we briefly present the OLS and QR estimates (Tables 3-6) before focusing on the IV estimation (Tables 7-10) that corrects for endogeneity bias. All results reported in these tables (3-10) are obtained by including the same control variables used in the previous estimates. We also reinsert worker characteristics and the same sector and regional (NUTS) dummies of our previous estimates.

With respect to our key variable, the OLS results reported in Table 3 for the entire sample suggest that FLB is positively related to changes in productivity. In our QR results, the point estimates of FLB are found to be positive and statistically significant across the distribution, although at different levels of significance and with higher coefficients at the highest quantiles. Analogous results are obtained by replicating our estimation strategy for the FF and FM sub-samples (see Tables 4 and 5, respectively), although for the 25th quantile, the coefficient for FLB is not significant for the FM firms. This finding implies that family-involved firms, in terms of both ownership and active management, tend to exploit some of the advantages of firm-level negotiations. In contrast, as shown in Table 6, non-family firms (NFF) do not appear to achieve significant improvements in labour productivity as a result of bargaining with their workforces. Indeed, with the exception of the 75th quantile, we obtained no significant coefficients for FLB at the median value and at other points in the productivity distribution.

[Insert Table 3], [Insert Table 4], [Insert Table 5], [Insert Table 6]

The findings for the NFF sub-sample confirm some major criticisms of the bargaining setting and practices observed in Italy, where the bargaining setting has come under pressure in recent years. For instance, some unions have argued that the system should be more flexible and better suited to

respond more effectively and rapidly to specific and changing conditions faced by individual firms. Other workers' representatives have cited long delays in reaching agreements, which are often signed months after old agreements have expired (European Trade Union Institute, 2014). These critical observations are likely to mostly concern firms that lack a controlling family owner, are large and characterized by slow reactivity to change and operate in more "confrontational" environments with bitter labour conflicts. By contrast, family-controlled firms that can more easily ensure the implementation of FLB exploit the advantages of company agreements that stipulate greater flexibility and closer connections with the firm's workforce.

IV estimates

Controlling for endogeneity confirms the positive and significant role of FLB on productivity and increases its measured impact. More precisely, we observe higher positive coefficients for FLB on the productivity distributions for both the entire sample and the FF and FM sub-samples (see Tables 7, 8 and 9, respectively). The IVQR_AAI estimates for FF firms (Table 8) show that the coefficient for FLB remains within the range of 0.433 (the median value) to 0.609 (Q10th). For the FM firms, the range is between 0.407 and 0.582 (median and Q90th, respectively).

We also show the results obtained using the IVQR_2LAD method (reported in the last column of Tables 7-9). This estimator enables us to obtain the conditional median result (Chernozhukov and Hansen, 2005 and Melly 2005) and test the statistical significance of the instrument obtained in the first stage (see Table A.3). The validity of our strategy is confirmed by the strong correlation between the endogenous variable (FLB) and our instrument (sales volatility). The correlation has the expected sign and is significant at the 1 percent and 5 percent levels for the entire sample and for the FF and FM sub-samples (Table A3, Appendix). Our results appear to confirm that our instrumental variable is valid[xiii] and helps to reduce the downward bias due to measurement errors (Griliches and Hausman, 1986).

For both the entire sample and the FF firms (Tables 7 and 8), we find a "U-shaped" relationship between FLB and the dependent variable (the magnitude of the coefficient decreases as we move from the lowest quantile to the median quantile and increases again in the 90th quantile). These findings suggest that especially for low and high performers, firm-level agreements provide incentives and suitable labour flexibility arrangements that improve enterprise performance.

By rerunning the estimates for the FM group (Table 9), we find that FLB remains significant at the 1 percent level, with point estimates that are lower than we found for the FF sample in all quantiles except the Q90th. All of these findings were obtained by controlling for a wide set of firm and worker characteristics as well as time, sector and regional effects, which were also controlled for in the OLS and QR estimations, as discussed above.

Finally, Table 10 shows the results for non-family firms. For this sub-sample, we obtain significant effects of FLB only for the Q10th and the Q75th quantiles, whereas in the remainder of the distribution, the insignificant effects obtained using OLS and conventional QR estimators (see Table 6) are confirmed. Additionally, note that for the NFF group, the correction introduced using the IVQR_2LAD method is not significant[xiv] (Table A3, Appendix).

[Table 7], [Table 8], [Table 9], [Table 10]

To summarize, one plausible interpretation of the above results is that FLB activates the advantages of family involvement, enabling the achievement of positive outcomes through agreements on labour and wage flexibility. Indeed, it is conceivable that family owners who sign firm-level contracts may seek the consolidation of their market positions through investment in cooperative relations with their workforces. Thus, negotiations regarding labour flexibility and wage incentives may reveal distinctive features of firms that are less motivated by self-interest and less prone to extract resources in the pursuit of personal aims. Such firms are likely to elicit greater effort from subordinates, obtain higher commitments from workers and achieve higher firm performance. In addition, it is conceivable that family owners with large ownership stakes have greater incentives to bear the costs of active labour relations. By contrast, this activism is less relevant for non-family firms in which, in conformity with Bertrand and Mullainathan (2003), hired managers tend to prefer a "quiet life" and are less likely to engage in monitoring and supervisory activities.

Conclusions

The literature on family businesses requires very detailed data and, as suggested by Bertrand and Schoar (2006, p. 95), may benefit from microeconomic studies that proceed on a country-by-country basis and enhance our understanding of the nexus between families and firms.

This paper has attempted to take a step in that direction. Its contribution to the ongoing debate in family firm research is to reconcile two distinct, opposing views. The first, grounded in agency theory, views family owners as self-serving at the expense of the efficient functioning and success of their companies. The second, based on the stewardship of loyal family owners, views a family business as a favourable setting for the enactment of strategic policies that positively affect firm efficiency.

This study has empirically tested these opposing views using labour productivity as a measure of Italian firm performance rather than profitability or firm value, which are used in most related works. First, based on comparative descriptive analyses and OLS and quantile estimations, our results confirm the predictions of the first view, indicating that the presence of family owners and family managers is unambiguously negatively associated with gains in labour productivity.

Additionally, we find that taking into account the diversity of ownership and management permits a better understanding of the heterogeneity of Italian firms.

Second, in testing whether firm-level bargaining may help to reverse the previous negative results, our study provides support for the stewardship view. In particular, IV estimates permit us to attenuate endogeneity problems and show a positive effect of decentralized agreements on the productivity of family-involved firms. We suggest that family members, who play an active role in day-to-day decisions and design appropriate incentives such as those formalized in firm-level bargaining, attach greater importance to the future prospects of the enterprise. We find that the ability to exploit opportunities offered by local agreements with workers positively and significantly affects the productivity of family firms but not non-family firms. In family companies, FLB, which includes training programmes and profit-sharing arrangements, acts as a signal that reveals a family's strategic commitment to a firm's competitiveness, which is likely to benefit all stakeholders, including employees, in accordance with the "stewardship" view. Thus, a family may provide "the springboard for a form of firm specific organizational capital known as family social capital" (Schulze and Gedajlovic, 2010, p. 196).

The relevance of this result goes beyond the specific Italian case because our findings help to identify the "microeconomic mechanism" that potentially helps family businesses to be as productive as other firms. In particular, this paper contributes to previous literature by showing that human resource management practices, which are established in negotiations at the firm level, may exert a sizeable effect on family firms in which reputation and long-term survival are the main concerns. The broad theoretical implications of our empirical study are that family ownership and involvement may be an "effective organizational structure" (Anderson and Reeb, 2003) when family leaders make strategic commitments to their employees (as shown in our case through FLB). This paper contributes to narrowing the distance between opposing theoretical views on family firms and provides a rationale to integrate components of agency and stewardship perspectives.

The clear political message is that enhanced implementation of agreements regarding multiple and complementary human resource management practices (extensive employee training, team-based production systems, performance related pay) may partly mitigate the slowdown in Italian productivity growth experienced over the last several decades. The recently proposed changes to the two-tier system of bargaining, which give a greater role to negotiations at the company level on such issues as working time and wage flexibility, might improve labour productivity and reduce the gap with major international competitors (European Trade Union Institute, 2014). Thus, full implementation of the bargaining rules recommended by the European Commission appears to

be a valid means of improving both family enterprise performance and the Italian system of corporate governance.

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Notes

[i] Productivity measurements permit to take into account technology, "the currently known ways of converting resources into outputs desired by the economy" and efficiency, to identify whether "a production process has achieved the maximum amount of output that is physically achievable with current technology, and given a fixed amount of inputs" (OECD, 2001, p.11). The measure of firm productivity we use is labour productivity based on value added, which is important as a reference statistic in wage bargaining (see the subsection on data below).

[ii] Another study, based on a US sample of S&P 500 manufacturing firms, is that of Martikainen et al. (2009), who show that the role of family ownership has a positive effect on productive efficiency. The study shows that differences in output are not caused by differences in production technologies but more efficient use of labour and capital resources.

[iii] We assumed that the same information holds for 2007. Therefore, both the FF and FM variables are time-invariant.

[iv] We consider firms owned by families but run by external managers as distinct from firms owned and run by family members, whereas our data do not permit the separation of firms run by 'lone' family founders from enterprises run by their heirs (i.e., inherited managers).

[v] The RIL Survey sample of firms is stratified by size, sector, geographic area and legal form. Inclusion depends on firm size, measured by the total number of employees. This choice has required the construction of a 'direct estimator' to take into account differing probabilities of inclusion of firms belonging to specific strata. In particular, the direct estimator is defined for each sample unit (firm) as the inverse of the probability of inclusion in the sample. Using this estimator, the RIL sample reproduces all active firms for each stratum and, simultaneously, the total number of employees in a given stratum (size, sector and other characteristics).

[vi] We also performed a chi_squared test of the independence of FLB and sales volatility after transforming the latter into a binary variable. The null hypothesis of independence was rejected at the 1 percent level of significance.

[vii] Detailed results of the within and between variation analysis of FLB are available upon request.

[viii] http://www.eurofound.europa.eu/eiro/1997/10/feature/it9710214f.htm.

[ix]We estimated a modified version that allows for only positive weights. See Abadie et al. (2002) and Frölich and Melly (2013).

[x] To save space we omit the table with results of equation (1') and we only mention some key values of the coefficients. More detailed results are available upon request (see also note xi).

[xi] Similar results are found when we consider heterogeneities in the subsample of family firms and estimate the role of family management, whose effect is negative and significant at the 1 percent level across the whole distribution. More detailed results for these estimates are available upon request.

[xii] This effect may be relevant in our case because the ISFOL database does not permit us to distinguish between family firms run by founders from those run by their successors, and we cannot control for the identity of family managers.

[xiii] As is well known, for instruments to be valid, orthogonality conditions must also be met. As regards this second property, one should note that we have only one instrument and one endogenous variable, so that the equation is perfectly identified, and no test is available to prove the orthogonality condition. According to the authors who propose the methods discussed above (Abadie et al., 2002; Frölich and Melly, 2010; 2013), instrument-error independence is plausible when the random assignment of the instrument can be plausibly justified. In our case, the standard deviation of sales is strictly related to uncertainty (Bloom, 2009), and conceivably, this volatility is randomly assigned to firms.

[xiv] This result might be related to the small number of observations of non-family firms.

Table 1. Descriptive statistics: the pooled sample 2007-2010

	Whole sample		FF		FF				NFF	
					FM management		NFM			
	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev
FLB	0.15	0.35	0.11	0.31	0.11	0.31	0.17	0.38	0.29	0.45
Ln (value added per employee)	10.79	0.56	10.74	0.53	10.73	0.53	10.84	0.56	11.02	0.62
Ln(physical capital per employee)	10.00	1.63	9.99	1.58	9.99	1.56	10.03	1.78	10.05	1.85
Ln(sales st.dev., 1998-2000)	13.17	1.35	13.07	1.30	13.06	1.30	13.26	1.41	13.55	1.43
Workforce characteristics										
% executives	0.04	0.08	0.03	0.08	0.03	0.08	0.05	0.09	0.06	0.10
% white collars	0.38	0.30	0.36	0.29	0.35	0.29	0.41	0.30	0.46	0.31
% blue collars	0.58	0.31	0.61	0.30	0.61	0.30	0.53	0.32	0.48	0.33
% women	0.34	0.28	0.33	0.28	0.33	0.28	0.35	0.28	0.36	0.27
% fixed-term contracts	0.09	0.15	0.09	0.16	0.09	0.15	0.10	0.17	0.08	0.13
Firm characteristics										
Firm age	25.21	16.53	25.09	15.87	24.98	15.74	26.27	17.44	25.70	19.02
Process innovation	0.43	0.49	0.43	0.49	0.43	0.49	0.41	0.49	0.42	0.49
Product innovation	0.51	0.50	0.51	0.50	0.51	0.50	0.49	0.50	0.52	0.50
Export	0.29	0.45	0.28	0.45	0.28	0.45	0.25	0.43	0.30	0.46
Size: 5 < n of employees<15	0.43	0.50	0.47	0.50	0.48	0.50	0.40	0.49	0.28	0.45
Size: 15 ≦n employees < 50	0.36	0.48	0.36	0.48	0.36	0.48	0.40	0.49	0.37	0.48
Size: 50 ≦ n employees < 250	0.18	0.39	0.15	0.36	0.15	0.36	0.18	0.38	0.30	0.46
Size: n of employees ≧250	0.02	0.14	0.01	0.11	0.01	0.10	0.02	0.15	0.06	0.23
Regions (NUTS1)										
North West	0.34	0.47	0.33	0.47	0.33	0.47	0.34	0.47	0.37	0.48
North East	0.28	0.45	0.27	0.44	0.27	0.44	0.24	0.43	0.30	0.46
Centre	0.21	0.41	0.21	0.41	0.21	0.41	0.19	0.40	0.19	0.40
South	0.18	0.38	0.19	0.39	0.19	0.39	0.22	0.42	0.13	0.34
Sectors										
Textile, wearing apparel, food industry	0.14	0.35	0.15	0.36	0.15	0.36	0.12	0.32	0.11	0.32
Other manufacturing, mining, utilities	0.35	0.48	0.35	0.48	0.36	0.48	0.25	0.43	0.34	0.47
Constructions	0.12	0.32	0.13	0.34	0.13	0.34	0.13	0.33	0.05	0.23
Trade, hotels, restaurants	0.14	0.35	0.14	0.35	0.14	0.34	0.14	0.35	0.14	0.35
Transportation and communication	0.05	0.21	0.04	0.20	0.04	0.20	0.05	0.21	0.07	0.26
Intermediation and other business services	0.10	0.30	0.09	0.29	0.09	0.28	0.13	0.34	0.14	0.35
Education, health and private social services	0.11	0.31	0.10	0.30	0.09	0.29	0.19	0.39	0.13	0.34
Observations	11979		9492		8745		662		2450	

Source: RIL-AIDA data; Note: descriptive statistics are performed with no sampling weights

Figure 1. Labour productivity distribution according to firm level bargaining (2007-2010)

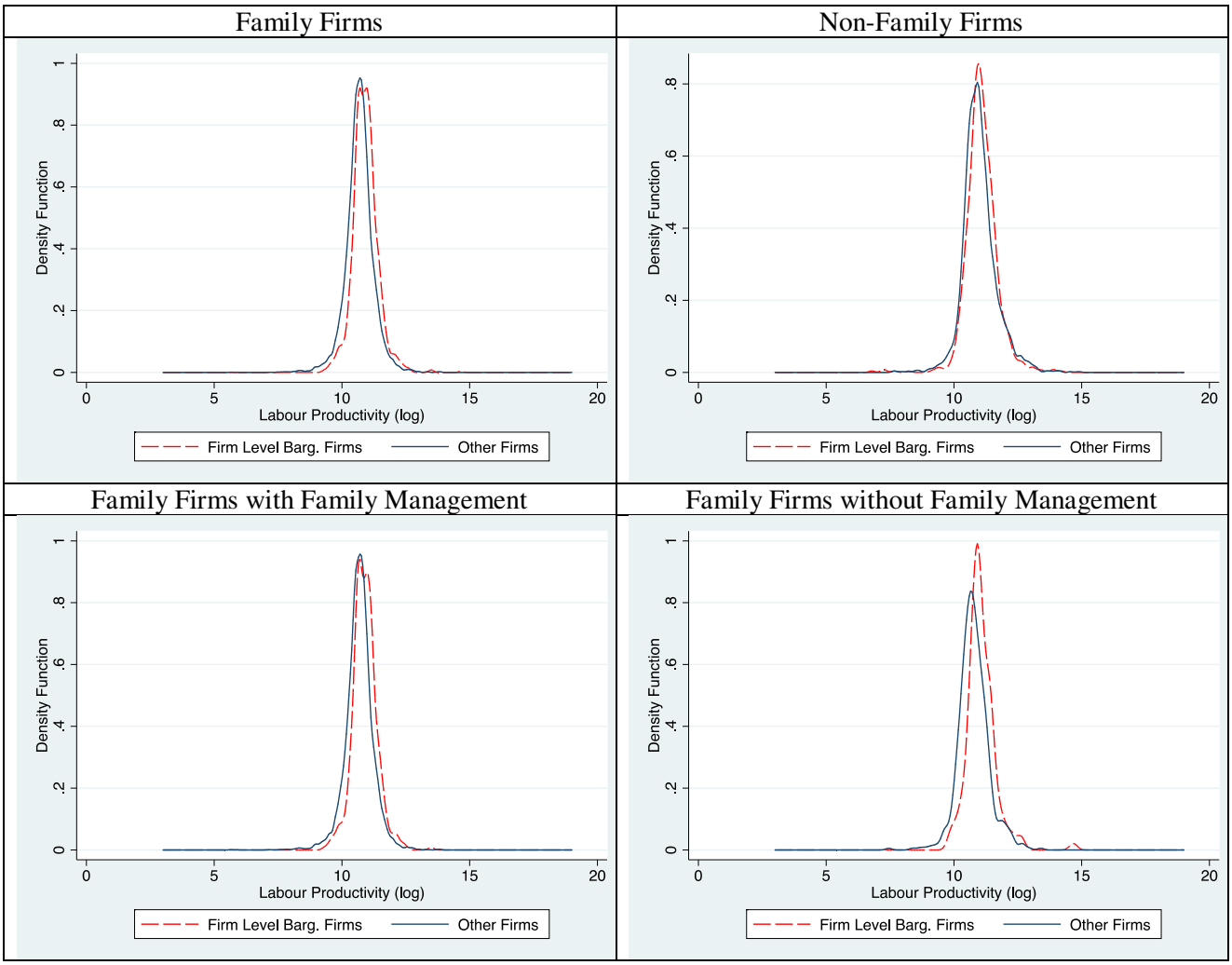

Table 2. OLS and Quantile Regressions: Family Firms and Labour productivity

	Simultaneous Quantile estimates					OLS
	Q10	Q25	Q50	Q75	Q90	
Family firms (D_{FF})	-0.149***	-0.160***	-0.162***	-0.216***	-0.290***	-0.208***
	(0.022)	(0.014)	(0.013)	(0.013)	(0.021)	(0.015)
% executives	0.176	0.459***	1.060***	1.389***	1.810***	0.958***
	(0.114)	(0.075)	(0.086)	(0.088)	(0.111)	(0.082)
%white collars	0.366***	0.398***	0.433***	0.520***	0.640***	0.472***
	(0.026)	(0.020)	(0.022)	(0.024)	(0.033)	(0.023)
% women	-0.510***	-0.471***	-0.441***	-0.421***	-0.414***	-0.444***
	(0.028)	(0.019)	(0.020)	(0.023)	(0.038)	(0.023)
% fixed-term contracts	-0.579***	-0.473***	-0.365***	-0.258***	-0.159**	-0.396***
	(0.074)	(0.041)	(0.027)	(0.034)	(0.069)	(0.038)
Ln(firm seniority)	0.014	0.017**	0.015**	0.016***	0.021*	0.013*
	(0.010)	(0.008)	(0.006)	(0.006)	(0.011)	(0.008)
Ln(physical capital per employee)	0.086***	0.095***	0.104***	0.118***	0.139***	0.118***
	(0.005)	(0.004)	(0.003)	(0.004)	(0.007)	(0.004)
Process innovation	0.054***	0.019	0.011	0.000	-0.019	0.015
	(0.018)	(0.014)	(0.012)	(0.012)	(0.020)	(0.011)
Product innovation	0.022	0.009	-0.004	-0.013	-0.038**	-0.003
	(0.015)	(0.012)	(0.011)	(0.012)	(0.016)	(0.011)
Export	0.087***	0.071***	0.059***	0.063***	0.063***	0.064***
	(0.018)	(0.013)	(0.010)	(0.011)	(0.017)	(0.011)
Ln(size)	0.054***	0.039***	0.020***	-0.006	-0.042***	0.011*
	(0.007)	(0.005)	(0.004)	(0.005)	(0.009)	(0.006)
Year 2010	-0.102***	-0.063***	-0.043***	-0.052***	-0.047***	-0.064***
	(0.015)	(0.009)	(0.011)	(0.011)	(0.017)	(0.008)
Constant	9.238***	9.465***	9.640***	9.842***	10.015***	9.561***
	(0.068)	(0.046)	(0.047)	(0.056)	(0.094)	(0.050)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R_2/PseudoR_2	0.181	0.183	0.189	0.203	0.218	0.306
Observations	11979					

Notes: Clustered-Robust (OLS) and bootstrap standard errors with 400 replications (Quantile Regression) in parentheses. *** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 3. OLS and Quantile Regressions: FLB and Labour productivity (Whole Sample)

	Simultaneous Quantile estimates					OLS
	Q10	Q25	Q50	Q75	Q90	
FLB	0.068***	0.066***	0.070***	0.092***	0.085***	0.086***
	(0.020)	(0.014)	(0.011)	(0.012)	(0.024)	(0.015)
% executives	0.100	0.526***	1.075***	1.622***	2.117***	0.971***
	(0.082)	(0.082)	(0.089)	(0.101)	(0.149)	(0.085)
%white collars	0.418***	0.454***	0.490***	0.568***	0.724***	0.531***
	(0.026)	(0.019)	(0.017)	(0.020)	(0.033)	(0.022)
% women	-0.522***	-0.498***	-0.470***	-0.448***	-0.466***	-0.459***
	(0.037)	(0.029)	(0.023)	(0.024)	(0.028)	(0.023)
% fixed-term contracts	-0.568***	-0.482***	-0.375***	-0.291***	-0.231***	-0.428***
	(0.062)	(0.034)	(0.031)	(0.036)	(0.057)	(0.034)
Ln(firm seniority)	0.009	0.013*	0.004	0.000	-0.002	(0.002)
	(0.009)	(0.007)	(0.006)	(0.005)	(0.009)	(0.008)
Ln(physical capital per employee)	0.100***	0.103***	0.106***	0.123***	0.140***	0.123***
	(0.005)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
Process innovation	0.047***	0.030***	0.015*	0.002	-0.004	0.019*
	(0.016)	(0.010)	(0.009)	(0.013)	(0.013)	(0.010)
Product innovation	0.028**	-0.001	-0.008	-0.019	-0.056***	-(0.008)
	(0.012)	(0.009)	(0.008)	(0.012)	(0.016)	(0.011)
Export	0.062***	0.066***	0.050***	0.058***	0.038*	0.050***
	(0.018)	(0.010)	(0.007)	(0.011)	(0.019)	(0.011)
Ln(size)	0.070***	0.046***	0.028***	0.005	-0.022**	0.026***
	(0.009)	(0.005)	(0.004)	(0.005)	(0.009)	(0.006)
Year 2010	-0.047***	-0.037***	-0.028***	-0.029***	-0.023	-0.028***
	(0.013)	(0.009)	(0.008)	(0.010)	(0.015)	(0.008)
Constant	8.824***	9.166***	9.436***	9.572***	9.736***	9.242***
	(0.063)	(0.044)	(0.031)	(0.036)	(0.061)	(0.046)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R_2/PseudoR_2	0.185	0.182	0.186	0.196	0.205	0.291
Observations	11979					

Notes: Clustered-Robust (OLS) and bootstrap standard errors with 400 replications (Quantile Regression) in parentheses.*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 4. OLS and Quantile Regressions: FLB and Labour productivity in Family Firms

	Simultaneous Quantile estimates					OLS
	Q10	Q25	Q50	Q75	Q90	
FLB	0.076***	0.047***	0.064***	0.074***	0.093***	0.087***
	(0.022)	(0.018)	(0.019)	(0.017)	(0.035)	(0.017)
% executives	-0.054	0.275***	0.595***	0.987***	1.330***	0.616***
	(0.118)	(0.090)	(0.100)	(0.090)	(0.182)	(0.088)
%white collars	0.345***	0.388***	0.433***	0.486***	0.572***	0.426***
	(0.033)	(0.023)	(0.018)	(0.027)	(0.041)	(0.024)
% women	-0.486***	-0.454***	-0.423***	-0.410***	-0.408***	-0.430***
	(0.037)	(0.025)	(0.023)	(0.030)	(0.042)	(0.025)
% fixed-term contracts	-0.548***	-0.462***	-0.359***	-0.237***	-0.204***	-0.396***
	(0.077)	(0.044)	(0.035)	(0.034)	(0.059)	(0.040)
Ln (firm seniority)	(0.012)	0.022***	0.019**	0.027***	0.030**	0.023***
	(0.013)	(0.008)	(0.008)	(0.009)	(0.015)	(0.009)
Ln(physical capital per employee)	0.095***	0.104***	0.102***	0.119***	0.138***	0.121***
	(0.006)	(0.004)	(0.004)	(0.005)	(0.006)	(0.004)
Process innovation	0.048***	0.02	0.017	0.001	-0.015	0.026**
	(0.016)	(0.015)	(0.012)	(0.013)	(0.018)	(0.012)
Product innovation	0.021	0.011	-0.009	-0.008	-0.026	-0.005
	(0.019)	(0.014)	(0.013)	(0.013)	(0.018)	(0.012)
Export	0.100***	0.086***	0.063***	0.076***	0.082***	0.087***
	(0.020)	(0.014)	(0.013)	(0.016)	(0.023)	(0.012)
Ln(size)	0.050***	0.035***	0.023***	-0.002	-0.036***	0.013*
	(0.010)	(0.007)	(0.005)	(0.006)	(0.009)	(0.007)
Year 2010	-0.113***	-0.074***	-0.049***	-0.053***	-0.046***	-0.074***
	(0.017)	(0.011)	(0.008)	(0.009)	(0.017)	(0.009)
Constant	9.006***	9.195***	9.460***	9.558***	9.650***	9.269***
	(0.059)	(0.051)	(0.047)	(0.053)	(0.099)	(0.051)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R_2/PseudoR_2	0.193	0.184	0.178	0.181	0.184	0.298
Observations	9492					

Notes: Clustered-Robust (OLS) and bootstrap standard errors with 400 replications (Quantile Regression) in parentheses.*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 5. OLS and Quantile Regressions: FLB and Labour productivity in Family Firms with Family Management

	Simultaneous Quantile estimates					OLS
	Q10	Q25	Q50	Q75	Q90	
FLB	0.072***	0.034*	0.057***	0.069***	0.109***	0.077***
	(0.025)	(0.020)	(0.020)	(0.017)	(0.031)	(0.018)
% executives	-0.117	0.183**	0.528***	0.884***	1.038***	0.481***
	(0.096)	(0.086)	(0.095)	(0.110)	(0.175)	(0.087)
%white collars	0.358***	0.400***	0.436***	0.491***	0.595***	0.427***
	(0.040)	(0.029)	(0.023)	(0.025)	(0.041)	(0.025)
% women	-0.496***	-0.457***	-0.422***	-0.404***	-0.397***	-0.426***
	(0.040)	(0.028)	(0.023)	(0.024)	(0.044)	(0.026)
% fixed-term contracts	-0.558***	-0.455***	-0.341***	-0.234***	-0.149**	-0.382***
	(0.094)	(0.049)	(0.038)	(0.040)	(0.070)	(0.043)
Ln(firm seniority)	(0.008)	0.019*	0.021**	0.026***	0.026**	0.025***
	(0.012)	(0.010)	(0.009)	(0.008)	(0.011)	(0.009)
Ln(physical capital per employee)	0.092***	0.103***	0.101***	0.117***	0.136***	0.119***
	(0.007)	(0.005)	(0.003)	(0.004)	(0.007)	(0.004)
Process innovation	0.053***	0.027*	0.020*	0.01	-0.026	0.032***
	(0.019)	(0.014)	(0.011)	(0.014)	(0.026)	(0.012)
Product innovation	(0.028)	0.01	-0.005	-0.007	-0.019	-0.003
	(0.021)	(0.016)	(0.010)	(0.014)	(0.021)	(0.012)
Export	0.094***	0.083***	0.064***	0.075***	0.075***	0.087***
	(0.022)	(0.014)	(0.012)	(0.014)	(0.022)	(0.012)
Ln(size)	0.052***	0.038***	0.021***	-0.001	-0.036***	0.013*
	(0.010)	(0.006)	(0.005)	(0.006)	(0.012)	(0.007)
Year 2010	-0.109***	-0.078***	-0.049***	-0.057***	-0.048**	-0.074***
	(0.015)	(0.011)	(0.011)	(0.012)	(0.020)	(0.009)
Constant	9.027***	9.201***	9.468***	9.567***	9.689***	9.284***
	(0.085)	(0.059)	(0.046)	(0.050)	(0.088)	(0.043)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R_2/PseudoR_2	0.192	0.181	0.172	0.174	0.175	0.175
Observations	8745					

Notes: Clustered-Robust (OLS) and bootstrap standard errors with 400 replications (Quantile Regression) in parentheses.*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 6. OLS and Quantile Regressions: FLB and Labour productivity in Non-Family Firms

	Simultaneous Quantile estimates					OLS
	Q10	Q25	Q50	Q75	Q90	
FLB	0.003	0.019	0.029	0.059**	0.059	0.029
	(0.039)	(0.022)	(0.029)	(0.030)	(0.048)	(0.030)
% executives	1.141***	1.640***	1.967***	2.275***	2.355***	1.930***
	(0.260)	(0.135)	(0.144)	(0.188)	(0.359)	(0.154)
%white collars	0.366***	0.398***	0.450***	0.602***	0.854***	0.590***
	(0.062)	(0.046)	(0.041)	(0.062)	(0.099)	(0.058)
% women	-0.601***	-0.587***	-0.498***	-0.452***	-0.431***	-0.509***
	(0.093)	(0.042)	(0.058)	(0.065)	(0.118)	(0.063)
% fixed-term contracts	-0.649***	-0.435***	-0.348***	-0.133	0.124	-0.334***
	(0.197)	(0.102)	(0.102)	(0.134)	(0.210)	(0.113)
Ln(firm seniority)	-0.016	-0.006	-0.027*	-0.014	-0.047*	-0.030*
	(0.025)	(0.012)	(0.016)	(0.016)	(0.028)	(0.016)
Ln(physical capital per employee)	0.049***	0.076***	0.100***	0.120***	0.126***	0.107***
	(0.011)	(0.006)	(0.008)	(0.009)	(0.014)	(0.009)
Process innovation	0.042	0.009	0.01	-0.015	0.082	-0.017
	(0.043)	(0.023)	(0.021)	(0.026)	(0.058)	(0.029)
Product innovation	-0.012	0.001	-0.001	-0.017	-0.163***	-0.001
	(0.045)	(0.021)	(0.025)	(0.028)	(0.053)	(0.028)
Export	0.001	0.004*	0.027*	0.047*	0.029	0.018*
	(0.054)	(0.023)	(0.029)	(0.032)	(0.046)	(0.010)
Ln(size)	0.049**	0.026*	-0.013	-0.052***	-0.101***	-0.020
	(0.019)	(0.014)	(0.011)	(0.014)	(0.023)	(0.013)
Year 2010	-0.037	-0.006	-0.027	-0.032	-0.048	-0.022
	(0.042)	(0.023)	(0.027)	(0.027)	(0.047)	(0.023)
Constant	9.823***	9.847***	9.950***	10.137***	10.646***	9.980***
	(0.215)	(0.109)	(0.167)	(0.159)	(0.242)	(0.122)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R_2/PseudoR_2	0.117	0.160	0.184	0.206	0.232	0.256
Observations	2450					

Notes: Clustered-Robust (OLS) and bootstrap standard errors with 400 replications (Quantile Regression) in parentheses.*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 7. IV Quantile Regressions: FLB and Labour productivity (whole sample)

	IVQR_AAI					IV_2LAD
	Q10	Q25	Q50	Q75	Q90	Q50
FLB	0.685***	0.475***	0.437***	0.466***	0.646***	0.964***
	(0.129)	(0.099)	(0.079)	(0.066)	(0.109)	(0.109)
% executives	1.174**	0.932**	1.181*	1.554**	2.152**	0.559***
	(0.513)	(0.367)	(0.653)	(0.678)	(1.009)	(0.177)
%white collars	0.407***	0.476	0.588***	0.655***	0.712**	0.504***
	(0.149)	(0.291)	(0.161)	(0.164)	(0.284)	(0.029)
% women	-0.579*	-0.583**	-0.587***	-0.525**	-0.625**	0.377***
	(0.326)	(0.294)	(0.226)	(0.231)	(0.285)	(0.099)
% fixed-term contracts	-0.061	-0.060	-0.050	-0.016	0.225	-0.567***
	(0.403)	(0.427)	(0.282)	(0.386)	(0.479)	(0.111)
Ln(firm seniority)	0.014	-0.032	-0.007	-0.003	-0.050	-0.310***
	(0.066)	(0.109)	(0.056)	(0.068)	(0.080)	(0.035)
Ln(physical capital per employee)	0.039	0.063	0.069*	0.091**	0.089	0.106***
	(0.040)	(0.056)	(0.040)	(0.041)	(0.059)	(0.005)
Ln(size)	0.067	0.064	0.055	0.074	0.074	0.554***
	(0.068)	(0.053)	(0.052)	(0.047)	(0.078)	(0.064)
Process innovation	0.226*	0.117	0.046	0.020	0.022	0.075***
	(0.119)	(0.124)	(0.088)	(0.089)	(0.158)	(0.021)
Product innovation	0.170	0.103	0.106	0.055	0.034	0.012
	(0.148)	(0.121)	(0.099)	(0.095)	(0.146)	(0.015)
Export	0.033	0.055	0.016*	0.064*	0.065	0.040**
	(0.164)	(0.129)	(0.009)	(0.035)	(0.114)	(0.017)
Year 2010	-0.125	-0.211	-0.138	-0.090	-0.121	0.018
	(0.128)	(0.117)	(0.069)	(0.118)	(0.188)	(0.016)
Constant	8.743***	9.163***	9.364***	9.240***	9.519***	13.552***
	(0.695)	(0.764)	(0.473)	(0.491)	(0.735)	(0.446)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4708					

Notes: robust standard errors (IVQR_AAI) and bootstrap standard errors with 400 replications (IV_2LAD) in parentheses. .*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 8. IV Quantile Regressions: FLB and Labour productivity (Family Firms)

	IVQR_AAI					IV_2LAD
	Q10	Q25	Q50	Q75	Q90	Q50
FLB	0.609***	0.456***	0.433***	0.468***	0.577***	0.683***
	(0.154)	(0.103)	(0.105)	(0.099)	(0.155)	(0.086)
% executives	1.424***	0.796**	1.119**	1.082	1.202	0.367*
	(0.403)	(0.327)	(0.483)	(0.735)	(0.957)	(0.217)
%white collars	0.356	0.454*	0.432***	0.434*	0.500	0.471***
	(0.426)	(0.263)	(0.148)	(0.251)	(0.327)	(0.035)
% women	0.260	0.292	0.194	0.283	0.335	0.081
	(0.586)	(0.435)	(0.283)	(0.414)	(0.435)	(0.067)
% fixed-term contracts	-0.510*	-0.551**	-0.456*	-0.489*	-0.612	-0.494***
	(0.279)	(0.241)	(0.237)	(0.275)	(0.420)	(0.111)
Ln(firm seniority)	0.046	0.002	0.037	0.049	0.082	-0.301***
	(0.236)	(0.114)	(0.084)	(0.084)	(0.143)	(0.045)
Ln(physical capital per employee)	0.068	0.078	0.074*	0.089**	0.090*	0.111***
	(0.056)	(0.068)	(0.042)	(0.041)	(0.053)	(0.006)
Ln(size)	0.076	0.059	0.026	0.053	0.036	0.346***
	(0.078)	(0.074)	(0.041)	(0.074)	(0.099)	(0.044)
Process innovation	0.156	0.016	-0.008	0.030	0.030	0.058**
	(0.121)	(0.127)	(0.103)	(0.113)	(0.177)	(0.025)
Product innovation	0.200	0.104	0.072	0.023	0.048	0.010
	(0.247)	(0.108)	(0.099)	(0.109)	(0.191)	(0.016)
Export	0.112	0.041	0.029*	0.060	0.099*	0.061***
	(0.140)	(0.109)	(0.017)	(0.160)	(0.053)	(0.021)
Year 2010	-0.271*	-0.181	-0.121	-0.120*	-0.096	-0.019
	(0.141)	(0.109)	(0.080)	(0.072)	(0.217)	(0.018)
Constant	8.366***	8.857***	9.261***	9.093***	9.115***	12.563***
	(0.931)	(1.146)	(0.457)	(0.544)	(0.880)	(0.377)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2761					

Notes: robust standard errors (IVQR_AAI) and bootstrap standard errors with 400 replications (IV_2LAD) in parentheses. .*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 9. IV Quantile Regressions: FLB and Labour productivity (Family Firms with Family Management)

	IVQR_AAI					IV_2LAD
	Q10	Q25	Q50	Q75	Q90	Q50
FLB	0.551***	0.420***	0.407***	0.468***	0.582***	0.573***
	(0.120)	(0.119)	(0.101)	(0.105)	(0.124)	(0.070)
% executives	1.403***	0.836	1.314***	1.028	1.279	0.529**
	(0.285)	(1.151)	(0.476)	(0.649)	(1.073)	(0.217)
%white collars	0.289	0.426*	0.420***	0.362	0.445	0.514***
	(0.349)	(0.240)	(0.136)	(0.226)	(0.385)	(0.031)
% women	-0.002	0.261	0.211	0.280	0.430	-0.062
	(0.546)	(0.421)	(0.324)	(0.435)	(0.557)	(0.054)
% fixed-term contracts	-0.617*	-0.608***	-0.580**	-0.530*	-0.694**	0.332***
	(0.318)	(0.231)	(0.256)	(0.288)	(0.344)	(0.068)
Ln(firm seniority)	0.043	-0.012	0.026	0.034	0.035	-0.259***
	(0.172)	(0.109)	(0.086)	(0.090)	(0.134)	(0.044)
Ln(physical capital per employee)	0.073*	0.071*	0.068**	0.090*	0.086	0.101***
	(0.064)	(0.057)	(0.043)	(0.052)	(0.059)	(0.007)
Ln(size)	0.096	0.068	0.033	0.060	0.028	0.271***
	(0.074)	(0.069)	(0.044)	(0.069)	(0.102)	(0.036)
Process innovation	0.214	0.043	-0.018	0.025	0.011	0.054**
	(0.205)	(0.122)	(0.096)	(0.108)	(0.215)	(0.022)
Product innovation	0.151	0.096	0.082	0.029	0.053	0.014
	(0.234)	(0.115)	(0.095)	(0.098)	(0.217)	(0.017)
Export	0.087	0.040	0.035*	0.049	0.111	0.044**
	(0.150)	(0.119)	(0.018)	(0.161)	(0.259)	(0.020)
Year 2010	-0.113	-0.047	-0.031	-0.040	-0.075	-0.025
	(0.113)	(0.114)	(0.073)	(0.077)	(0.125)	(0.017)
Constant	8.241***	8.971***	9.312***	9.145***	9.373***	12.167***
	(1.201)	(0.864)	(0.494)	(0.583)	(0.975)	(0.339)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2557					

Notes: robust standard errors (IVQR_AAI) and bootstrap standard errors with 400 replications (IV_2LAD) in parentheses. .*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 10. IV Quantile Regressions: FLB and Labour productivity in Non-Family Family Firms

	IVQR_AAI					IV_2LAD
	Q10	Q25	Q50	Q75	Q90	Q50
FLB	0.311**	0.210	0.217	0.248**	0.196	0.647***
	(0.137)	(0.133)	(0.143)	(0.104)	(0.131)	(0.174)
% executives	1.999	2.060***	2.391***	1.987***	2.194*	1.306***
	(1.442)	(0.654)	(0.487)	(0.346)	(1.217)	(0.325)
%white collars	0.793	0.758*	0.905***	0.965***	0.859***	0.634***
	(0.527)	(0.388)	(0.348)	(0.265)	(0.306)	(0.090)
% women	-0.451	-0.468	-0.587**	-0.762**	-0.559	-0.133
	(0.370)	(0.396)	(0.285)	(0.299)	(0.362)	(0.166)
% fixed-term contracts	0.129	-0.074	0.223	0.012	0.038	-0.372*
	(0.566)	(0.446)	(0.461)	(0.366)	(0.561)	(0.191)
Ln(firm seniority)	-0.031	-0.037	-0.045	-0.127	-0.268**	-0.357***
	(0.113)	(0.117)	(0.110)	(0.095)	(0.125)	(0.082)
Ln(physical capital per employee)	0.036	0.033	0.065	0.072*	0.104	0.106***
	(0.037)	(0.057)	(0.064)	(0.040)	(0.073)	(0.014)
Ln(size)	0.076	0.071	0.079	0.058	0.007	0.351***
	(0.102)	(0.092)	(0.090)	(0.080)	(0.207)	(0.086)
Process innovation	0.138	0.034	0.068	0.015	0.077	-0.097
	(0.278)	(0.086)	(0.184)	(0.113)	(0.174)	(0.064)
Product innovation	0.043	-0.018	-0.172	-0.187	-0.134	0.025
	(0.188)	(0.136)	(0.180)	(0.132)	(0.212)	(0.059)
Export	0.116	0.061	0.077	0.021	0.049	0.047
	(0.156)	(0.132)	(0.132)	(0.103)	(0.186)	(0.042)
Year 2010	-0.032	-0.043	-0.005	-0.056	-0.043	-0.022
	(0.138)	(0.096)	(0.117)	(0.107)	(0.183)	(0.037)
Constant	9.234***	9.871***	9.904***	10.601***	11.122***	13.031***
	(0.478)	(0.877)	(0.858)	(0.654)	(0.867)	(0.773)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	782					

Notes: robust standard errors (IVQR_AAI) and bootstrap standard errors with 400 replications (IV_2LAD) in parentheses. .*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Appendix

Table A.1

Variable	Definition
FLB	Dummy variable that equals 1 if the firm adopts a firm level bargaining (FLB), 0 otherwise.
FF	A dummy variable that equals 1 if the firm is owned and or controlled by a family (FF) and 0 otherwise (NFF)
FM	A dummy variable that equals 1 if the family firm is managed by family management (FM) and 0 otherwise (NFM)
Ln (value added per capita)	Log of value-added per employee (source AIDA) deflated by the value added deflator (source ISTAT)
Ln (physical capital per capita)	Log of capital stock per employee (source AIDA) deflated by the investment deflator (source ISTAT)
n(Sales volatility)_1998-2000	Logarithm of the standard deviation of sales over the period 1998-2000
% executives	Percentage of managers and supervisors
% white collars	Percentage of white collar workers
% blue collars	Percentage of manual workers
% women	Percentage of women among total workers
% fixed-term contracts	Percentage of fixed-term workers
Ln(firm seniority)	Logarithm of the age of firms
Process Innovation	Dummy variable that equals 1 if the firm adopted process innovations in the last three years, 0 otherwise
Product Innovation	Dummy variable that equals 1 if the firm originated new products in the last three years, 0 otherwise
Export	Dummy variable that equals 1 if the firm exported in the last three years, 0 otherwise
Firm Size	Logarithm of the number of employees at firm level
North- West	Dummy variable that equals 1 if the firm is localised in North-Western regions, 0 otherwise
North-East	Dummy variable that equals 1 if the firm is localised in North-Eastern regions, 0 otherwise
Centre	Dummy variable that equals 1 if the firm is localised in Central regions, 0 otherwise
South	Dummy variable that equals 1 if the firm is localised in Southern regions, 0 otherwise
Sectors	Dummy variable that equals 1 if the firm is localised in sector shown in table1, 0 otherwise

Table A.2: Family Firms (FF) and Non Family Firms (NFF), tests for differences between means and proportions

	Means		Differences (FF –NFF)	t / z statistics	P>|t|
	FF	NFF			
FLB	0.11	0.29	-0.18***	-17.62	0.000
Ln (value added per employee)	10.74	11.02	-0.28***	-17.98	0.000
Ln(physical capital per employee)	9.99	10.05	-0.06	-1.12	0.263
Ln(sales st.dev., 1998-2000)	13.06	13.55	-0.48***	-8.75	0.000
Workforce characteristics					
% executives	0.03	0.06	-0.03***	-11.44	0.000
% white collars	0.35	0.46	-0.11***	-12.06	0.000
% blue collars	0.61	0.48	0.13***	14.55	0.000
% women	0.33	0.36	-0.03***	-3.40	0.001
% fixed-term contracts	0.09	0.08	0.01***	2.85	0.004
Firm characteristics					
Firm age	24.98	25.70	-0.72	-1.28	0.199
Process innovation	0.43	0.42	0.01	-0.13	0.899
Product innovation	0.51	0.52	-0.01	-0.74	0.458
Export	0.28	0.30	-0.02	-0.45	0.656
Size: 5 < n of employees<15	0.48	0.28	0.20***	13.70	0.000
Size: 15 ≦n employees < 50	0.36	0.37	-0.01	-0.80	0.422
Size: 50 ≦ n employees < 250	0.15	0.30	-0.15***	-12.66	0.000
Size: n of employees ≧250	0.01	0.06	-0.05***	-10.79	0.000
Regions (NUTS1)					
North West	0.33	0.37	0.04***	-3.28	0.001
North East	0.27	0.30	0.03**	-2.53	0.011
Centre	0.21	0.19	0.02	1.42	0.155
South	0.19	0.13	0.06***	5.50	0.000
Sectors					
Textiles, wearing apparel, food industry	0.15	0.11	0.04***	3.60	0.000
Other manufacturing, mining, utilities	0.36	0.34	0.02	0.51	0.613
Constructions	0.13	0.05	0.08***	8.40	0.000
Trade, hotels, restaurants	0.14	0.14	-0.004	-0.50	0.619
Transport and communications	0.04	0.07	-0.03***	-5.17	0.000
Intermediation and other business services	0.09	0.14	-0.05***	-5.92	0.000
Education, health and private social services	0.09	0.13	-0.04***	-3.65	0.000

Notes: The test for the differences between means is the t statistic. The test to compare proportions is the z statistic, *** significant at .01 percent level; **significant at .05 percent level

Table A.3. IV Quantile Regressions 2_LAD: First Stage (Probit Model)

Dependent Variable: FLB	Total Sample	Family Firms	Family Firms with Family management	No Family Firms
High Sales Volatility (1/0)	0.152***	0.212**	0.253***	0.082
	(0.054)	(0.083)	(0.085)	(0.127)
% executives	1.131***	1.268**	1.207**	0.424
	(0.301)	(0.570)	(0.502)	(0.610)
%white collars	-0.073	-0.087	-0.16	-0.451
	(0.109)	(0.130)	(0.200)	(0.282)
% women	-0.866***	-0.701***	-0.585***	-0.902***
	(0.134)	(0.157)	(0.171)	(0.318)
% fixed term contracts	-0.775***	-0.777**	-0.655*	-1.174**
	(0.244)	(0.378)	(0.338)	(0.551)
Ln(firm seniority)	0.326***	0.467***	0.483***	0.189*
	(0.054)	(0.080)	(0.092)	(0.110)
Ln(physical capital per employee)	-0.005	-0.017	-0.007	-0.016
	(0.021)	(0.024)	(0.028)	(0.041)
Ln(size)	0.111**	0.147	0.171**	0.059
	(0.051)	(0.093)	(0.086)	(0.155)
Process innovation	-0.011	-0.042	-0.048	0.096
	(0.054)	(0.080)	(0.083)	(0.141)
Product innovation	0.046	0.108*	0.085	-0.116
	(0.062)	(0.065)	(0.074)	(0.085)
Export	0.538***	0.464***	0.428***	0.595***
	(0.033)	(0.040)	(0.048)	(0.059)
Year 2010	-0.07	-0.079	-0.068	-0.099
	(0.046)	(0.070)	(0.068)	(0.087)
Constant	-3.973***	-4.255***	-4.372***	-2.834***
	(0.335)	(0.368)	(0.415)	(0.588)
NUTS1_level Dummies	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes
Observations	4708	2761	2557	782

Notes: bootstrap standard errors with 400 replications in parentheses.*** significant at .01 level; ** significant at .05 level; *significant at .10 level.