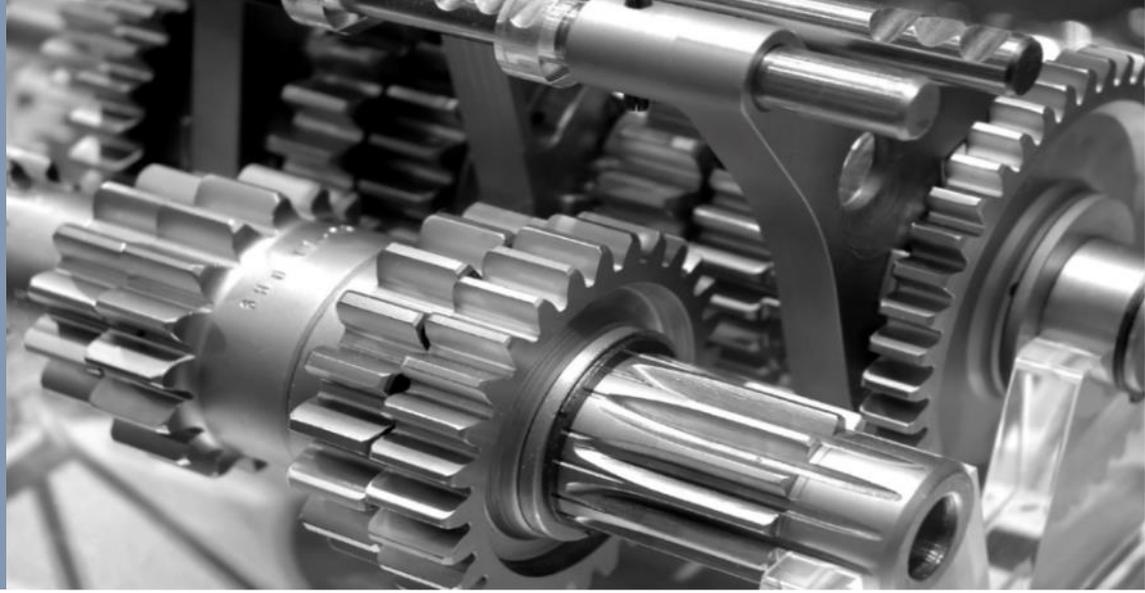


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**La Grande Recessione e le imprese manifatturiere**

*The Impact of the Great Recession on Manufacturing Firms*

Proceedings

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**FAMILY FIRMS AND THE GREAT CRISIS:  
EVIDENCE FROM THE ITALIAN CASE**

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# **FAMILY FIRMS AND THE GREAT CRISIS: EVIDENCE FROM THE ITALIAN CASE**

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## **ABSTRACT**

Few studies have analyzed how family firms have acted during the global great crisis in comparison to their nonfamily counterparts. This paper tries to fill this gap on the basis of the Italian experience using a sample of almost 4,500 for 2007 and 2010. We study whether family control affects labour productivity, labour costs and competitiveness and if the adoption of performance related pay (PRP) reveals an efficacious strategy to mitigate the effects of the crisis and reduce the gap in competitiveness with respect to nonfamily firms. We use quantile regression techniques to test the heterogeneous role of PRP and pay attention for its possible endogeneity. We have observed that after the outburst of the crisis, the distance in terms of competitiveness of family firms with respect to their nonfamily counterparts has been amplified. We also find that family firms may take advantage from the adoption of incentive schemes, such as PRP, to encourage commitment and motivation from their employees more than nonfamily firms. The positive role of PRP on labour productivity, coupled with a moderate influence of these schemes on wage premiums, enable them to regain competitiveness also under hostile pressures, as those featuring the strong global crisis.

JEL Classifications: G32, J33, D24.

Keywords: family firms; performance related pay; labour productivity; wages; competitiveness.

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## **Introduction**

“Family involvement in business is the core variable that distinguishes family enterprise research from other disciplines.” (Sharma and Carney, 2012, p.238) This field of research is of paramount importance because private held family firms are the most common organizational form around the world (Fogel, 2006). Yet this literature is still underdeveloped and more than 80% of the research on management has been focused only on listed firms (Sharma and Carney, 2012). One major issue that deserves further attention concerns strategies of family firms (FF) to respond to disruptive shocks. Even after the onset of the last global crisis, the research on characteristics of FF that make them more resilient or not with respect to nonfamily firms (NFF) when dealing unexpected strong shocks is still less advanced. The outburst of the great economic crisis is a

natural experiment for evaluating this specific issue and verifying how family firms response to sudden adverse events, comparing their reactions to those of their nonfamily counterparts. So far this issue has received only a very limited attention and with a focus on financial strategies and financial outcomes (Lins et al. 2012; Bauweraerts, 2013; Essen, 2015). Changes in management strategies of family firms, in particular on wage incentives, adopted during the global recession, are less explored so far. Differently from few available literature, our paper is focused on sensitivity of family firms in designing enterprise level contracts to deal with the crisis, in particular on contractual clauses on performance related pays (PRP). Specifically we analyze whether during the last recession, PRP affected differently wages and productivity of family firms (FF) in comparison to nonfamily firms (NFF). This is an extremely important issue since PRP might be a channel that might contribute to explain the different managerial abilities to respond to market pressures.

In order to explore this topic we use the surveys for the years 2007 and 2010 provided by ISFOL (Istituto per lo Sviluppo della Formazione Professionale dei Lavoratori – Institute for the Development of Workers Professional Training) that cover a national representative sample of Italian firms. From this unique and rich dataset, we have access to information on firm ownership and management, establishment and workplace characteristics for a nationally sample of Italian firms of all dimensional size. The information we obtain allows us looking at evidence on corporate governance issues of family firms in Italy, without limiting the analysis on listed firms.

We mainly focus on the conditional mean within estimator (panel data regression) and adopt the quantile fixed effect technique of Canay (2011) to study the role of PRP along the entire conditional productivity and wage distributions<sup>1</sup>. This strategy permits to test the heterogeneous effects of PRP and to determine whether firms in different positions of the wage and productivity distributions benefit from PRP differently from their peers. In addition, we control for possible endogeneity of PRP by means of the instrumental variable quantile regression techniques that will be discussed below.

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

## **2. Background**

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<sup>1</sup> Since we investigate also the effect of PRP on competitiveness, we indeed considered the larger aggregate of labour costs rather than wages. However, in order to avoid excessive repetitions we use in this paper “labour costs” and “wages” as interchangeable terms.

The main question we address is if a strong global crisis heighten or mitigates advantages and disadvantages of family firms (FF) and thus if specific traits of FF do affect their resilience, i.e. “the ability of organizations to avoid, absorb, respond to, and recover from situations that could threaten their existence” (Chrisman et al. 2011, p.1107).

As noticed by Astrachan (2010), family firms abilities to face structural adverse shocks are still under-investigated, but, in order to explore their longevity, two different competing narratives may be relevant. On the one hand, family firms may present disadvantages to face a crisis because they are reluctant to change and suffer for conflicts of interests between founding families and minority owners (Bertrand and Schoar, 2006). Families interested in preserving their control may divert resources to accomplish this aim and during a crisis their underperformance may be higher because outside investors would expect private benefits of control to be particularly costly (Lins et al .2013). Furthermore, the FF risk aversion may hinder the adoption of new strategies to deal with unexpected events, at least in comparison to their nonfamily counterparts (Demsetz and Lehn, 1985).

On the other hand, specific advantages that typify FF and that are relevant during a crisis are their long term horizons (Habbershon and Williams, 1999), their lower agency costs for alignment of interests inside the firm between ownership and management (Jensen and Meckling 1976), their pursuit to preserve accumulated socio-emotional endowments (Gómez-Mejía et al., 2007). Concerning the role of alignment of interests between owner and management during a crisis, it may be argued that “managers have the incentive to take excessive risky projects when firm is close to bankruptcy because they get the upside gain of the excess risk but lose nothing from the downside failure” (Zhou, 2012). On the contrary, the alignment of interests between owners and managers of FF reduces the probability of excessive risk taking and may reveal “an undeniable competitive advantage during a crisis period.” (Bauweraerts, 2013, p. 92).

An additional factor that influences abilities of FF to survive to adverse shock is the greater interest of FF for their socio-emotional wealth (SEW). Gomez-Meja et al. (2007) show that family firms are not only concerned with financial returns, but their ‘primary reference point’ is their socio-emotional wealth and this concern affects their exposure to risk and adoption of different risky strategies<sup>2</sup>. In the SEW view, FF might go beyond financial aims and might meet the desires of diverse parties, sometimes with conflicting interests, such as employees, suppliers and

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<sup>2</sup> The authors, using a population of 1,237 family-owned olive oil mills in Southern Spain show that “ family firms are willing to accept a significant risk to their performance; yet at the same time, they avoid risky business decisions that might aggravate that risk” (Gómez-Mejía et al. 2007, p.106).

community at large. Going one step further, there may be also ‘instrumental motives’ according to which interests for other stakeholders is a tool to maximize shareholder interests (Jones and Wicks, 1999). In this vein Cennamo et al. (2012) argue that family firms have higher propensity to adopt proactive stakeholder engagement activities because they intend to preserve and enhance their socio-emotional wealth. Thus, as signaled by the authors “the family firm will proactively engage more primary, internal stakeholders (those whose welfare is most directly affected by the firm’s actions such as employees, suppliers, and shareholders) as a way to strengthen relational trust, and gain endorsement over the firm’s direction and management.” (Cennamo et al., 2012, p. 1155). The concern for strong social ties for internal stakeholders was also addressed in a previous study by Sraer and Thesmar (2007). The authors showed that FF have interests for employment continuity, and these interests usually typify family firm strategies. They documented that FF and heir-managed family enterprises pay low wages but smooth out employment across the business cycle, thus offering their workers with long-term implicit insurance contracts. Also Bach and Serrano-Velarde (2009) and Mueller and Philippon (2011) argue that FF are interested in maintaining valuable implicit contracts with their employees and thus in a crisis period may adopt less layoffs and lower labour cost reductions.

Concerning reactions to the crisis, these different hypotheses have been tested in few studies. Lins et al (2012) have analyzed whether and how family control affects valuation and corporate decisions during the years 2008–2009 using a sample from 35 countries. The authors do not find support for this ‘implicit contract’ hypothesis, as FF engage in layoffs and labour cost reductions just as other firms do. Also, they find that family-controlled firms underperform significantly, also because they cut investment more relative to other firms and took actions to preserve their control benefits at the expense of outside shareholders.

On the contrary, in a study for Belgium, Bauweraerts (2013) has found that family involvement has played a positive role in terms on return of assets, likely because the importance given to socio-emotional wealth during previous stable periods had provided family firms with a competitive advantage in terms of a less formalistic view of the organization. This attitude has enhanced flexibility to cope an unexpected event such as the global financial crisis.

Essen (2015) has considered family firms outcomes of 27 countries and their pre-crisis and post-crisis conditions. His findings suggest favorable employee outcomes of FF, but not crisis-specific. Favorable employee outcomes are a confirmation that FF “ typically demonstrate greater stewardship toward their employees regardless of economic conditions”. (Le Breton-Miller et al., 2011).

In our analysis, we try to test the relationship between family involvement and performance for the Italian case, taking into account environment conditions caused by the global economic crisis. In particular, we verify if managerial strategies based on performance related pay represent a specific ‘microeconomic mechanism’ through which family firm involvement may affect firm labour productivity and competitiveness and whether the efficiency of this mechanism is altered by the crisis.

As known, PRP schemes may determine beneficial effects because these schemes are a useful device to select, retain and motivate employees, thus inducing greater effort and higher quality of workforce. However, these schemes may present also some drawbacks. For instance, collective PRP bonuses may induce employees to free-ride on the efforts of others and thus cut productivity. A plausible solution to the problem of free-riding attitudes is the promotion of team culture and employee participation in decision-making, a policy which contributes, like financial participation, to increasing commitment (Kruse et al. 2010). Furthermore, social ties between workers are important, as shown by Bandiera et al. (2010). Along these lines, it may be argued that in family businesses the climate of industrial relations encouraging cooperative attitudes, self-control and fairness, may mitigate the various drawbacks of incentive schemes.

The Italian context is an ideal setting to verify if family organizational form plays some role in explaining heterogeneity in responses to the crisis. The country is dominated by small enterprises whose ownership and control are mainly concentrated in family hands (Cucculelli et al. 2014; Damiani, Pompei and Ricci, 2016). More than 75 percent of listed firms are family controlled and Italy records the widespread use of pyramidal groups (family-controlled pyramids represented 20 percent of market capitalization at the end of the 1990s) (Bianco and Casavola, 1999). 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, especially during a strong and sudden adverse shock. The need for additional stimulus and new encouragement of performance related pays to closely link wages to enterprises performance inspired the reform proposals of 22 January 2009, incorporated in the agreement which was signed by the government, national employers' associations and the trade unions, with the exception of CGIL (one of three main national representative organizations of employees). The agreement designs new rules for wage setting in order to amplify the importance of the variable wage component and was matter of political debate and interventions in the following years.

The changes introduced in 2009, relevant for our analysis, are discussed further below. (1) The new agreement explicitly envisages that a production bonus is negotiated in every enterprise. In this way, the trade unions and workers have the right to the opening of negotiations on the introduction of production bonuses in all enterprises where the new system is applied. (2) The trade unions renounce to national level negotiations regarding increases in remuneration linked to productivity (as was done in the old system), with the aim of leaving more room to enterprise-level negotiations. However, the agreement also envisages that national sectoral agreements include a “guaranteed element of remuneration”, intended to be effective in those enterprises where enterprise-level negotiations do not take place. (3) Enterprise agreements now are able to define procedures and conditions for modifying, entirely or partly, also temporarily, specific elements (economic and normative) of sectoral collective agreements (Accordo Quadro Riforma degli Assetti Contrattuali, 22 January 2009)<sup>3</sup>.

We will test how these measures aimed at encouraging greater use of PRP systems, at the aftermath of the crisis have been effective in family and nonfamily firms.

### **3. Data and Descriptive Statistics**

#### **3.1 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, the RIL survey also offers 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 nonfamily firms (NFF) all other firms. Thus, we created a dummy variable that equals one if a firm is owned/controlled by a family (family firms, FF) and 0 otherwise (nonfamily firms, NFF). In 2010 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

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<sup>3</sup> Other changes introduced in 2009 are the following. The duration of sectoral agreements, which in the past used to be valid, for the normative part, for four years, and for the economic part for two years, is raised to three years, both for the economic and normative parts. Finally, wage increases are anchored to anticipated inflation, determined on the basis of the estimated inflation index (the EU harmonized consumer prices index), with the exclusion of prices of imported energy products.

hired from *outside* the company. Firms responding *i*) and *ii*) are about 90% of family firms and the results we obtain for firms with family management are always not significantly different from those obtained for family owned firms (Damiani, Pompei and Ricci, 2016), thus we decided to only keep the main distinction between family and nonfamily firms. 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.

In the RIL questionnaire, each firm was asked whether a firm-level bargaining agreement had been adopted. Such firm-level agreements in Italy cover, among various issues, performance related pay, i.e. wage bonuses linked to the enterprise performance (PRP). Thus, we created a dummy variable that indicates the presence of some kind of performance related pay scheme (PRP).

Other regressors introduced in our estimates concern 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), training activities, firm size and other firm strategies (hiring, 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. We excluded firms with fewer than five employees to retain only firms characterized by a minimum level of organizational structure. Therefore, the sample that we used in the first specifications was an unbalanced panel of approximately for 4476 firms for 2007 and 4336 for 2010.

### 3.2 Descriptive statistics

Table 1 permits a comparison *between* family and nonfamily firms (FF and NFF, respectively) before and after the outburst of the crisis<sup>4</sup>. Over the period 2007-2010, FF were less successful in terms of per capita value added, paid lower wages and their competitiveness indicator ( $\ln(P/LC)$ ) was more unfavourable to these firms. Concern capital intensity, FF had on average a lower value of the physical capital per employee with respect to the NFF group. In addition, Table 1 shows that FF employed less executives and white collars, made less use of training, were less active than nonfamily enterprises in product innovation, and, as regards their workforce, had a lower proportion of men and a higher percentage of fixed-term contracts.

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<sup>4</sup> Further details for these variables are available in Table A.1, in the Appendix.

However, our major interest is to investigate the various disparities in responses of FF and NNF to the global financial recession. We start with our key variable, i.e. the diffusion of firm level bargaining on performance related pay (PRP).

#### Insert Table 1

From Table 1 it appears that the incidence of agreements on PRP was modest before the crisis and that a smaller fraction of FF adopted payments by results (8%) with respect to NFF (26%). In 2010, these different propensities to PRP are still remarkable but, likely also as result of the 22 January 2009 agreement commented above, both groups slightly increased their recourse to PRP (9% and 29%, in FF and NFF, respectively). Interestingly, this change was accompanied by the increasing proportion of trained employees that in FF passed from 20 percent in 2007 to around 25 percent in 2010. A significant increase was also recorded in NFF (from 28% to 35%). This evidence show that, after the outbreak of the great economic crisis, Italian enterprises featured a slight higher recourse to performance related pays and a higher intensity of training programs of their workforce. Furthermore, we also observe the slight decline of fixed- term contracts, that in FF were around 10 percent in 2007 and 9 percent in 2010. In NFF the decline was from 9% to 7%. These tendencies for training and fixed-term contracts confirm that also in Italy, as in other European countries, during the crisis “firms try to protect the human capital embodied in skilled blue-collar and white-collar workers” (Békes et al. 2011, p. 2), giving priority to the retention of human capital embodied in skilled labour and retraining the other workers. These organizational changes are confirmed by other employee characteristics. For both groups of firms we observe slight changes in the structure of the workforce in terms of occupational categories (executives, white and blue collars). The need to retain human capital leaded to an increase of shares of executives and white-collars, and a parallel decline of blue-collars. These results confirm evidence obtained by the research conducted by the ESCB’s Wage Dynamics Network –WDN- for the Italian firms with more than 20 employees (D’Amuri et al., 2013).

For firm performances and strategies, the major changes observed after the crisis is the higher reduction of labour productivity in the FF group (in log from 10.80 in 2007 to 10.75 in 2010) whereas for NFF the labour productivity was quite stagnant (the reduction in log was from 11.02 in 2007 to 11.00 in 2010). These tendencies were coupled with a general substantial sluggishness of real labour costs. As result, the decline of competitiveness ( $\ln(P/LC)$ ) achieved by FF before and after the outburst of the crisis was higher (from 0.43 in 2007 to 0.38 in 2010), with respect to the reduction featuring NFF (from 0.47 to 0.44).

It is remarkable the strong decline of process and product innovation recorded in both groups of enterprises. Interestingly, for the year 2010, the number of family and nonfamily firms that weathered the crisis relying to international markets was increasing, thus showing the role of the extensive margin, i.e. the change in the number of exporting (family and nonfamily) firms as a strategical response to mitigate and compensate the contraction of domestic demand.

These simple descriptive statistics, based on mean values, signal disparities of productivity and wages *between* the two groups of enterprises (FF and NFF) but do not tell us the role of PRP in shaping these gaps, once the various firm characteristics, discussed above, are ruled out. In addition, we are interested in the role that heterogeneity plays *within* each group. All firm characteristics being equal, the next question we pose is whether the gap of FF with respect to their NFF peers is restricted to the low performers (those firms that record low labour productivity, pay less wages and are less competitive) or if the gap is persistent and still evident along the distribution of firms (ranked by labour productivity, labour costs, and competitiveness).

These issues have been addressed in the section below.

## 4. Econometric strategy

### 4.1 Methods

We begin our econometric analysis by estimating the relationship between labour productivity and family ownership and control. The relationship 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:

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

where subscripts  $i$  and  $t$  are firms and years, respectively,  $\ln\left(\frac{P}{L}\right)_{i,t}$  is the (log of) valued added per employee,  $\ln\left(\frac{K}{L}\right)_{i,t}$  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.  $Crisis$  is a dummy variable taking the value 1 for the year 2010 and 0 otherwise, whereas  $Crisis \cdot D_{FF}$  is an interaction term (1). The parameter associated with  $D_{FF}$  indicates whether firms owned/controlled by a family are more or less productive than nonfamily 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 workforce composition (shares of executives, white collars, blue collars, temporary contracts, women, trained workers and new hirings) and for firm characteristics, such as process and product innovations and export propensity (for more details see

Table A.1 in the Appendix). The parameter  $\mu_s$  denotes sector-specific fixed effects,  $\gamma_j$  denotes regional (NUTS1\_level) fixed effects for macro-areas and  $\varepsilon_{it}$  is an error term capturing the idiosyncratic component of labour productivity.

We replicate this strategy for labour cost  $\ln\left(\frac{LC}{L}\right)_{it}$  and the gap between labour productivity and labour cost  $\ln\left(\frac{P}{LC}\right)_{it}$

$$(2) \ln\left(\frac{LC}{L}\right)_{it} = \alpha' \cdot \ln\left(\frac{K}{L}\right)_{it} + \beta' \cdot D_{FF,it} + \gamma' Crisis + \delta' D_{FF,it} \cdot Crisis + \theta' \cdot F_{i,t} + \mu_s + \gamma_j + \varepsilon_{it} \quad t=2007,2010$$

(3)

$$\ln\left(\frac{P}{LC}\right)_{it} = \alpha'' \cdot \ln\left(\frac{K}{L}\right)_{it} + \beta'' \cdot D_{FF,it} + \gamma'' Crisis + \delta'' D_{FF,it} \cdot Crisis + \theta'' \cdot F_{i,t} + \mu_s + \gamma_j + \varepsilon_{it} \quad t=2007,2010$$

Besides OLS, we also use the quantile regression (QR) technique that allows us to estimate differing effects on different parts of the productivity and wage distributions. For example, workforce composition and firm characteristics being equal, we can study if the family firms gap differs along quantiles of productivity and wage distributions ( $\beta \cdot D_{FF,it}$ ). In addition, we study whether this gap changed over different quantiles during the crisis ( $\delta D_{FF,it} \cdot Crisis$ ).

We used the classic Koenker and Basset (1978) estimator:

$$(4) \quad (\alpha^\tau, \beta^\tau, \gamma^\tau, \delta^\tau, \theta^\tau) = \underset{\alpha, \beta, \gamma, \delta, \theta}{\operatorname{argmin}} \sum \rho_\tau \cdot \left( \ln\left(\frac{P}{L}\right)_{it} - \alpha - \beta \cdot D_{FF,it} - \gamma Crisis - \delta D_{FF,it} \cdot Crisis - \theta \cdot X_{it} \right)$$

where  $\beta$ ,  $\gamma$  and  $\delta$  are the coefficients of interest,  $\theta$ , is a vector of coefficients for all control variables that now are included in the vector  $\mathbf{X}$ ,  $\tau$  is the quantile 0.1; 0.25, 0.5; 0.75; 0.9,  $\rho_\tau$  is the asymmetric loss function  $\rho_\tau(u) = 1(u > 0) \cdot \tau|u| + 1(u \leq 0) \cdot (1 - \tau)|u|$ . The same equation is used to study the labour cost  $\ln\left(\frac{LC}{L}\right)_{it}$  and competitiveness  $\ln\left(\frac{P}{LC}\right)_{it}$  gap of family firms across quantiles of the respective distributions. All these estimations are performed on the pooled sample (2007 and 2010), because the key explanatory variable (i.e. the dummy for family firms,  $D_{FF}$ ) is time invariant.

In a second step, we estimate the relationship between labour productivity and performance related pay (PRP) augmenting the production function by: i) a dummy variable capturing the incidence of PRP; ii) a dummy variable for the *Crisis*; iii) and the interaction term ( $Crisis \cdot PRP$ ).

We also insert the other controls for firm characteristics and workforce composition. We replicate this estimate for the labour costs  $\ln(LC/L)$  and the gap between labour productivity and labour cost  $\ln\left(\frac{P}{LC}\right)_{i,t}$ . In this case, the time varying nature of PRP led us to take into account time-constant unobserved factors, such as managerial quality or other unobserved structural characteristics of the firm, that could bias the PRP coefficient. A quantile fixed effect estimator enables us to disentangle, for both the subsamples of family and nonfamily firms, the differences that are actually attributable to the different role of PRP, from other sources of unobserved heterogeneity at firm level. Therefore, we perform quantile fixed effects estimates, where the unobserved individual heterogeneity is proxied by individual fixed effects that capture time-invariant firm characteristics and apply the technique elaborated by Canay (2011):

$$5) \quad (\beta^\tau, \gamma^\tau, \delta^\tau, \theta^\tau) = \underset{\rho_\tau}{\operatorname{argmin}} \sum \left( \ln\left(\frac{\bar{P}}{L}\right)_{i,t} - \beta \cdot D_{FF,i,t} - \gamma \cdot Crisis - \delta \cdot D_{FF,i,t} \cdot Crisis - \theta \cdot X_{i,t} \right)$$

where  $\ln\left(\frac{\bar{P}}{L}\right)_{i,t}$  is now a dependent variable generated from a previous step in which we calculated the individual fixed effects  $\alpha_i$  in a conditional mean regression (that is, a panel data structure of equation 1) and get  $\ln\left(\frac{\bar{P}}{L}\right)_{i,t} = \ln\left(\frac{P}{L}\right)_{i,t} - \alpha_i$ , by assuming that this fixed effects do not vary over quantiles. We also repeated equation 5) for labour costs  $\left(\frac{LC}{L}\right)_{it}$  and competitiveness  $\ln\left(\frac{\bar{P}}{LC}\right)_{i,t}$ .

As a final step, we take into account the issue of endogeneity. It may be argued that the adoption of PRP requires high-quality personnel policies and is more likely to be affordable for top-performing firms with a high level of efficiency. Thus, higher-productivity firms may have a higher probability of adopting a PRP scheme.

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, as well as the other two dependent variables, observed several years later. Thus, our instrument is expected to randomly affect sample firms and to influence the probability that firms will introduce PRP. The rationale behind this is that unstable market conditions, captured by sales volatility, increase the probability of decentralized agreements that typically include performance related pay. This hypothesis receives support in the Italian case, where PRP is most widely adopted by Italian companies as a strategy for adapting their wage strategy to variable and uncertain external pressures (see the EIRO report, 1997).

The binary nature of our key explanatory variable (PRP) 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 PRP schemes) and the control group (firms not adopting PRP 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 PRP throughout the distribution of our dependent variables 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 PRP 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 PRP. Following Abadie et al. (2002), the conditional quantile treatment effect for compliers can be estimated consistently by the following weighted quantile regressions:

$$(6) \quad (\beta_{IV}^{\tau}, \delta_{IV}^{\tau}) = \underset{\beta, \delta}{\operatorname{argmin}} \sum W_{i,t}^{AAI} \cdot \rho_{\tau} \cdot \left( \ln \left( \frac{P}{L} \right)_{i,t} - \beta \cdot PRP_{i,t} - \delta \cdot \mathbf{X}_{i,t} \right)$$

$$(7) \quad W_{i,t}^{AAI} = 1 - \frac{PRP_{i,t} \cdot (1 - SV_{i,t})}{1 - Pr(SV=1|X_{i,t})} - \frac{(1 - PRP_{i,t}) \cdot SV_{i,t}}{Pr(SV=1|X_{i,t})}$$

where  $SV$  is the binary instrument for volatility of sales, and the weights  $W_{i,t}^{AAI}$  combine the endogenous variable and the instrument. As stated above, the instrument is assumed to hit the sample firms randomly, and the conditional probability of having a volatility above the median,  $Pr(SV = 1|X_{i,t})$ , 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 a regression performed in a first step, and then inserting the fitted values for PRP as a covariate to yield the IVQR\_2LAD estimator of  $\ln \left( \frac{P}{L} \right)_{i,t}$ ,  $\ln \left( \frac{LC}{L} \right)_{i,t}$  and  $\ln \left( \frac{P}{LC} \right)_{i,t}$  in a second step. In our case, as noted above, the first step is a probit regression of PRP (our endogenous binary variable) on the binary instrument (sales volatility,  $SV$ ) at the firm level.

$$(8) \quad P(PR P_{i,t} = 1 | SV_{i,t}, \mathbf{X}_{i,t}) = \Phi(\xi \cdot SV_{i,t} + \delta \cdot \mathbf{X}_{i,t})$$

where  $X_{i,t}$  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<sup>5</sup>.

## 4.2 Results

### 4.2.1 Family involvement and performance

Table 2 shows that family involvement is negatively linked with labour productivity and the conditional mean estimate suggests that FF suffer of a productivity gap with respect to NFF of almost 12%, as indicated by the coefficient associated to the FF dummy variable that is negative and significant at .01 level. The crisis has contributed to this imbalance with an impact of around 7% (see the OLS coefficient associated to the interaction term *Family firms · Year2010*). Similar differentials of FF from NFF are recorded for labour cost (around -9%) and for competitiveness (Tables 3 and 4, respectively). For this last indicator, the gap with respect to FF becomes negative and significant with the crisis. In details, in 2010, -0.05 in log value is the difference of family firms in terms of competitiveness. This figure exceeds the unadjusted Ln(P/LC) *difference-in-difference* (*family-nonfamily\_2010 minus family-nonfamily\_2007*), implicitly deduced from Table 1, and thus signals that FF were seriously hit by the 2008 crisis<sup>6</sup>.

Going beyond a mere conditional mean model and applying quantile regressions we obtain meaningful results. First of all, the coefficient associated to the FF dummy confirms the insight obtained with the OLS results but also suggests that the point estimates differ widely across the

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<sup>5</sup> As well known, for instruments to be valid, orthogonality conditions must also be met. As regards this 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.

<sup>6</sup> By taking the competitiveness indicator (Ln(P/LC)) from Table 1 we see that the decline for family firms from 0.43 to 0.38 *minus* the decline for nonfamily firms from 0.47 to 0.44 is  $-0.05 - (-0.03) = -0.02$ . The family involvement contributed to this average value by -0.05, whereas it is likely that other firm characteristics counterbalanced this negative influence.

various quantiles<sup>7</sup>. Quite surprisingly, the best performers present the major penalty in terms of labour productivity (LP) when managed by families (-21%), whereas for the group located at the median position and at the 10<sup>th</sup> percentile the penalties of FF with respect to NFF are significantly lower (-9% and -8.5%, respectively). Notice that the best performers in terms of labour productivity (Q90) pay low wages and have lower labour costs (-8%) with respect to the corresponding nonfamily firms, but for this quantile (Q90) the distance in LC estimates of FF from NFF is not statistically different from that recorded by the firms located at the bottom of the distribution (the coefficient associated to family firms for the Q10 is -10.8%)<sup>8</sup>. As result, we obtain that the firms run by families located at the top of the distribution present a significant gap in terms of competitiveness ( $\ln(P/LC)$ ), of -12,7 points in log values, with respect to NFF and this gap is significantly higher from that recorded by firms located in the nearest position (Q75). For this latter group, the penalty of FF in terms of competitiveness ( $\ln(P/LC)$ ) with respect to NFF is significantly lower (-7.5 in log values)<sup>9</sup>.

In sum, heterogeneities are more marked for labour productivity, whereas for labour costs, likely as result of more uniform and compressed wage strategies, differentials between FF and NFF across the different quantiles are less evident. It means that the best performer FF, those with high labour productivity, have more chances of survival, but at the same time are more distant in terms of competitiveness from their NFF peers. How can they fill this gap? Are high road approaches to managerial strategies an efficient strategy for surviving and closing the distance from firms owned by outsiders and run by professional managers? How do FF use these strategies, such as PRP, to face the crisis? We will try to answer these questions below.

#### **4.2.2. Performance related pay, family firms and the crisis**

In this section we investigate the relationship between PRP and our three key dependent variables. The results are obtained adopting the quantile fixed effect estimates that enables us to disentangle, for both the subsamples of family and nonfamily firms, the differences that are actually attributable to the different role of PRP, from other sources of unobserved heterogeneity at firm level. We perform quantile fixed effects estimates, where the unobserved individual heterogeneity is proxied by individual fixed effects that capture time-invariant firm characteristics and apply the technique elaborated by Canay (2011).

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<sup>7</sup> For the coefficients associated to Family Firms we obtain that Q50 vs. Q90 and Q10 vs. Q90 are significantly different at .01 level.

<sup>8</sup> The differences of quantile coefficients for Family Firms are only significantly different at .05 level for Q10 vs Q50. .

<sup>9</sup> As shown by Table 4, the quantile coefficients associated to Family Firms for Q10 vs. Q90 and Q75 vs. Q90 are significantly different at .01 level and at 0.10 level respectively.

Given our focus on the role of PRP, with a main concern for the year of crisis, we only present the related estimated coefficients for PRP, the Year 2010 and their interaction but do not comment on the results for the other covariates included in our empirical models (these results are available on request). The findings for the FF subsample indicate that the managerial strategies based on PRP play a positive role on labour productivity along the whole distribution (Table 5). This results is in accordance with the vast related literature on PRP that has shown that these contingent rewards generate beneficial effects in the form of higher effort and work quality, higher commitment and incentives to firm-specific human capital, greater workforce cooperation in facing organizational changes, lower labour turnover and longer average tenure (Prendergast, 1999). Interestingly, these efficiency arguments apply for FF but not for NFF (Table 6). This finding supports the hypothesis that only family-involved firms, in terms of both ownership and active management, tend to exploit some of the advantages of firm-level negotiations focused on incentive pays. It implies that FF may present some advantages because in these firms interpersonal relationships are characterized by stability and a shared social network (Nahapiet & Ghoshal, 1998). Furthermore, family businesses feature socio-emotional value and more identity than non-kinship firms (Gómez-Mejía et al., 2007).

Notice that the crisis has hit very hard the labour efficiency of FF, with a range of values along the distribution from -5% to -9%. However, our results also indicate that the period of crisis does not decrease the positive relationship between PRP and labour productivity of FF. For all but the median quantile (Q50), the coefficients associated to the interaction term  $PRP*Year2010$  are not significantly different from 0, thus confirming that the crisis has not attenuated the positive relationship between performance related pay and labour efficiency of FF. It means that also in 2010, the association of PRP with productivity has been quite close to the average value (+8.5% for the best performers). Interestingly, the association of PRP with wages (more precisely, with the real labour costs LC), is of minor intensity, particularly for the FF at the highest quantile (Q90), for which LC appears to be quite sticky. Only for firms in the intermediate position (Q25, Q50 and Q75) a slight decrease is observed in 2010.

However, the gains of competitiveness of FF obtained from PRP at all quantiles along the ln (P/LC) distribution deserve the major attention. Noticeably, these gains are invariant with the outburst of the crisis: with the only exception of firms in the Q50 and Q75 positions, the role of PRP in 2010 is not significantly different from the positive mean value which is around + 0.05 points in log value. Notice also that the coefficient for the best performers (+0.049) is not significantly different from those obtained for the Q75 quantile (0.058) and the Q50 quantile (0.052). It implies that family firms linking pays to performance may encourage motivation and elicit more effort from their employees, with a gain of competitiveness of +0.05 points in log values that exactly offsets the

losses suffered with the crisis (see Table 4, OLS column). This gain permits to partially recover the gap of FF with respect to their NFF counterparts.

The positive effects of PRP on productivity and competitiveness are also confirmed by quantile regression techniques taking into account the likely endogeneity between PRP and productivity or PRP and labour cost. Table A.2 and A.3 in the Appendix show that PRP, instrumented by lagged sales volatility, positively affect productivity, labour cost and competitiveness only in the group of family firms. Table A.4 shows the relevance of the instrument (High Sales Volatility) in the first stage of the Instrumental Variable 2 Stages Least Absolute Deviation regression (IVQR\_2LAD). All these methods are largely discussed in section 4.1.

## **Conclusions**

In our paper we have split our sample into two subsamples for establishments run by families (FF) or by professional, external managers (NFF) and have analyzed both subsamples separately. The major changes observed after the crisis is the higher reduction of labour productivity in the FF group and a general substantial sluggishness of real labour costs in both subsamples. As related result, we have observed that after the outburst of the crisis, the distance in terms of competitiveness of FF with respect to their NFF counterparts has been amplified.

In a next step, by using quantile regressions, we have taken care of enterprise heterogeneity and have found that the major penalty of FF with respect to NFF, in terms of labour productivity and competitiveness, is suffered by the best performers, those family firms located at the 0.9 quantile in labour productivity and competitiveness distributions. This gap appears structural and unaltered by the crisis.

As a final step, we have used fixed effects estimates and have tested the role of performance related pay schemes in both subsamples. We have verified that these schemes reveal efficacious in family firms (but not in NFF) and this efficacy has not been altered by the crisis. It seems a confirmation that FF may present some advantages, especially when family businesses feature socio-emotional value and more identity than non-kinship firms (Gómez-Mejía et al., 2007). In addition, family businesses more likely feature a “shared identification of their members with core cultural values” (Dodd and Dyck, p. 314). Under these conditions, PRP schemes could be a strategic tool to face the specific agency costs that affect family firms and these schemes enable family firms to reduce the competitiveness gap with their nonfamily competitors.

This paper offers a contribution, along the lines suggested by the socio-emotional wealth approach (Gómez-Mejía et al., 2007), by evaluating the effects of compensation systems on family firm performance. We have shown that family firms may take advantage from adoption of incentive schemes, such as PRP, and use these contingent rewards to encourage commitment and motivation from their employees. Furthermore, the efficiency enhancing role of PRP, coupled with a moderate influence of these schemes on wage premiums, enable them to regain competitiveness also under hostile pressures, as those featuring the strong global crisis.

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**Table 1 Descriptive statistics**

	Total Sample				Family Firms				No-Family Firms			
	2007		2010		2007		2010		2007		2010	
	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev
PRP	0.12	0.32	0.14	0.34	0.08	0.27	0.09	0.29	0.26	0.44	0.29	0.45
Ln (P/L)	10.85	0.55	10.81	0.55	10.80	0.51	10.75	0.52	11.02	0.64	11.00	0.59
Ln(LC/L)	10.42	0.37	10.42	0.37	10.37	0.35	10.37	0.36	10.55	0.41	10.56	0.36
Ln(P/LC)	0.44	0.39	0.39	0.38	0.43	0.35	0.38	0.36	0.47	0.48	0.44	0.44
Ln(K/L)	9.99	1.52	10.22	1.71	9.98	1.45	10.24	1.65	10.05	1.73	10.18	1.89
<b>Workforce characteristics</b>												
% new hirings	0.13	0.16	0.09	0.15	0.13	0.16	0.10	0.16	0.13	0.15	0.09	0.13
% executives	0.04	0.09	0.05	0.10	0.03	0.08	0.04	0.08	0.09	0.13	0.09	0.14
% white collars	0.38	0.30	0.39	0.29	0.35	0.30	0.36	0.29	0.47	0.30	0.48	0.30
% blue collars	0.58	0.33	0.56	0.32	0.62	0.31	0.60	0.30	0.44	0.35	0.43	0.35
% women	0.34	0.28	0.35	0.27	0.33	0.28	0.34	0.27	0.36	0.26	0.37	0.26
% fixed term contracts	0.10	0.15	0.08	0.14	0.10	0.16	0.09	0.14	0.09	0.14	0.07	0.12
% trained workers	0.22	0.34	0.27	0.37	0.20	0.33	0.25	0.36	0.28	0.35	0.35	0.38
<b>Firms characteristics</b>												
Process innov	0.45	0.50	0.40	0.49	0.45	0.50	0.39	0.49	0.44	0.50	0.43	0.50
Product innov	0.57	0.50	0.46	0.50	0.57	0.50	0.44	0.50	0.59	0.49	0.50	0.50
Export	0.20	0.40	0.34	0.47	0.20	0.40	0.35	0.48	0.21	0.41	0.31	0.46
Size: $5 < n$ of employees $< 15$	0.40	0.49	0.42	0.49	0.44	0.50	0.47	0.50	0.24	0.43	0.26	0.44
Size: $15 \leq n$ employees $< 50$	0.37	0.48	0.36	0.48	0.38	0.48	0.36	0.48	0.37	0.48	0.36	0.48
Size: $50 \leq n$ employees $< 250$	0.19	0.40	0.18	0.39	0.16	0.37	0.15	0.36	0.30	0.46	0.30	0.46
Size: $n$ of employees $\geq 250$	0.03	0.18	0.03	0.17	0.02	0.13	0.02	0.13	0.09	0.29	0.08	0.28
<b>Regions (NUTS1)</b>												
North West	0.34	0.47	0.33	0.47	0.33	0.47	0.32	0.47	0.38	0.49	0.38	0.49
North East	0.27	0.44	0.27	0.44	0.27	0.44	0.26	0.44	0.29	0.45	0.29	0.45
Centre	0.20	0.40	0.20	0.40	0.21	0.40	0.21	0.40	0.20	0.40	0.20	0.40
South	0.19	0.39	0.19	0.39	0.20	0.40	0.21	0.41	0.13	0.33	0.13	0.34
<b>Sectors</b>												
Textile, Wearing Apparel, Food	0.14	0.35	0.14	0.34	0.15	0.36	0.15	0.35	0.10	0.31	0.10	0.30
Other Manufacturing, Mining, Utilities	0.33	0.47	0.34	0.47	0.34	0.47	0.34	0.47	0.28	0.45	0.33	0.47
Constructions	0.11	0.31	0.11	0.31	0.12	0.33	0.13	0.34	0.05	0.22	0.05	0.21
Trade, hotels, restaurants	0.15	0.35	0.12	0.32	0.15	0.35	0.13	0.33	0.15	0.36	0.09	0.29
Transportation and communication	0.05	0.21	0.07	0.25	0.02	0.15	0.06	0.24	0.12	0.33	0.10	0.30
Intermediation and other business	0.09	0.29	0.13	0.33	0.09	0.29	0.10	0.30	0.11	0.32	0.23	0.42
Education, health and private social	0.14	0.35	0.10	0.30	0.13	0.33	0.10	0.30	0.18	0.38	0.10	0.30
Observations	4476		4336		3473		3401		983		918	

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

**Table 2 OLS and Quantile Regressions: Family firms and Labor Productivity**

	Simultaneous Quantile estimates					OLS
	Q10	Q25	Q50	Q75	Q90	
Family firms	-0.085*** (0.025)	-0.085*** (0.020)	-0.093*** (0.021)	-0.146*** (0.027)	-0.214*** (0.043)	-0.118*** (0.024)
Year 2010	-0.026 (0.047)	-0.018 (0.028)	-0.021 (0.036)	-0.072** (0.034)	-0.042 (0.064)	-0.040* (0.024)
Family firms* Year 2010	-0.061 (0.055)	-0.052* (0.031)	-0.069** (0.034)	-0.04 (0.036)	-0.05 (0.069)	-0.069*** (0.026)
Ln(K/L)	0.075*** (0.008)	0.093*** (0.005)	0.109*** (0.004)	0.123*** (0.005)	0.142*** (0.007)	0.115*** (0.006)
% new hirings	0.001 (0.052)	0.014 (0.048)	0.041 (0.045)	0.052 (0.050)	0.026 (0.102)	0.032 (0.052)
% white collars	-0.499*** (0.137)	-0.709*** (0.145)	-1.083*** (0.125)	-1.084*** (0.142)	-1.289*** (0.229)	-0.955*** (0.137)
% blue collars	-0.826*** (0.132)	-1.075*** (0.136)	-1.489*** (0.117)	-1.614*** (0.134)	-1.965*** (0.219)	-1.418*** (0.132)
% women	-0.442*** (0.050)	-0.441*** (0.034)	-0.417*** (0.036)	-0.338*** (0.037)	-0.292*** (0.049)	-0.396*** (0.036)
% fixed-term contracts	-0.03 (0.077)	-0.110* (0.060)	-0.082 (0.053)	-0.014 (0.066)	0.177* (0.106)	0.013 (0.061)
% trained workers	0.102*** (0.031)	0.053*** (0.019)	0.058*** (0.021)	0.038** (0.018)	0.032 (0.026)	0.055*** (0.020)
Process innovation	0.039* (0.024)	0.016 (0.018)	0.005 (0.015)	-0.013 (0.017)	0.016 (0.033)	0.008 (0.016)

Product innovation	0.018	0.015	0.005	-0.003	-0.058*	-0.005
	(0.022)	(0.016)	(0.014)	(0.016)	(0.034)	(0.016)
Export	0.02	0.047***	0.054***	0.062***	0.070**	0.049***
	(0.023)	(0.016)	(0.013)	(0.020)	(0.029)	(0.016)
15<n of employees<100	0.111***	0.074***	0.014	-0.042**	-0.112***	0.002
	(0.024)	(0.014)	(0.013)	(0.018)	(0.029)	(0.018)
99<n of employees<250	0.167***	0.116***	0.053***	-0.038*	-0.142***	0.031
	(0.027)	(0.019)	(0.018)	(0.020)	(0.029)	(0.021)
n of employees>249	0.103*	0.063**	0.009	-0.097**	-0.199***	-0.045
	(0.054)	(0.029)	(0.035)	(0.038)	(0.048)	(0.038)
Constant	10.417***	10.712***	11.238***	11.453***	11.895***	11.101***
	(0.144)	(0.146)	(0.126)	(0.138)	(0.214)	(0.151)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R_2/PseudoR_2	0.154	0.166	0.177	0.197	0.215	0.279
Observations	5308					

**Notes:** Clustered-Robust (OLS) and bootstrap standard errors with 100 replications (Quantile Regression) in parentheses. Workers categories: omitted variable % executives. Firm's size: omitted variable 5<n of employees<16.

**Quantile coefficients for Family Firms: Q50 vs Q90 and Q10 vs Q90 are significantly different at .01 level.**

\*\*\* significant at .01 level; \*\* significant at .05 level; \*significant at .10 level

**Table 3 OLS and Quantile Regressions: Family firms and Labor Costs**

	Simultaneous Quantile estimates					OLS
	Q10	Q25	Q50	Q75	Q90	
Family firms	-0.108***	-0.097***	-0.060***	-0.064***	-0.080***	-0.086***
	(0.021)	(0.011)	(0.011)	(0.013)	(0.020)	(0.015)

Year 2010	-0.025	-0.020	-0.012	-0.017	-0.039	-0.014
	(0.031)	(0.016)	(0.014)	(0.018)	(0.028)	(0.013)
Family firms* Year 2010	0.023	0.012	-0.021	-0.017	-0.006	-0.020
	(0.035)	(0.019)	(0.016)	(0.021)	(0.029)	(0.015)
Ln(physical capital per employee)	0.034***	0.032***	0.030***	0.033***	0.032***	0.039***
	(0.005)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
% new hirings	-0.08	-0.02	-0.003	0.007	0.002	-0.029
	(0.057)	(0.047)	(0.035)	(0.030)	(0.076)	(0.035)
% white collars	-0.527***	-0.767***	-1.032***	-1.226***	-1.266***	-0.957***
	(0.087)	(0.103)	(0.079)	(0.086)	(0.170)	(0.104)
% blue collars	-0.843***	-1.105***	-1.369***	-1.568***	-1.636***	-1.307***
	(0.074)	(0.098)	(0.069)	(0.077)	(0.161)	(0.100)
% women	-0.467***	-0.476***	-0.453***	-0.438***	-0.419***	-0.459***
	(0.032)	(0.024)	(0.022)	(0.017)	(0.028)	(0.024)
% fixed-term contracts	-0.281***	-0.191***	-0.119**	-0.099**	0.017	-0.108**
	(0.062)	(0.062)	(0.047)	(0.040)	(0.081)	(0.043)
% trained workers	0.035**	0.039***	0.037***	0.043***	0.042**	0.040***
	(0.017)	(0.012)	(0.012)	(0.014)	(0.018)	(0.013)
Process innovation	0.006	-0.009	-0.018*	-0.007	-0.027	-0.021**
	(0.015)	(0.011)	(0.010)	(0.010)	(0.018)	(0.010)
Product innovation	0.021	0.01	0.000	-0.004	-0.001	0.009
	(0.014)	(0.010)	(0.010)	(0.010)	(0.017)	(0.010)
Export	0.021	0.009	0.009	0.002	0.003	0.020**
	(0.014)	(0.012)	(0.009)	(0.011)	(0.016)	(0.009)
15<n of employees<100	0.114***	0.077***	0.050***	0.019	-0.024	0.043***
	(0.016)	(0.013)	(0.010)	(0.012)	(0.016)	(0.011)
99<n of employees<250	0.195***	0.152***	0.098***	0.055***	0.01	0.102***

	(0.014)	(0.011)	(0.010)	(0.013)	(0.020)	(0.012)
n of employees>249	0.170***	0.147***	0.114***	0.021	-0.053*	0.063**
	(0.034)	(0.021)	(0.016)	(0.019)	(0.029)	(0.024)
Constant	10.695***	11.127***	11.538***	11.844***	12.077***	11.380***
	(0.098)	(0.102)	(0.084)	(0.090)	(0.181)	(0.114)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R_2/PseudoR_2	0.251	0.248	0.242	0.234	0.231	0.351
Observations	5340					

**Notes:** Clustered-Robust (OLS) and bootstrap standard errors with 100 replications (Quantile Regression) in parentheses. Workers categories: omitted variable % executives. Firm's size: omitted variable 5<n of employees<16.

**Quantile coefficients for Family Firms: Q10 vs Q50 are significantly different at .05 level.**

\*\*\* significant at .01 level; \*\* significant at .05 level; \*significant at .10 level

**Table 4 OLS and Quantile Regressions: Family firms and Competitiveness**

	Simultaneous Quantile estimates					OLS
	Q10	Q25	Q50	Q75	Q90	
Family firms	0.031*	0.013	-0.017	-0.075***	-0.127***	-0.030
	(0.017)	(0.014)	(0.015)	(0.023)	(0.033)	(0.020)
Year 2010	-0.024	0.000	-0.004	-0.051	-0.043	-0.027
	(0.030)	(0.020)	(0.023)	(0.032)	(0.055)	(0.020)
Family firms* Year 2010	-0.031	-0.044**	-0.050**	-0.009	-0.027	-0.050**
	(0.034)	(0.019)	(0.024)	(0.033)	(0.057)	(0.021)
Ln(physical capital per employee)	0.030***	0.046***	0.066***	0.090***	0.114***	0.076***
	(0.005)	(0.003)	(0.002)	(0.004)	(0.006)	(0.005)
% new hirings	0.122***	0.060*	0.036	0.064	0.063	0.064*

	(0.034)	(0.031)	(0.030)	(0.041)	(0.061)	(0.038)
% white collars	-0.092	-0.042	-0.005	-0.047	-0.146	-0.046
	(0.089)	(0.052)	(0.052)	(0.098)	(0.272)	(0.082)
% blue collars	-0.1	-0.098*	-0.068	-0.160*	-0.37	-0.158**
	(0.088)	(0.051)	(0.050)	(0.089)	(0.253)	(0.080)
% women	0.058*	0.022	0.068***	0.087***	0.093**	0.064**
	(0.032)	(0.019)	(0.017)	(0.024)	(0.046)	(0.028)
% fixed-term contracts	0.023	0.061	0.083**	0.109**	0.11	0.121***
	(0.055)	(0.043)	(0.034)	(0.048)	(0.087)	(0.043)
% trained workers	0.029*	0.022**	-0.005	0.01	0.028	0.015
	(0.017)	(0.010)	(0.013)	(0.018)	(0.030)	(0.016)
Process innovation	0.042***	0.027***	0.019*	0.024*	0.026	0.028**
	(0.013)	(0.009)	(0.010)	(0.013)	(0.024)	(0.013)
Product innovation	0.004	-0.002	0.002	-0.02	-0.041*	-0.015
	(0.014)	(0.010)	(0.009)	(0.014)	(0.024)	(0.013)
Export	0.040**	0.020*	0.044***	0.040**	0.066***	0.030**
	(0.017)	(0.012)	(0.011)	(0.016)	(0.023)	(0.014)
15<n of employees<100	0.02	-0.009	-0.031***	-0.073***	-0.140***	-0.041***
	(0.018)	(0.010)	(0.011)	(0.018)	(0.030)	(0.014)
99<n of employees<250	0.021	-0.005	-0.057***	-0.115***	-0.238***	-0.071***
	(0.019)	(0.011)	(0.011)	(0.016)	(0.025)	(0.016)
n of employees>249	0.036	-0.021	-0.088***	-0.139***	-0.272***	-0.110***
	(0.034)	(0.022)	(0.024)	(0.029)	(0.056)	(0.034)
Constant	-0.273**	-0.199***	-0.256***	-0.162	0.079	-0.234**
	(0.110)	(0.065)	(0.055)	(0.099)	(0.268)	(0.094)
NUTS1_level Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R_2/PseudoR_2	0.030	0.050	0.080	0.111	0.146	0.119

Notes: Clustered-Robust (OLS) and bootstrap standard errors with 100 replications (Quantile Regression) in parentheses.

Competitiveness is measured as Ln(Labour Productivity)- Ln(Labour costs).

Workers categories: omitted variable % executives. Firm's size: omitted variable  $5 < n < 16$ .

Quantile coefficients for Family Firms: Q10 vs Q90 and Q75 vs Q90 are significantly different at .01 level and at 0.10 level respectively.

\*\*\* significant at .01 level; \*\* significant at .05 level; \*significant at .10 level

Table 5 Quantile fixed effects, Family firms

Panel A Dep. Var. : Ln (labour productivity)						
	Q10	Q25	Q50	Q75	Q90	FE
PRP	0.067** (0.034)	0.064*** (0.017)	0.068*** (0.000)	0.082*** (0.017)	0.085*** (0.030)	0.068 (0.047)
Year 2010	-0.092*** (0.013)	-0.092*** (0.007)	-0.086*** (0.000)	-0.056*** (0.007)	-0.077*** (0.013)	-0.086*** (0.014)
PRP*Year2010	-0.058 (0.045)	-0.029 (0.023)	-0.016*** (0.002)	-0.032 (0.027)	-0.012 (0.049)	-0.016 (0.040)
Work.Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	9.340*** (0.117)	9.503*** (0.051)	9.479*** (0.000)	9.496*** (0.049)	9.557*** (0.111)	9.479*** (0.266)
Pseudo R2	0.589	0.699	0.797	0.811	0.729	
N of firms (panels)	2655					
N of Obs	4009					
Panel B Dep. Var. : Ln (Labour Costs)						
	Q10	Q25	Q50	Q75	Q90	FE
PRP	0.018 (0.013)	0.021*** (0.007)	0.009*** (0.000)	0.022*** (0.007)	0.007 (0.011)	0.009 (0.030)
Year 2010	-0.042*** (0.007)	-0.039*** (0.004)	-0.033*** (0.000)	-0.016*** (0.004)	-0.023*** (0.007)	-0.033*** (0.009)
PRP*Year2010	-0.012 (0.021)	-0.020* (0.011)	-0.008*** (0.000)	-0.023** (0.011)	-0.007 (0.017)	-0.008 (0.026)
Work.Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	9.435*** (0.048)	9.478*** (0.028)	9.457*** (0.000)	9.484*** (0.029)	9.580*** (0.060)	9.457*** (0.170)
Pseudo R2	0.652	0.740	0.814	0.817	0.741	
N of firms (panels)	2661					
N of Obs	4031					
Panel C Dep. Var. : Ln (Labour productivity)- Ln (Labour Costs)						
	Q10	Q25	Q50	Q75	Q90	FE
PRP	0.046** (0.022)	0.042** (0.017)	0.052*** (0.000)	0.058*** (0.010)	0.049* (0.026)	0.052 (0.037)
Year 2010	-0.057*** (0.012)	-0.054*** (0.005)	-0.055*** (0.000)	-0.026*** (0.006)	-0.033*** (0.010)	-0.055*** (0.011)
PRP*Year2010	-0.013 (0.034)	-0.008 (0.017)	-0.007*** (0.001)	-0.024* (0.015)	-0.024 (0.033)	-0.007 (0.031)
Work.Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes

Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.043 (0.095)	0.090** (0.044)	0.054*** (0.000)	0.075** (0.035)	0.164** (0.071)	0.054 (0.206)
Pseudo R2	0.414	0.548	0.671	0.667	0.538	
N of firms (panels)	2655					
N of Obs.	4009					
<b>Notes:</b> Robust (panel data model) and bootstrapped standard errors with 100 replications (QR) in parentheses. *** significant at .01 level; ** significant at .05 level; *significant at .10 level.						
<b>Workers' characteristics</b> include: shares of blue, white-collar and executives; shares of fixed term contracts, trained workers and women.						
<b>Firm characteristics</b> include: firm's size, capital intensity (Ln(K/L)); share of new hirings; product and process innovation; export.						
Results for all control variables included in both labour force and firm characteristics are available upon request.						

**Table 6 Quantile fixed effects, Nonfamily firms**

Panel A Dep. Var. : Ln (labour productivity)						
	Q10	Q25	Q50	Q75	Q90	FE
PRP	-0.051 (0.045)	-0.019 (0.017)	-0.004*** (0.000)	0.01 (0.016)	0.049 (0.041)	-0.004 (0.060)
Year 2010	-0.044 (0.033)	-0.022* (0.012)	-0.011*** (0.000)	0.022 (0.014)	0.005 (0.031)	-0.011 (0.030)
PRP*Year2010	0.016 (0.059)	0.003 (0.022)	-0.004 (0.004)	-0.011 (0.024)	-0.029 (0.061)	-0.004 (0.053)
Work.Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	10.311*** (0.193)	10.432*** (0.083)	10.478*** (0.001)	10.512*** (0.058)	10.521*** (0.158)	10.478*** (0.446)
Pseudo R2	0.455	0.595	0.693	0.656	0.590	
N of firms (panels)	787					
N of Obs	1232					
Panel B Dep. Var. : Ln (Labour Costs)						
	Q10	Q25	Q50	Q75	Q90	FE
PRP	0.060*** (0.015)	0.063*** (0.007)	0.081*** (0.001)	0.061*** (0.008)	0.088*** (0.021)	0.081** (0.040)
Year 2010	-0.018 (0.014)	-0.020*** (0.007)	0.005*** (0.000)	0.000 (0.009)	0.019 (0.018)	0.005 (0.020)
PRP*Year2010	-0.034 (0.022)	-0.034*** (0.012)	-0.040*** (0.002)	-0.022* (0.013)	-0.070** (0.028)	-0.04 (0.034)
Work.Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	10.322*** (0.091)	10.330*** (0.035)	10.339*** (0.001)	10.367*** (0.033)	10.519*** (0.099)	10.339*** (0.287)
Pseudo R2	0.564	0.652	0.709	0.674	0.613	
N of firms (panels)	791					
N of Obs	1241					
Panel C Dep. Var. : Ln (Labour productivity)- Ln (Labour Costs)						
	Q10	Q25	Q50	Q75	Q90	FE
PRP	-0.091* (0.051)	-0.066** (0.026)	-0.061*** (0.012)	-0.091*** (0.000)	-0.081*** (0.011)	-0.101*** (0.025)
Year 2010	-0.021 (0.025)	-0.001 (0.023)	-0.016 (0.012)	-0.021*** (0.000)	0.017 (0.012)	0.017 (0.022)
PRP*Year2010	0.043 (0.044)	0.009 (0.047)	0.018 (0.018)	0.043*** (0.001)	0.027 (0.018)	0.033 (0.031)
Work.Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes

Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.037 (0.374)	-0.131 (0.128)	0.05 (0.063)	0.037*** (0.001)	0.025 (0.051)	0.006 (0.126)
Pseudo R2	0.393	0.514	0.612	0.558	0.472	
N of firms (panels)	787					
N of Obs.	1232					
<b>Notes:</b> Robust (panel data model) and bootstrapped standard errors with 100 replications (QR) in parentheses. *** significant at .01 level; ** significant at .05 level; *significant at .10 level. <b>Workers' characteristics</b> include: shares of blue, white-collar and executives; shares of fixed term contracts, trained workers and women. <b>Firm characteristics</b> include: firm's size, capital intensity (Ln(K/L)); share of new hirings; product and process innovation; export. Results for all control variables included in both labour force and firm characteristics are available upon request.						

## APPENDIX

### APPENDIX

Table A.1 Description of the Variables

Variable	Definition
PRP	Dummy variable that equals 1 if the firm adopts a PRP scheme, 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 (P)	Log of value-added per employee (source AIDA) deflated by the value added deflator (source ISTAT)
Ln (LC/L)	Log of Labour cost per employee (source AIDA) deflated by the consumer price index for blue and white collar workers (source ISTAT)
Ln (P/LC)	Proxy of competitiveness of the firms
Ln (K/L)	Log of capital stock per employee (source AIDA) deflated by the investment deflator (source ISTAT)
% executives	Percentage of managers and supervisors on total workers
% white collars	Percentage of white collar workers on total workers
% blue collars	Percentage of manual workers on total workers
% females	Percentage of women on total workers
% fixed-term contracts	Percentage of fixed-term workers on total workers
% new hirings	Number of hired workers on total workers in the previous year
% trained workers (share)	Percentage of trained workers on total workers
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
Foreign market	Dummy variable that equals 1 if the firm exported in the last three years, 0 otherwise
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
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**Table A.2 IV Quantile Regressions: Effects of PRP on Productivity, Labour Costs and Competitiveness in Family Firms**

<b>Panel A Dep. Var. : Ln (labour productivity)</b>						
	<b>IVQR_AAI</b>					<b>IV_2LAD</b>
	<b>Q10</b>	<b>Q25</b>	<b>Q50</b>	<b>Q75</b>	<b>Q90</b>	<b>τ=50</b>
PRP	0.427*** (0.084)	0.323*** (0.083)	0.226* (0.130)	0.279*** (0.094)	0.404** (0.194)	0.513*** (0.072)
Year 2010	-0.095 (0.205)	-0.009 (0.112)	-0.014 (0.103)	-0.002 (0.126)	-0.002 (0.178)	-0.151*** (0.018)
Work.Character.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	9.437*** (1.015)	9.764*** (1.071)	10.250*** (1.319)	10.563*** (1.372)	10.129*** (1.927)	11.085*** (0.191)
Pseudo R2						0.179
N of Obs	2441					2372
<b>Panel B Dep. Var. : Ln (Labour Costs)</b>						
	<b>IVQR_AAI</b>					<b>IV_2LAD</b>
	<b>Q10</b>	<b>Q25</b>	<b>Q50</b>	<b>Q75</b>	<b>Q90</b>	<b>τ=50</b>
PRP	0.253*** (0.095)	0.245*** (0.080)	0.203*** (0.060)	0.244*** (0.085)	0.285*** (0.087)	0.133*** (0.044)
Year 2010	0.041 (0.123)	0.067 (0.093)	0.050 (0.086)	0.040 (0.099)	0.044 (0.106)	-0.036*** (0.013)
Work.Character.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	10.477*** (0.485)	10.433*** (1.664)	10.667*** (0.927)	11.022*** (1.159)	11.185*** (1.324)	11.397*** (0.111)
Pseudo R2						0.229
N of Obs	2454					2383
<b>Panel C Dep. Var. : Ln (Labour productivity)- Ln (Labour Costs)</b>						
	<b>IVQR_AAI</b>					<b>IV_2LAD</b>
	<b>Q10</b>	<b>Q25</b>	<b>Q50</b>	<b>Q75</b>	<b>Q90</b>	<b>τ=50</b>
PRP	0.501*** (0.172)	0.349** (0.139)	0.324** (0.130)	0.399*** (0.117)	0.433** (0.178)	0.300*** (0.058)
Year 2010	-0.085 (0.141)	-0.064 (0.126)	-0.077 (0.109)	-0.100 (0.107)	-0.105 (0.200)	-0.095*** (0.016)
Work.Character.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.300*** (0.883)	-1.947* (1.043)	-1.255 (1.631)	-1.385 (2.025)	-1.359 (1.913)	-0.23 (0.140)
Pseudo R2						0.100
N of Obs.	2441					2372
Notes: IVQR_AAI is the Quantile Treatment Effect Estimator of Abadie et al. (2002); IV_2LAD is the traditional Two-Stages Least Absolute Deviation Estimator of Amemya (1982).						
<b>Workers' characteristics</b> include: shares of blue, white-collar and executives; shares of fixed term contracts, trained workers and women.						
<b>Firm characteristics</b> include: firm's size, capital intensity (Ln(K/L)); share of new hirings; product and process innovation; export.						
Results for all control variables included in both labour force and firm characteristics are available upon request.						
.*** significant at .01 level; ** significant at .05 level; *significant at .10 level.						
Boostrapped standard errors with 100 replications in parentheses.						

**Table A.3 IV Quantile Regressions: Effects of PRP on Productivity, Labour Costs and Competitiveness in Nonfamily Firms**

Panel A Dep. Var. : Ln (labour productivity)						
IVQR_AAI						IV_2LAD
	Q10	Q25	Q50	Q75	Q90	$\tau=50$
PRP	0.231 (0.251)	0.199 (0.136)	0.180 (0.151)	0.152 (0.135)	0.151 (0.247)	0.809*** (0.207)
Year 2010	-0.033 (0.253)	-0.018 (0.116)	0.024 (0.142)	0.014 (0.163)	-0.084 (0.250)	-0.051 (0.040)
Work.Character.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	10.573*** (0.935)	12.048*** (0.605)	12.228*** (1.037)	11.706*** (1.258)	11.044*** (1.290)	13.633*** (0.446)
Pseudo R2						0.213
N of Obs	2441					746
Panel B Dep. Var. : Ln (Labour Costs)						
IVQR_AAI						IV_2LAD
	Q10	Q25	Q50	Q75	Q90	$\tau=50$
PRP	0.260 (0.182)	0.215* (0.122)	0.175** (0.074)	0.111 (0.086)	0.068 (0.099)	0.364*** (0.122)
Year 2010	0.067 (0.122)	0.032 (0.074)	0.029 (0.055)	0.021 (0.050)	0.038 (0.092)	-0.006 (0.019)
Work.Character.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	11.616*** (0.564)	11.761*** (0.443)	11.787*** (0.372)	12.295*** (1.034)	12.302*** (1.276)	12.619*** (0.233)
Pseudo R2						0.275
N of Obs	2454					749
Panel C Dep. Var. : Ln (Labour productivity)- Ln (Labour Costs)						
IVQR_AAI						IV_2LAD
	Q10	Q25	Q50	Q75	Q90	$\tau=50$
PRP	0.287 (0.218)	0.174 (0.151)	0.156 (0.115)	0.124 (0.120)	0.075 (0.189)	0.471*** (0.181)
Year 2010	-0.025 (0.109)	0.013 (0.094)	-0.041 (0.087)	0.007 (0.111)	-0.022 (0.232)	-0.038 (0.029)
Work.Character.	Yes	Yes	Yes	Yes	Yes	Yes
Firm Charact.	Yes	Yes	Yes	Yes	Yes	Yes
Macro-regions	Yes	Yes	Yes	Yes	Yes	Yes
Sectors	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.353 (0.325)	0.253 (0.671)	0.333 (0.435)	0.171 (0.625)	0.022 (0.724)	0.763** (0.310)
Pseudo R2						0.098
N of Obs.	2441					746
Notes: IVQR_AAI is the Quantile Treatment Effect Estimator of Abadie et al. (2002); IV_2LAD is the traditional Two-Stages Least Absolute Deviation Estimator of Amemya (1982).						
<b>Workers' characteristics</b> include: shares of blue, white-collar and executives; shares of fixed term contracts, trained workers and women.						
<b>Firm characteristics</b> include: firm's size, capital intensity (Ln(K/L)); share of new hirings; product and process innovation; export.						
Results for all control variables included in both labour force and firm characteristics are available upon request.						
.*** significant at .01 level; ** significant at .05 level; *significant at .10 level.						
Boostrapped standard errors with 100 replications in parentheses.						

**Table A.4. IV Quantile Regressions 2\_LAD: First Stage (Probit Model)**

<b>Dependent Variable: PRP</b>	<b>Family Firms</b>	<b>No Family Firms</b>
<b>High Sales Volatility (1/0)</b>	0.256***	0.176
	(0.096)	(0.136)
Year 2010	0.130	0.077
	(0.083)	(0.122)
Ln(physical capital per employee)	-0.296	-0.119
	(0.346)	(0.607)
% new hirings	-2.519***	-0.531
	(0.549)	(0.705)
% white collars	-2.231***	-0.137
	(0.452)	(0.678)
% blue collars	-0.461**	-0.541*
	(0.200)	(0.299)
% women	-1.365***	-1.680**
	(0.447)	(0.788)
% fixed-term contracts	0.219**	0.420***
	(0.093)	(0.158)
% trained workers	0.019	0.017
	(0.030)	(0.045)
Process innovation	-0.088	0.057
	(0.101)	(0.123)
Product innovation	0.042	0.111
	(0.117)	(0.115)
Export	0.134	-0.176
	(0.087)	(0.141)
15<n of employees<100	0.715***	0.704**
	(0.140)	(0.278)
99<n of employees<250	1.232***	1.347***
	(0.159)	(0.290)
n of employees>249	1.722***	1.824***
	(0.308)	(0.442)
Constant	-0.472	-1.682**
	(0.512)	(0.853)
NUTS1_level Dummies	Yes	Yes
Sector Dummies	Yes	Yes
Observations	2358	741

**Notes:** bootstrap standard errors with 400 replications in parentheses.

\*\*\* significant at .01 level; \*\* significant at .05 level; \*significant at .10 level.