Enterprise-level bargaining and labour productivity of Italian family firms: a quantile regression analysis

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Abstract

We investigate the role of Italian firms to evaluate their role on labour productivity performance. We find that family owned firms are less efficient than their no-family counterparts and also that family management negatively affects labour productivity. Furthermore, we estimate the role of firm level bargaining to verify whether family controlled firms, adopting these types of agreements, may partially close their efficiency gap with respect to their competitors. We find that enterprises under family governance obtain significant efficiency gains when they adopt firm level bargaining, greater than those obtained by their no-family counterparts.

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Introduction

The presence of family-influenced firms is a common trait in many economies and their role on enterprise performance animates an ongoing debate (Chrisman et al 2010)[i]. Two main alternative perspectives have been proposed, as reviewed by Bertrand and Schoar (2006). The first one considers family firms more risk averse than their nonfamily counterparts (Demsetz and Lehn, 1985), reluctant to change and plagued by conflicts of interests between founding families and minority owners. The second opposite view, based on efficiency arguments, sets the comparative advantage of family firms, associated with their long term horizons (Habbershon, 1999), to their lower agency costs for alignment of interests inside the firm (Jensen and Meckling 1976), and to their role as a weak substitute for poor investor protection (Burkart et al. 2003).

The diffusion of family controlled firms has been documented for a number of countries, among others the US (Anderson and Reeb 2003), Western Europe (Faccio and Lang, 2002), and Eastern Asian economies (Claeesens et al. 2000). However, so far, empirical evidence on their role is sparse (Maury, 2006) and, since no conclusive results have been obtained (Schulze and Gedajlovich, 2010), additional research remains of paramount importance, especially for countries, such as Italy, typically dominated by small enterprises whose ownership and control are mainly concentrated in the hands of families (Cucculelli et al. 2014). Furthermore, previous studies have mainly focused on financial performance, whereas limited evidence is available on productivity results, with only few exceptions (Palia and Lichtenberg, 1999; Barbera and Moores, 2013; Cucculleli et al. 2014). Also, as stressed by Martikainen et al. (2009, p.2 96), what remains poorly explored is the specific 'microeconomic mechanism' through which various factors may affect family firm results.

Differently from most of the available studies, our contribution concerns productivity performances of Italian family firms. By using a unique and rich data set for the Italian economy, provided by ISFOL (Istituto per lo Sviluppo della Formazione Professionale dei Lavoratori – Institute for the Development of Workers Professional Training), we first estimate the association of family ownership and control with productivity of Italian enterprises. Second, we estimate the role of the specific mechanism represented by

firm level bargaining (FLB) to verify whether family controlled firms, adopting this type of agreements, may partially close their efficiency gap with respect to their competitors. Notice that FLB agreements, that cover an ample range of matters, have been recommended by the European Central Bank to countries facing structural crises in reforming labour markets. Their role is to increase the flexibility of wage and labour policies and to correlate these policies with specific requirements of individual enterprises (European Commission, 2011)[ii]. This is an important issue for a country that has recorded, in the last decades, one the worst performances in terms of productivity growth and has been steadily losing competitiveness in world markets (Barba Navaretti et al. 2008). Our empirical strategy allows us to verify, among the proposed explanations, not only the predominance of small firms, their sectoral specialisation, and their limited recourse to outside professional managers (Bank of Italy, 2009), but also their insufficient adoption of decentralised agreements, closely linked to firm specific needs, and thus tailored to dealing with international competitive pressures.

The results suggest that enterprises under family governance obtain significant efficiency gains when they adopt firm level bargaining, greater than those obtained by their no-family counterparts. Family-based corporate governance may shape industrial relations policies, such as performance related pay, employee training and team-based production systems, in an efficient way. The direct involvement of family when they adopt human resource management practices, negotiated in FLB, may induce a 'relational governance' that leads to a strategic commitment to employees. Thus, family ties may alleviate problems of contractual enforcement and imperfect information (De Paola and Scoppa, 2001) and the high level of 'emotional involvement' of family members may enhance communication, transmission of tacit knowledge and mobilization of human resources (Tagiuri and Davis, 1996).

To verify these hypotheses we have organized the paper as follows: section 1 briefly discusses the related literature; section 2 presents the data used and descriptive statistics; section 3 illustrates the econometric framework employed and section 4 our estimation results; section 5 concludes.

Discussion

Literature Review

The enterprise run by families is largely the predominant form that typically prevails in US and European economies (La Porta et. 1999, Burkart et al. 2003, Faccio and Lang, 2002) and a wide-ranging literature has focused on its effects on firm outcomes.

However, to date no consensus has been reached on a unique exact definition of family firms as shown, for instance, by the nearly thirty articles published in top journals and examined by Miller et al. (2007). In this literature, a large field of research, inaugurated by the seminal work of Berle and Means (1932), defines family firms as those which are "either owned, controlled, and/or managed by a family unit" (see also Barbera and Moores, 2013, p. 954). Another strand of research proposes a clearer distinction between family firms managed by external managers or run by family members; finally, other studies consider separately family firms run by founders from those run by founders' successors (Villalonga and Amit, 2006, Cucculelli and Micucci 2008).

In the literature review of Shleifer and Vishny (1997) and Bertrand and Schoar (2006), two contradictory perspectives of family enterprises have been proposed, sometimes named the 'agency' and the 'stewardship' views (Miller et al. 2008, Chirico and Bau 2014).

In the first one, 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 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 at pursuing private benefits of control (such as related-party transactions, special dividends, excessive compensations for family management, redistribution of rents from employees to family members, Shleifer and Vishny 1997). Also, family firms usually suffer mismanagement, due to the inefficient selection of executives, frequently chosen among family members rather than from a pool of external and talent managers. One related aspect is nepotism and rigid inheritance norms, with the consequence that family firms, run by second and later generation family managers, frequently underperform with respect to firms run by founding owners (Villalonga and Amit, 2006; Cucculelli and Micucci, 2008), thus dynastic management might cause a decline in the return of assets (Bennedsen et al., 2007).

Aspects closely related to the focus of our paper, e.g. labour productivity, are offered by studies that analyse the role of human and organizational resources in family firms. For instance, Caselli and

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Gennaioli, 2013) find that dynastic management reduces a firm's total factor productivity. Bloom and van Reenen (2007) analyse management practices across firms of four countries, the United States, United Kingdom, France, and Germany. They 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 the founder as well as intensity of product market competition. They show that in family enterprises, especially those that select the CEO on the basis of primogeniture, managers are of low quality, their effort is low effective, and inferior management practices are usually adopted.

The second view, the stewardship perspective, portrays family firms as organizations in which family owners are 'stewards' of the firm. Their conduct, driven by loyalty and commitment to reputation, may assure the long-run survival of their business, also through generous investments and profitable relationships with all stakeholders, thus enhancing the firm value and assuring its transmission to future generations (Habbershon, 1999). The lengthy tenure of family firms assures superior oversight and monitoring of management (Demsetz and Lehn, 1985) and more incentives in *active* control. This is also because concentrated ownership, that typifies family firms, reduces the free rider problem that usually affects dispersed ownership. In addition, 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, because "due to their longer time horizons, family owners may have a comparative advantage at sustaining implicit labor contracts, which may be reciprocated by workers with cooperative behavior."

Thus, it is expected that a set of psychological traits such as motivation, self-control, fairness and a cooperative attitude provide important enforcement mechanisms for labour discipline and long-term employment relationships, mainly in workplaces characterised by incomplete contracts (Fehr and Gachter, 2000). These traits may often pervade family firms that better socialise employees (Habbershon, 1999), promote their commitment to firm aims, provide a climate of labour relations characterised by employee involvement and dedication, and devote efforts to obtain motivation, training and loyalty from their employees (Miller et al. 2008). 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 creates a pool of resources and capabilities, unique to the family unit. In this resource view of the firm,

individual family members create unique systemic conditions, e.g. "complex arrays of systemic factors that impact strategy processes and firm performance outcomes." (Habberson et al. (2003, p.952)

The evolution of social norms, based on gift exchange and efficiency wages that enhance reputation, trust and learning processes (Bowles, 1998) are relevant aspects of the working environment. In this perspective, De Paola and Scoppa (2001) explore the role of reputation in firms that employ members of the same families and show that the no shirking condition in these enterprises allows the firm to pay lower efficiency wages.

Summing up, this short discussion suggests that the relationship between family involvement and firm performance is complex and multifaceted. We expect that negative characteristics of family ownership and management might be mitigated by firm level good practices. Our main hypothesis, tested below, is that the positive idiosyncratic traits of family firms, such as trust and superior human resource policies, are activated only when favourable firm level institutional settings emerge, for instance those agreements, recommended by the European Commission (2011) and the ECB (2011)[iii], that adapt wages and working conditions to the specific needs of companies and that in the Italian economy are still too poorly implemented.

The Italian institutional setting

The importance of family business involvement may be seen in its interactions with other aspects of corporate governance and country formal institutions (Bertrand ad Schoar, 2006). In Italy, governance structures are founded on family capitalism (more than 75 percent of listed firms are family controlled), the predominance of small business (the incidence of firms with less than 10 employees is 14 percentage points higher than 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 that 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 ends up being assigned to family governance and, concerning labour relations, the impact of firm level bargaining aimed at increasing flexibility in working conditions and wages appears particularly relevant. From the early

Nineties, Italy has been characterised by a two-tiered bargaining regime, established by the July 1993 National Income Agreement. This agreement was the first attempt to create a systematic regulation for collective bargaining, characterised by industry-wide bargaining at the first level and decentralised bargaining at the second level. In this institutional setting, first-level contracts, linked to the target inflation rate, were intended to guarantee the purchasing power of wages, whereas decentralised bargaining was intended to distribute wage premiums, linked to productivity or firm results. In addition, decentralised bargaining (at the firm or territory level) addresses a number of other matters, such as working time, employee training, labour organisation, and union relations. These negotiations may promote reorganisation and innovation of productive processes and recently there have been calls for new rules aimed at amplifying the importance of the decentralised level of negotiations[iv], so that reforming the Italian bargaining setting is the subject of current debate.

The implementation of firm level bargaining (FLB) reached so far and its influence on the productivity of Italian family firms are examined in the next sections.

Data and Descriptive Statistics

Our empirical analysis is based on information obtained by the Employer and Employee Surveys (RIL) that were 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 the year 2010 a further section was inserted in the RIL questionnaire to collect information regarding some characteristics of corporate governance, ownerships/ control and management structure. We define family firms (FF) as those controlled or owned by an individual or a family and non-family firms (NFF) all others. Thus we constructed 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 if 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; *iii)* a manager hired from *outside* the company. We thus divided family firms into two types of firms: family management (FM) (answer *i*) and no-family management NFM (answers *ii* and *iii*)[v]. Finally, we

selected the subsample of firms not involved in mergers and acquisitions in order to limit our analysis to those enterprises whose ownership and control structure remains unchanged in the observation period.

Concerning our key explanatory variable, in the RIL questionnaire each firm was asked whether or not a firm level bargaining agreement (FLB) has been adopted. These firm level agreements in Italy cover several issues, such as working time, variable pays, employee training, labour organisation, and union relations. Thus, we constructed a dummy variable indicating the existence or not of an FLB contract for each year under study.

In addition, we have information on the occupation composition of the labour force within the firm (executives, blue- and white collars), gender, type of contract (long-term/short-term) and other firm strategies (innovation and export). We also control for sectors and regions (NUTS 1) in which firms are located.

Each RIL cross-section for the years 2007 and 2010 counts about 25,000 firms, whereas its longitudinal component over the period 2007-2010 counts about 12,000 firms. In order 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.

Then the longitudinal RIL-AIDA merged sample was restricted to those limited liability companies that disclose detailed accounts following the scheme of the 4th Directive CEE. We also excluded firms with less than five employees to retain only those firms characterized by a minimum level of organizational structure. This criterion of selection, which is consistent with the focus of our paper, allows us to avoid excluding all micro-firms (those with less 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 only 19 percent (Bank of Italy, 2013, p. 5). Furthermore, we excluded firms with missing data for the key variables. Therefore, the sample that we use in the first specifications amounts to a no-balanced panel of about 7,700 firms during the period 2007-2010.[vi]

Finally, we also collected information from AIDA to set up our instrumental variable quantile regression approach, thoroughly discussed below. The instrument is a measure of sales volatility that

firms experienced in the past (the standard deviation of sales over the period 1998-2000) that we transformed into a binary variable according to the quantile treatment effect technique (Abadie et al., 2002). It is worth noting that information on lagged sales volatility, used as instrument for FLB (1 when this volatility is higher than the median value recorded in the industry in which the firm is included and 0 otherwise), is available only for a restricted sub-sample of firms (about 4700 observations in the total pooled sample). This means that by performing instrumental variable regressions we made a double robustness check. First, we took into account endogeneity and second we performed estimates on a different, more restricted sample of firms. Detailed definitions of variables are reported in Table A1.

Table 1 presents descriptive statistics for the pooled sample 2007-2010. We find that about 80 percent of firms are owned by families, (FF) and that the large majority of these firms, 92 percent, are run by family management (FM). Thus, the main characteristic of the Italian case, considering both manufacturing and service sectors, is not the prevalence of family owned firms, which is a common trait of many other countries, but the predominance of family managed firms, that represent only a minority in other economies (one third in Spain, and only one fourth in France and Germany, Accetturo et al. 2013). Data reported in Table 1 also show the limited diffusion of FLB, on average in 15 percent of the whole sample, with a higher diffusion in non-family firms (NFM), that register a percentage of 29 percent, and a lower diffusion among family firms, particularly among firms run by family management, 11 percent, whereas family firms run by external management show a higher incidence (17 percent). Interestingly, we have a correspondence between FLB diffusion and the magnitude of sales volatility that firms experienced in the past. Indeed, the highest value of sales volatility (log sales st.dev.) is in NFM firms (13.55), that are also those firms that adopt the highest number of FLB[vii].

[Table 1 about here]

NFF firms, as shown by the last column of Table 1, are also more efficient and more frequently represented in international markets as exporters, although they are no longer active in process or product innovation projects than family enterprises. In addition, we find that differences among firms, classified by corporate governance indicators, also concern workforce characteristics. NFF hire more executives and white collars and make less use of fixed-term contracts. The opposite is true for FF firms, especially for the FM subgroup. Finally, the sectoral distribution of firms shows some differences among different

groups, with a lower presence of NFF in Construction and Textiles, and a higher presence in Finance (Intermediation and other business services) and in Transports and Communications.

Summing up, the overall portrait which describes the typical profile of a family firm involved is unambiguous: they are less successful in terms of per capita value added, less present in international markets, less active in terms of outlays in investments, not particularly involved in incentive strategies and in high quality personnel policies bargained in firm level negotiations with their workforce and more present in traditional sectors.

Figure 1 depicts the distribution of labour productivity (per capita value added) referring to FLB Firms (those that adopt firm level bargaining) and Other Firms (those that do not adopt firms level bargaining). The comparison is performed for all sub-samples, distinguished on the basis of ownership and management. We find that the distribution referring to FLB firms is slightly placed to the right of that concerning Other Firms (firms without FLB) for all typologies of family firms. By contrast, for no-family firms, we have more firms without FLB (Other firms) in the end of the upper tail. These first comparisons encouraged us to further explore the existence of possible different relations between FLB and enterprise performance for family and non-family firms.

In view of our focus on heterogeneity, for each type of firm we single out the incidence of FLB along the productivity distribution, organised by quartiles. (Table 2). This allows us to check whether differences among firms, grouped according to owners and managers, but also ranked by productivity, are related to adoption of FLB. First, we observe that, for each quartile, NFF firms record a more diffuse presence of FLB; second, we obtain, as common trait for each group of firms, that FLB diffusion is increasing along the productivity distribution, at least up to the 3rd QR. However, after this quartile some fundamental differences emerge. Only in family led enterprises placed at the highest quantiles of the productivity distribution the increasing tendency persists, suggesting that only best performing firms, owned and managed by families, are also more intensively involved in collective actions with their employees. These findings clearly suggest that addressing the question of heterogeneity is particularly relevant in the Italian case, as seen below.

[Table 2 about here]

Econometric strategy and results

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Estimation strategy

In this section we present the empirical strategy we 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 capturing the role of family ownership and inserting the set of other 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, D_{FF} represents a dummy variable taking the value of 1 if the firm is owned and/or controlled by a family and zero otherwise (1). The parameter associated with D_{FF} measures whether firms owned/controlled by a family are more or less productive than no-family firms. The vector F_{it} denotes controls for other firms' characteristics and workforce composition. The parameter μ_s denotes sector specific fixed effects, γ_j regional (NUTS1_level) fixed effects for macro-areas, η_t represents year fixed effects and ε_{it} is the error term capturing the idiosyncratic component of labor productivity.

Furthermore, we restrict our analysis to family firms and insert a dummy variable, D_{FM}, among regressors, 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), D_{FM} measures whether firms managed by a family member are more or less efficient than family firms run by external managers. Concerning 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; we thus insert a dummy variable, capturing the incidence of FLB, and 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 represents a dummy variable indicating the presence of firm level bargaining.

We started with a pooled cross section analysis of equations (1), (1') and (2), controlling for time fixed effects. We prefer pooled sample estimates because we have only two years and an unbalanced panel dataset, with different number of observations for each year. Notice that restrictions of data over time is a serious constraint that limits the possibility to account for unobserved heterogeneity with fixed effect estimates and thus to explore *within* variability of firm labour productivity. However, we may address the importance of *between* firm variability by taking into account heterogeneity across firms. We started with the classical Koenker and Basset (1978) estimator:

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

$$(4) \qquad (\beta^\tau, \boldsymbol{\delta}^\tau) = argmin \sum \rho_\tau \cdot \left(ln \left(\frac{W}{L}\right)_{i,t} - \beta \cdot FLB_{i,t} - \boldsymbol{\delta} \cdot \boldsymbol{X}_{i,t} \right)$$

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

For labour productivity we estimated five different quantile regressions with $\tau = 0.1, 0.25, 0.5, 0.75$ and 0.9. In addition, we addressed heteroskedasticity by means of bootstrap standard errors (Cameron and Trivedi, 2005). As well known, 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 casual effects *and* spurious correlation between FLB and productivity, that will typically arise if more productive firms more likely adopt FLB agreements. Thus, if there are unobserved factors influencing the adoption of FLB, the estimated effect on productivity will be biased. To avoid these relationships remaining obscured, the issue of endogeneity has to be taken into account. The binary nature of our key explanatory variable (FLB) led us to handle endogeneity within the context of the treatment effect techniques. As we will discuss below, in the instrumental variable quantile method used in our estimates, we compared the performance of both treated firms (firms adopting FLB scheme) and the control group (firms that do not adopt FLB schemes) to have a counterfactual analysis. The volatility of sales at the firm level,

recorded in the past (over the period 1998-2000) [viii] may be a valid instrument because it is a proxy of uncertainty; at the same time, by 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 the sample firms, but at the same time also influences the probability that firms introduce *FLB*. The rational behind this, is that unstable market conditions, captured by sales volatility, enhances the probability of decentralized agreements which typically enhance flexibility in work organization and pay. This hypothesis finds support from the Italian experience where FLB, that includes negotiations on labour flexibility (job rotation, provision of training, changes in working hours), is most widely adopted by Italian companies as strategies of adaptation to fluctuating demand and as responses to variable, uncertain, external pressures (see the EIRO report, 1997)[ix].

A first objection is that previous sales volatility may be related to potential components of productivity. It is likely that different propensities to exports, as well as technology and innovation strategies may affect volatility of sales. For instance, firms that export and operate geographical diversification of their markets or operate in (high-tech) sectors, that use superior technology, may have different volatility of sales from other firms. However, in our estimates we control for internationalisation and innovation strategies, related to technical changes (process innovation) or diversification of markets (product innovation). In addition, the potential biases mentioned above are also mitigated by including industry dummies that capture sector-specific technological factors.

Furthermore, notice that FLB also includes agreements on wage flexibility, e.g. provisions that link pay levels more closely to the enterprise's performance; thus a second objection is that volatility of sales may lead to a lower, not higher adoption of FLB agreements, because risk-averse employees will be reluctant to accept these 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 gain positive results; thus also risk averse employees do not face any trade off from variable pays.

Concerning our estimation strategy, we use two different methods: i) the Quantile Treatment Effect Estimator of Abadie, et al. (2002) (IVQR_AAI); ii) the traditional Two-Stages Least Absolute Deviation Estimator (IVQR_2LAD) of Amemya (1982).

The IVQR_AAI estimator, that allows us to look at the impact of FLB throughout the labor productivity distribution by tackling endogeneity, presents some specific different characteristics. It is based on a binary endogenous variable and a binary instrument. Thus, we transformed the past sales' volatility of the firm in a dummy variable that is equal to 1 when the firm experienced a volatility higher than the median volatility recorded by the others, and 0 otherwise. The Abadie et al (2002) conditional quantile treatment effects estimator (IVQR_AAI) can be applied only if both endogenous variable and 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 to adopt a FLB scheme is correlated to the higher estimated probability of having experienced a past volatility of sales above the median. In our sample these compliers are about 72 percent of all firms adopting FLB. Following Abadie, et al.(2002), the conditional quantile treatment effect for compliers can be estimated consistently by the following weighted quantile regressions:

$$(5) \qquad (\beta_{IV}^\tau, \boldsymbol{\delta}_{IV}^\tau) = argmin \sum W_{i,t}^{AAI} \cdot \rho_\tau \cdot \left(ln\left(\frac{P}{L}\right)_{i,t} - \beta \cdot SLB_{i,t} - \boldsymbol{\delta} \cdot \boldsymbol{X}_{i,t} \right)$$

$$(6) \qquad (\beta_{IV}^\tau, \boldsymbol{\delta}_{IV}^\tau) = argmin \sum W_{i,t}^{AAI} \cdot \rho_\tau \cdot \left(ln\left(\frac{W}{L}\right)_{i,t} - \beta \cdot SLB_{i,t} - \boldsymbol{\delta} \cdot \boldsymbol{X}_{i,t} \right)$$

$$(8) \qquad W_{i,t}^{AAI} = 1 - \frac{SLB_{i,t} \cdot (1 - SV_{i,t})}{1 - Pr(SV=1|\boldsymbol{X}_{i,t})} - \frac{(1 - SLB_{i,t}) \cdot SV_{i,t}}{Pr(SV=1|\boldsymbol{X}_{i,t})}$$

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

The IVQR_2LAD estimator consists in using the fitted values, obtained from estimates performed in a first step, and then inserting the fitted values for FLB as a covariate to give the LAD estimator of $ln\left(\frac{P}{L}\right)_{i,t}$ in a second step. In our case, as mentioned 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.

$$(7) \quad P\left(FLB_{i,t} = 1 \middle| SV_{i,t}, \boldsymbol{X_{i,t}}\right) = \boldsymbol{\Phi}\left(\boldsymbol{\xi} \cdot SV_{i,t} + \boldsymbol{\delta} \cdot \boldsymbol{X}_{i,t}\right)$$

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

In order to obtain consistent standard errors, we bootstrapped them in both the first stage and the 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 quantile treatment effect differs across quantiles and it is precisely in that case that the quantile regression method is interesting (see also Melly, 2005 and Bosio, 2009). For this reason we only keep the IVQR_2LAD estimator as IV conditional median estimation, that permits us to show the significance of the instrument (sales volatility) in the first stage.

Results

Labour productivity and family-influenced firms

Tables 3 and 4 show the association between labour productivity and corporate governance structures. Firstly, for the whole sample we introduce as key regressor the dummy variable for family firms (Table 3); secondly, we restrict the analysis to the FF subsample and test the association between labour productivity and family management (Table 4). Both sets of estimates also control for other firm and employee characteristics. From OLS estimates, we find that family owned firms are, on average, 20.8 percent less efficient than their no-family counterparts (Table 3). In addition, within the subsample of family firms, family management negatively affects labour productivity by -9.8 percent (Table 4).

By performing quantile regression (QR), we may also address the question of firms' heterogeneity and study the effect of family ownership along different points of the productivity distribution. Also notice that QR estimates assign less weight to outliers and are robust to departures from normality, so that in cases of non-normal errors they are more efficient than OLS estimates (Buchinsky, 1998).

[Insert Table 3], [Insert Table 4]

In Table 3, we see that the coefficients of FF are negative, statistically significant at the 1 percent level and increasing across the productivity distribution, ranging from -0.15 at the 10th, to -0.29 at the 90th quantile. These results suggest that Italian firms, owned and controlled by families, are less productive than non-family firms, particularly high performers (-29 percent), thus confirming that, as such, owners often pursue family aims and private benefits of control according to the agency cost perspective mentioned above (Shleifer and Vishny, 1997).

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 (Table 4). As discussed in Section 1, family management reduces the agency problem that usually arises from separation between ownership and control, but this positive effect may be offset by some costs because family management might underperform with respect to hired professional management, causing a 'failure of meritocracy' (Caselli and Gennaioli, 2013). In our case study, this failure is overwhelming as shown by the negative association between labour productivity and family management.

With respect to other firm characteristics, as expected, we obtain a positive association of labour productivity with the capital stock per capita and, in line with other studies on Italian firms (see Hall et al. 2009), with the propensity to export and the firm's size. Controlling for the latter variable, measured by the log of employees, is particularly important because, as shown in related literature (Bertrand and Schoar, 2006, p. 86), "We expect the stronger reliance on family members in the ownership and management of family firms to be associated with smaller size on average…Reliance on family members rather than professional managers may also lead to inefficiencies in decision making that will on average slow firm growth."

We also control for firm age that may be related to the quality of management and firm performance (see among others Levesque and Minniti, 2006). Opposite effects may be conceivable. First, it is likely that aging 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). On the other hand, aging can negatively affect firm performance, inducing inertia, process rigidities, reluctance to innovation and obsolescence of initial endowments (Agrawal and Gort, 2002). Also notice that firm aging might be associated with higher probability that the firm's founder is no longer present in the firm, and that the enterprise's control has passed into the hands of his descendants, that usually destroy firm value (Villalonga and Amit, 2006)[xi]. Our results suggest that the positive aspect dominates the negative one (Tables 3 and 4), with the only exception for the lowest quantile for which no significant coefficients are found.

Estimations also control for worker heterogeneity, e.g. for a number of other potential determinants of productivity including the socioeconomic characteristics of an individual (such as gender), and three occupational groups (managers and supervisors, white- and blue-collars). The hypothesis is that the heterogeneity of workers (differentiated by gender and skills) will influence the relationships we are testing. We find that employment positions play a role, so that the coefficients associated with executives and white-collar workers are positive and significant across the whole distribution, with respect to the omitted category, the blue collars. A plausible explanation is that managerial and more skilled employees have a higher relation with productivity.

We also obtain the negative coefficient of fixed-term workers on labour productivity, but the QR analysis reveals some evidence of heterogeneity. The negative coefficients of fixed-term contracts are significant across the whole productivity distribution both in FF and FM estimates with a magnitude, in absolute value, that decreases at higher quantiles in FF and FM estimates. The higher coefficient for the lower end of the distribution suggests that, especially in low performer firms that use temporary contracts as a cost cut strategy, these forms of job instability reduces investments in training and workers' motivations, and end up deteriorating productivity prospects (Blanchard and Landier 2002).

Finally, the estimates of Tables 3 and 4 seem to confirm that lower productivity gains are obtained when the proportion of women is higher. This is in line with other studies that find that female employees, on average, prefer activities that allow larger flexibility between job and family and have lower interdependence with other workers so that they are less involved in participative and 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, as well as geographical disparities which likely influence the dependent variables and cannot be captured by the controls included in our analysis.

Labour productivity and FLB: OLS and QR estimates

Concerning the role of firm level bargaining, we briefly present the OLS and QR estimates (Tables 5-8), before focusing on the IV estimation (Table 9-11) that correct for endogeneity biases. All the results reported in these tables (5-11) are obtained by including the same control variables inserted in previous estimates. Thus, the group of firm characteristics includes size, age, and a group of variables related to

enterprise strategies: capital accumulation, export, innovation. We also reinsert worker characteristics and the same sector and regional (NUTS) dummies of our previous estimates.

Concerning our key variable, the OLS results reported in Table 5 for the whole sample suggest that FLB is positively related to changes in productivity. From our QR results, the point estimates of FLB are positive and statistically significant across the whole distribution, although at different levels of significance and with higher coefficients at the highest quantiles. Analogous results have been obtained by replicating our estimation strategy for the FF and FM sub-samples (see, respectively, Tables 6 and 7), although for the 25th quantile the coefficient of FLB is not significant for the FM firms. This means that family involved firms, both in terms of ownership, but also in terms of active management, tend to exploit some of the advantages of firm level negotiations. On the contrary, as shown in Table 8, non-family firms (NFF) do not seem to gain significant improvements in labour productivity from bargaining with their workforce. Indeed, with the exception of the 75th quantile, we obtained no significant coefficients of FLB at the median value and other points of the productivity distribution.

[Insert Table 5], [Insert Table 6], [Insert Table 7], [Insert Table 8]

The findings for the NFF subsample confirm some major criticism on the bargaining setting and practices experienced so far 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 suited to respond better and more rapidly to the specific and changing conditions faced by individual firms. Other workers' representations have signalled the long delays in reaching agreement, often signed months after the old agreement has run out (European Trade Union Institute, 2014). These critical aspects likely concern particularly firms without a controlling family owner, that are more frequently larger organizations characterised by slower reactivity to changes, more 'confrontational' environments and bitter labour conflicts. By contrast, those family-controlled firms that may assure implementation of FLB more easily exploit advantages coming from these company agreements, that mainly consist in more 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 of FLB on the

productivity distributions (with respect to OLS and QR estimates with exogenous FLB) for the whole sample, as well as FF and FM sub-samples (see, respectively Tables 9, 10, 11). The IVQR_AAI estimates for FF (Table 10) show that the coefficient of FLB stays within the range 0.433 (at the median value) and 0.609 (for the Q10[th]). For the FM firms, the range is between 0.407 and 0.582 (median and Q90[th]).

We also show the results obtained by using the IVQR_2LAD method (reported in the last column of Tables 9-11). We use this estimator, that allows us to obtain the conditional median result (Chernozhukov and Hansen, 2005 and Melly 2005), also because it permits testing the statistical significance of the instrument obtained in the first stage (see Table A.2). From our results, the validity of our strategy is given by the coefficients of the volatility of sales (our external instrument described above) that shows the expected sign and is significant at the 1 percent and 5 percent levels (Table A2, Appendix). It seems to confirm that our instrumental variable helps reduce the downward bias due to measurement errors (Griliches and Hausman, 1986).

For both the whole sample and the FF firms (Tables 9 and 10), we found a 'U shaped' relationship between FLB and the dependent variable (the magnitude of coefficients decreases, moving from the lowest quantile to the median quantile, and increases again at the 90th quantile). These findings suggest that, especially for low and high performers, firm level agreements provide incentives and appropriate labour flexibility arrangements that improve enterprise performance.

By rerunning the estimates for the FM group (Table 11), we find that FLB is still significant at the 1 percent level, with point estimates lower with respect to the FF sample at all quantiles but the Q90[th]. All these findings were obtained by controlling for the wide set of firm and worker characteristics, time, sector and regional dummies, introduced also in the OLS and QR estimates, discussed above.

Finally, Table 12 shows the results for non-family firms. For this subsample, we obtain significant impacts of FLB only at the Q10[th] and the Q75[th], whereas for the rest of the distribution the insignificant impacts already found in OLS and conventional QR estimates (see Table 8) are confirmed. Also notice that for the NFF group the correction introduced with IV estimates is not significant[xii] (Table A2, Appendix).

[Table 9], [Table 10], [Table 11], [Table 12]

To summarise, one plausible interpretation of all previous results is that FLB activates advantages of family involvement, thus permitting the achievement of positive outcomes from agreements on labour and wage flexibility. Indeed, it is conceivable that family owners, who sign firm level contracts, may also be oriented to consolidate their market position through investing in cooperative relations with their workforce. It means that negotiations on labour flexibility and wage incentives may reveal distinctive features of those firms that are less subject to self interest and less prone to extract resources for personal aims. They are likely to elicit more effort from their subordinates, obtain their higher commitment and thus experience higher firm performance. In addition, it is conceivable that family owners, with large ownership stakes, have more incentives to bear the costs of active labour relations. By contrast, this activism is less relevant in non-family firms where, in conformity with Bertrand and Mullainathan (2003), hired managers tend to prefer a 'quiet life' and are less prone to be involved in monitoring and supervisor activities.

Conclusions

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

This paper has attempted to make a step in this direction. Its contribution has been to empirically evaluate the role of Italian family firms by using labour productivity as a measure of their performance rather than profitability or firm value, usually adopted in most related works.

Our results firstly suggest that by taking into account the diversity of ownership and management permits a better understanding of the heterogeneity of Italian firms. A priori, two distinct, contradictory views may be conceivable. The first one, grounded on agency rationales, sees family owners as self serving at the expense of the efficient functioning and success of the company. Comparative descriptive analyses, as well as OLS and Quantile estimates are in line with this prediction and indicate that the

presence of family owners and family managers is unambiguously negatively associated with gains in labour productivity.

However, a second view, based on the stewardship of loyal family owners, considers family business as a favorable setting, that may engender strategic policies and positively affects efficient firm organization. We have tested whether firm level bargaining plays some role in reversing the previous negative results and in providing support to the stewardship view. Indeed, we showed that this is the case. In particular, the IV estimates have permitted us to estimate the causal effect of these decentralized agreements on the productivity of family involved firms. We found that family ability to exploit opportunities offered by local agreements with their workforce is positive and significant in family firms but not in non-family firms. Thus, it is likely 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 more relevance to the future prospects of the enterprise. In these companies, FLB, that also includes training programs and profit sharing schemes, ends up being a signal that reveals their strategic commitment to enhance firm competitiveness and likely benefits all stakeholders, including employees, along the line proposed by the 'stewardship ' view. Thus, family may provide "the springboard for a form of firm specific organizational capital known as family social capital"(Schulze and Gedajlovic, 2010, p. 196).

This result is of great concern in Italy. FLB allows family leaders to sign strategic commitments to their employees, so that that family ownership and involvement may be an 'effective organizational structure' (Anderson and Reeb, 2003). The clear political message is that an enhanced implementation of agreements on 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 in last decades. The recent proposed changes to the two-tier system of bargaining, giving a greater role to negotiations at company level on issues such as working time and wage flexibility, might improve labour productivity and reduce the efficiency gap with major international competitors (European Trade Union Institute, 2014). Thus, removing the incomplete implementation of the Italian bargaining rules seems a valid response for improving both family enterprise performance and the Italian system of corporate governance.

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Endnotes

[i] Chrisman et al (2010) examine 25 articles that have been particularly influential in research on family businesses, identify common themes among those studies, and indicate directions for future research in the field.

[ii] One reason behind the decentralisation of collective bargaining is to remove too-rigid wage and working conditions that lead to low workforce motivation and productivity and less competitive firms involved in global competition. However, the evidence about the influence of the degree of centralisation and coordination of collective bargaining on aggregate employment and unemployment remains inconclusive, as indicated in the OECD Employment Outlook, 2006. One crucial factor is whether wage bargaining agents internalise negative externalities of their wage demands in centralised settings.

[iii] See Draghi, M. and J.-C. Trichet (2011) 'Letter to the Prime Minister of Italy', 5 August.

[iv] The 2009 agreement (Accordo Quadro Riforma degli Assetti Contrattuali, 22 January 2009) was signed by the government, the national employers' associations and the trade unions, with the exception of CGIL (one of the three main national representative organisations of employees).

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

[vi] The RIL Survey sample is stratified by size, sector, geographic area and the legal form of firms. 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 the different 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. By 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).

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

[viii] As explained in the previous section, the volatility of sales is not available for all firms, hence robustness checks are performed on a restricted sample.

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

[x] We estimated a modified version of $W_{i,t}^{AAI}$ that allows only positive weights, see Abadie, et al. (2002) and Frölich and Melly (2013).

[xi] 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.

[xii] 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		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 caracteristics										
% 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
Firms characteristics										
Firrm age	25.21	16.53	25.09	15.87	24.98	15.74	26.27	17.44	25.70	19.02
Process innov	0.43	0.49	0.43	0.49	0.43	0.49	0.41	0.49	0.42	0.49
Product innov	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 service	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	

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

Table2

Incidence of FLB by quartile of productivity distribution

	Total sample	Family Firms	Family management Firms	Non-family management firms	Non-family Firms
1-25th	0.084	0.059	0.062	0.216	0.246
25-50th	0.137	0.111	0.116	0.321	0.326
50-75th	0.183	0.123	0.132	0.391	0.399
75-100th	0.252	0.183	0.195	0.384	0.350
total	0.15	0.11	0.11	0.17	0.29

Figure 1

Labour productivity distribution according to firm level bargaining (2007-2010)
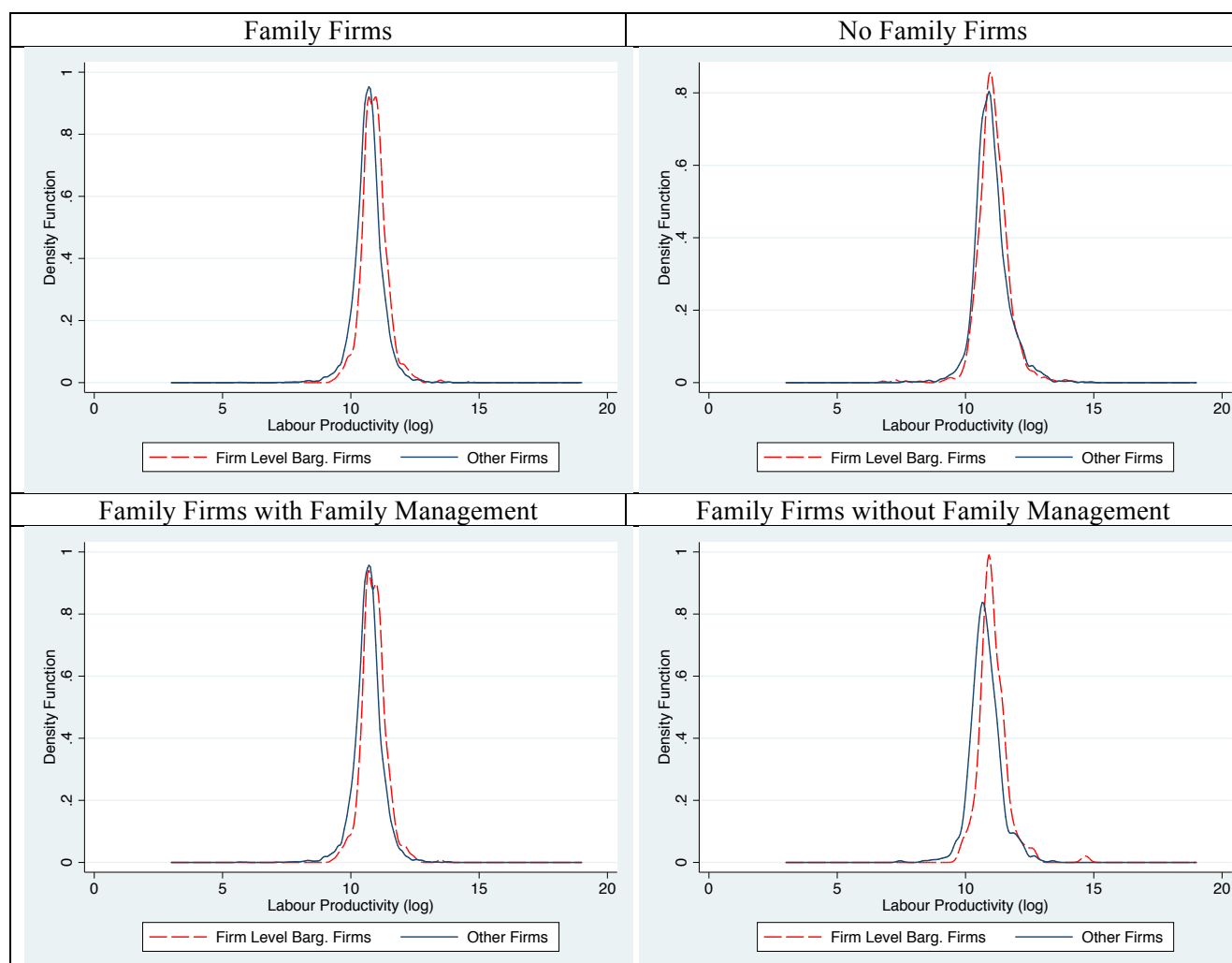
Table 3
OLS and Quantile Regressions: Family firms and Labor Productivity

	Quantile estimates					OLS
	Q10	**Q25**	**Q50**	**Q75**	**Q90**	
Family firms	-0.149***	-0.160***	-0.162***	-0.216***	-0.290***	-0.208***
	(0.022)	(0.014)	(0.013)	(0.013)	(0.021)	(0.013)
% executives	0.176	0.459***	1.060***	1.389***	1.810***	0.958***
	(0.114)	(0.075)	(0.086)	(0.088)	(0.111)	(0.078)
%white collars	0.366***	0.398***	0.433***	0.520***	0.640***	0.472***
	(0.026)	(0.020)	(0.022)	(0.024)	(0.033)	(0.022)
% women	-0.510***	-0.471***	-0.441***	-0.421***	-0.414***	-0.444***
	(0.028)	(0.019)	(0.020)	(0.023)	(0.038)	(0.022)
% 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)	(0.037)
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)	(0.007)
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)	(0.005)
Year 2010	-0.102***	-0.063***	-0.043***	-0.052***	-0.047***	-0.064***
	(0.015)	(0.009)	(0.011)	(0.011)	(0.017)	(0.010)
Constant	9.238***	9.465***	9.640***	9.842***	10.015***	9.561***
	(0.068)	(0.046)	(0.047)	(0.056)	(0.094)	(0.046)
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: Robust (OLS) and bootstrap (Quantile Regression) standard errors in parentheses. .*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 4.
OLS and Quantile Regressions: Labor Productivity and Family Management (estimates for the family firms subsample)

	Quantile estimates					OLS
	Q10	Q25	Q50	Q75	Q90	
Family management	-0.116***	-0.094***	-0.063***	-0.067***	-0.072*	-0.098***
	(0.020)	(0.016)	(0.015)	(0.024)	(0.040)	(0.019)
% executives	-(0.053)	0.235***	0.568***	0.989***	1.348***	0.587***
	(0.090)	(0.083)	(0.098)	(0.082)	(0.141)	(0.083)
%white collars	0.338***	0.399***	0.436***	0.490***	0.576***	0.424***
	(0.035)	(0.023)	(0.014)	(0.030)	(0.039)	(0.023)
% women	-0.496***	-0.450***	-0.422***	-0.415***	-0.407***	-0.429***
	(0.028)	(0.025)	(0.021)	(0.019)	(0.037)	(0.023)
% fixed term contracts	-0.569***	-0.469***	-0.370***	-0.250***	-0.209***	-0.403***
	(0.056)	(0.040)	(0.032)	(0.037)	(0.044)	(0.039)
Ln(firm seniority)	(0.017)	0.025***	0.024***	0.028***	0.032*	0.027***
	(0.011)	(0.007)	(0.009)	(0.010)	(0.016)	(0.008)
Ln(physical capital per employee)	0.097***	0.103***	0.103***	0.118***	0.138***	0.121***
	(0.008)	(0.005)	(0.003)	(0.004)	(0.007)	(0.004)
Process innovation	0.040*	0.022	0.020*	0.001	-0.01	0.027**
	(0.022)	(0.019)	(0.011)	(0.012)	(0.013)	(0.012)
Product innovation	(0.027)	0.013	-0.01	-0.008	-0.029	-(0.005)
	(0.021)	(0.016)	(0.011)	(0.011)	(0.018)	(0.011)
Export	0.108***	0.084***	0.064***	0.083***	0.080***	0.091***
	(0.015)	(0.013)	(0.012)	(0.015)	(0.028)	(0.012)
Ln(size)	0.055***	0.040***	0.028***	0.004	-0.023***	0.019***
	(0.008)	(0.005)	(0.006)	(0.005)	(0.008)	(0.006)
Year 2010	-0.113***	-0.074***	-0.047***	-0.050***	-0.045**	-0.073***
	(0.018)	(0.013)	(0.011)	(0.010)	(0.019)	(0.010)
Constant	9.072***	9.269***	9.481***	9.622***	9.680***	9.344***
	(0.078)	(0.047)	(0.040)	(0.045)	(0.087)	(0.050)
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	0.177	0.179	0.183	0.297
Observations			9492			

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

Table 5
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)	(0.014)
% 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)	(0.021)
% women	-0.522***	-0.498***	-0.470***	-0.448***	-0.466***	-0.459***
	(0.037)	(0.029)	(0.023)	(0.024)	(0.028)	(0.022)
% 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)	(0.007)
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)	(0.005)
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: Robust (OLS) and bootstrap (Quantile Regression) standard errors 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 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)	(0.016)
% executives	-0.054	0.275***	0.595***	0.987***	1.330***	0.616***
	(0.118)	(0.090)	(0.100)	(0.090)	(0.182)	(0.084)
%white collars	0.345***	0.388***	0.433***	0.486***	0.572***	0.426***
	(0.033)	(0.023)	(0.018)	(0.027)	(0.041)	(0.023)
% women	-0.486***	-0.454***	-0.423***	-0.410***	-0.408***	-0.430***
	(0.037)	(0.025)	(0.023)	(0.030)	(0.042)	(0.023)
% 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)	(0.039)
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)	(0.008)
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)	(0.011)
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)	(0.010)
Constant	9.006***	9.195***	9.460***	9.558***	9.650***	9.269***
	(0.059)	(0.051)	(0.047)	(0.053)	(0.099)	(0.047)
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: Robust (OLS) and bootstrap (Quantile Regression) standard errors in parentheses. .*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 7
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***	0.109**	0.077***	0.072***
	(0.025)	(0.021)	(0.017)	(0.043)	(0.017)	(0.025)
% executives	-(0.117)	0.183**	0.528***	1.038***	0.481***	-(0.117)
	(0.099)	(0.083)	(0.071)	(0.178)	(0.083)	(0.099)
%white collars	0.358***	0.400***	0.436***	0.595***	0.427***	0.358***
	(0.035)	(0.022)	(0.019)	(0.044)	(0.024)	(0.035)
% women	-0.496***	-0.457***	-0.422***	-0.397***	-0.426***	-0.496***
	(0.038)	(0.023)	(0.024)	(0.040)	(0.024)	(0.038)
% fixed-term contracts	-0.558***	-0.455***	-0.341***	-0.149**	-0.382***	-0.558***
	(0.090)	(0.048)	(0.032)	(0.062)	(0.041)	(0.090)
Ln(firm seniority)	(0.008)	0.019**	0.021***	0.026**	0.025***	(0.008)
	(0.009)	(0.008)	(0.006)	(0.010)	(0.008)	(0.009)
Ln(physical capital per employee)	0.092***	0.103***	0.101***	0.136***	0.119***	0.092***
	(0.005)	(0.004)	(0.003)	(0.007)	(0.004)	(0.005)
Process innovation	0.053***	0.027*	0.02	-0.026	0.032***	0.053***
	(0.020)	(0.016)	(0.012)	(0.025)	(0.012)	(0.020)
Product innovation	(0.028)	0.01	-0.005	-0.019	-(0.003)	(0.028)
	(0.018)	(0.015)	(0.011)	(0.023)	(0.012)	(0.018)
Export	0.094***	0.083***	0.064***	0.075***	0.087***	0.094***
	(0.018)	(0.014)	(0.010)	(0.020)	(0.012)	(0.018)
Ln(size)	0.052***	0.038***	0.021***	-0.036***	0.013*	0.052***
	(0.011)	(0.007)	(0.005)	(0.012)	(0.007)	(0.011)
Year 2010	-0.109***	-0.078***	-0.049***	-0.048**	-0.074***	-0.109***
	(0.018)	(0.010)	(0.010)	(0.020)	(0.011)	(0.018)
Constant	9.027***	9.201***	9.468***	9.689***	9.284***	9.027***
	(0.061)	(0.054)	(0.048)	(0.088)	(0.049)	(0.061)
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	0.289
Observations			8745			

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

Table 8
OLS and Quantile Regressions: FLB and labour productivity in No- 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)	(0.029)
% executives	1.141***	1.640***	1.967***	2.275***	2.355***	1.930***
	(0.260)	(0.135)	(0.144)	(0.188)	(0.359)	(0.155)
%white collars	0.366***	0.398***	0.450***	0.602***	0.854***	0.590***
	(0.062)	(0.046)	(0.041)	(0.062)	(0.099)	(0.056)
% women	-0.601***	-0.587***	-0.498***	-0.452***	-0.431***	-0.509***
	(0.093)	(0.042)	(0.058)	(0.065)	(0.118)	(0.060)
% 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)	(0.111)
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)	(0.008)
Process innovation	0.042	0.009	0.01	-0.015	0.082	-0.017
	(0.043)	(0.023)	(0.021)	(0.026)	(0.058)	(0.028)
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)	(0.030)
Ln(size)	0.049**	0.026*	-0.013	-0.052***	-0.101***	-0.02
	(0.019)	(0.014)	(0.011)	(0.014)	(0.023)	(0.012)
Year 2010	-0.037	-0.006	-0.027	-0.032	-0.048	-0.022
	(0.042)	(0.023)	(0.027)	(0.027)	(0.047)	(0.026)
Constant	9.823***	9.847***	9.950***	10.137***	10.646***	9.980***
	(0.215)	(0.109)	(0.167)	(0.159)	(0.242)	(0.147)
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: Notes: Robust (OLS) and bootstrap (Quantile Regression) standard errors in parentheses. .*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 9
IV Quantile Regressions: FLB and Productivity (whole sample)

	IV Quantile estimates					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: IV (Quantile Regression) standard errors in parentheses. .*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 10
IV Quantile Regressions: FLB and Productivity (family firms)

	IV Quantile estimates					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: IV (Quantile Regression) standard errors in parentheses. .*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 11

IV Quantile Regressions: FLB and Productivity (family Firms with family management)

	IV Quantile estimates					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: IV (Quantile Regression) standard errors in parentheses. .*** significant at .01 level; ** significant at .05 level; *significant at .10 level

Table 12

IV Quantile Regressions: FLB and Productivity in No-Family family firms

	IV Quantile estimates					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: IV (Quantile Regression) standard errors in parentheses. .*** significant at .01 level; ** significant at .05 level; *significant at .10 level

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. IV Quantile Regressions 2_LAD: First Stage

	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