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Workforce diversity, productivity and wages in France: the role of managers vs. the proprietary structure of the firm

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JEL Classifications: D24, J24, J31, M12

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ULB

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Andrea Garnero♦

OECD, SBS-EM (CEB) and IZA

Abstract

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1. Introduction

Managing a diverse workforce is a key challenge for many firms. A rich mix of employees can allow responding more efficiently to the variety of tasks and demands a firm is confronted to, but it can also be a source of conflicts and misunderstanding. In the last decade, diversity management both as a human resource management objective and a Corporate Social Responsibility tool has become a prominent issue for many firms across OECD countries. In 2004 a group of French companies launched a Diversity Charter to ban discrimination at the workplace and implement adapted human resources policies stating that "*promoting pluralism and seeking diversity […] improve[s] efficiency and contribute[s] to a better social climate.*" However, as most managers know, it is far from clear if diversity is indeed positive for efficiency and social climate.

Previous theoretical literature on the subject (e.g. Jehn et al., 1999 and Lazear, 1999) posits that labour diversity is good if it fosters complementarities, generate spillovers, improve firms' standing with the customers or improve the overall working environment. However, diversity can also increase misunderstandings, conflicts or forms of workplace segregation which result in a negative effect on firm's performance.

The empirical evidence regarding the impact of workforce diversity on firms' performance is so far quite scarce and inconclusive and findings must often be interpreted with caution because of methodological and/or data limitations. The literature available can be divided in two main streams (see Garnero et al. 2014 for a complete theoretical and empirical review). The first stream uses specific case studies, often based on personnel records from single companies (Hamilton et al., 2004; Leonard and Levine, 2006; Kurtulus, 2011). The second strand of the literature relies on linked employer-employee data (Barrington and Troske, 2001; Grund and Westergaard-Nielsen, 2008; Ilmakunnas and Ilmakunnas, 2011; Navon, 2009; Parrotta et al. 2014; Garnero et al., 2014). Overall the results of these papers suggest that the impact of demographic diversity (age, gender and ethnicity) tends to be negative for firms' productivity while education or skill diversity tends to be positive. In particular Parrotta et al. (2014) show a negative effect of demographic diversity (age, gender and ethnicity) and a positive one of educational diversity in Denmark. Garnero et al. (2014) find a positive effect of educational diversity and a negative effect of age while the impact of gender diversity is positive in high-tech sectors but negative in more traditional industries. Navon (2009) also finds a positive effect of education diversity in Israel. Hamilton et al. (2004), Kurtulus (2011) and Leonard and Levine (2003) find negative effects of age diversity in studies at company level in the US. The only exception in the literature is the paper by Ilmakunnas and Ilmakunnas (2011) for Finland which shows a positive effect of age diversity and a negative one of educational diversity.[1]

Only few studies have tried to measure if and how the benefits or the costs of diversity for firms' performance are passed on to workers via higher or lower wages (Ilmakunnas and Ilmakunnas,

[1] A summary of the main results and the methods and data used in these papers can be found in Table A1.

2011 and Garnero et al., 2014). Finally no study, to our knowledge, has looked at the role played by managers and shareholders.

In this paper we extend the analysis to France and to the role of managers and shareholders. Managers exercise the day-to-day control of the business and have a huge influence on firms' performance. With regards to their interaction with their employees, managers not only often select them but also can have idiosyncratic sympathies or incompatibilities. We might expect that managers will go along better with employees who are more similar to them. For instance previous literature has found that a greater representation of women at top management levels has a positive effect on female workers' career outcomes (Bell et al., 2011; Matsa and Miller, 2011). When workers and supervisors are similar, mentoring may be more effective (Athey et al., 2000) or managers may be better equipped at interpreting signals of productivity from similar workers (Flabbi et al. 2014).[2] On the opposite the "queen bee syndrome" literature which originated in the 1970s (Staines et al. 1974) posits an incompatibility between similar workers.[3] According to this literature women in top management positions, particularly in male-dominated occupations, may intentionally hinder other women's career perspectives to avoid competition. A third stream of literature suggests that managers may be more inclined to promote diversity and seek the advancement of similar co-workers, but their bosses or shareholders can hold that against them. Hekman et al. (2014) find in both field and laboratory samples that white male leaders who value diversity are rewarded by their supervisors with better performance evaluations, whereas minority and female leaders who value diversity are penalized with worse performance ratings. Hence, this suggests that managers who engage in diversity-increasing behaviours can be penalized with lower performance ratings for doing so and hence refrain from promoting diversity not because they perceive similar workers as a threat as the "queen bee" syndrome would suggest, but because it is better for their own career prospects. This can be reconciled with the "queen bee" syndrome since, as Sheryl Sandberg writes, "*queen bees internalized the low status of women and in order to feel worthy themselves wanted only to be associated with men. Often these queen bees were rewarded for maintaining the status quo*" (2011, p. 164). If this is true, then, those who appoint and reward top managers can play a significant role in defining company's policies and attitude towards diversity, i.e. the shareholders.

Indeed, contrary to the management, shareholders do not usually run directly the company (with the quite frequent exception of family firms) but they choose the managers and set the main strategic lines. The economic literature has worked on principal-agent problems since many decades but only Méon and Szafarz (2011) have modelled the process of hiring decisions in terms of a standard principal-agent problem where shareholders look only for profits and managers are taste-based discriminators. They find that a performance-based contract can moderate managers' propensity

[2] On another dimension, Aslund et al. (2014) find that similarity matters in the decision of hiring and they show that immigrant managers in Sweden are more likely to hire immigrant workers.
[3] Terms as "tokens" or "cat fights" reflect the same concept in a broader way: if women are used as tokens they are in competition since only one woman is "allowed" to ascend to the senior ranks in any particular company

to discriminate but not completely. However, not all shareholders care only about profits but they may also want to define the overall company's culture and values and therefore diversity in the firm. There is an increasing literature on the ownership structure and firm performance (e.g. Demsetz and Villalonga, 2001; Margaritis and Psillaki, 2010) or on the impact of ownership forms on HR practices (e.g. Braun and Warner, 2002; Cooke and Saini, 2010). Diversity can become a matter of concern for shareholders if they see it as a value as such or even just for social or political correctness (i.e., Cox and Blake 1991; Thomas 2004). Cooke and Saini (2010) find that diversity management in India varies according to the type of ownership form: in particular public-owned companies tend to replicate more traditional norms while Indian or foreign multinationals are more open to diversity and more effective HR management. Kulik (2014) reports that some important companies even give formal and clear incentives to managers to diversify the workforce.

The empirical literature exploring the specific nexus between proprietary structure and workforce diversity is almost absent. Ono and Odaki (2011) and Olcott and Oliver (2014) have studied the effect on foreign ownership on gender in Japan, a traditionally male-dominated economy. In this case, opening up companies to foreign shareholders with different values improves prospects for women in these firms. Similar results are found by Fukase (2013) in Vietnam and by Dammert et al. (2013) in China. Even on family firms, where the literature is fairly rich, there are no studies on diversity management as such. The closest papers concentrate on the effect on women, but mostly women engaging as managers in their family business.

In conclusion, despite the increasing importance of diversity management and the potentially significant role that shareholders and managers can play in shaping firms approach and policies for diversity, no clear evidence is available in the literature. Therefore, the aim of this paper is threefold. First, we test the impact of workforce diversity on productivity at firm level using a rich linked employer-employee dataset for France. Second, we examine how the benefits and losses are shared between workers and employers by testing the impact of diversity on wages and the productivity-wage gap. Finally, we extend the literature by examining the role of managers' characteristics and the role of different proprietary structures.

The remainder of this paper is organized as follows. Sections 2 and 3 respectively describe the empirical framework and the data used. The impact of workforce diversity on productivity, wages and productivity-wage gaps and the role of managers vs. the proprietary structure of the firm is analysed in Section 4. The last section discusses the results and concludes.

2. Empirical framework

The empirical results presented in this paper are based on the separate estimation of a value added function and a wage equation at the firm level. The latter provide parameter estimates for the impact of labour diversity (with respect to education, age and gender) on average productivity and wages,

respectively. Given that both equations are estimated on the same samples with identical control variables, the parameters for marginal products and wages can be compared and conclusions can be drawn on how the benefits or losses of diversity are shared between workers and firms. This technique was pioneered by Hellerstein and Neumark (1995) and refined by Hellerstein et al. (1999), Hellerstein and Neumark (2004), Aubert and Crépon (2009) and van Ours and Stoeldraijer (2011).

The estimated firm-level productivity and wage equations are the following:

$$\log\left(\frac{Value\ Added}{L}\right)_j = \alpha + \beta_1 A_j^{\sigma} + \beta_2 E_j^{\sigma} + \beta_3 G_j^{\sigma} + \beta_4 \overline{A}_j + \beta_5 \overline{E}_j + \beta_6 \%women_j + \lambda X_j + \varepsilon_j \qquad (1)$$

$$\log\left(\frac{Total\ Wages}{L}\right)_j = \alpha^* + \beta_1^* A_j^{\sigma} + \beta_2^* E_j^{\sigma} + \beta_3^* G_j^{\sigma} + \beta_4^* \overline{A}_j + \beta_5^* \overline{E}_j + \beta_6^* \%women_j + \lambda^* X_j + \varepsilon_j^* \qquad (2)$$

The dependent variable in equation (1) is firm *j*'s added value per worker, obtained by dividing the total added value (at factor costs) of the firm *j* by the total number of workers. The dependent variable in equation (2) is firm *j*'s average gross wage. It is obtained by dividing the firm's total wage bill (total sum of gross wages of an establishment excluding employers' contributions) by the total number of workers.

Labour diversity indicators with respect to education, age and gender (E^{σ}, A^{σ} and G^{σ}) are the main variables of interest. In this paper we use the second moment (standard deviation) of workforce characteristics (education, age and gender). The standard deviation of workforce characteristics (education, age and gender) reflects group diversity at firm level while $\overline{A}$, $\overline{E}$ and *% women* reflect the role of workers' average age and education and the share of women. We also compute an alternative gender diversity index, i.e. the share of women times the share of men within firms (Hoogendoorn et al., 2013) to test the robustness of our results.

Control variables in the vector *X* include the share of part-time workers, the fraction of workers with a fixed-term employment contract, workers' tenure, the percentage of white-collar workers, firm size (i.e. the number of employees) and the log of capital per employee, 10 industry dummies, 21 region dummies and the interaction of industry and region dummies.

To test directly whether the difference between the value added and the wage coefficients for a given diversity indicator is statistically significant we follow van Ours and Stoeldraijer (2011) by estimating a model in which the difference between firm *j*'s value added and wage (i.e. the hourly gross operating surplus) is regressed on the same set of explanatory variables as in equations (1) and (2). This produces coefficients for the diversity indicators and directly measures the size and significance of their respective productivity-wage gaps.

Equations (1) and (2), as well as the productivity-wage gap, are estimated with ordinary least squares (OLS). Pooled OLS estimators of productivity models have been criticized for their potential "heterogeneity bias" (Aubert and Crépon 2003: 116) due to the fact that firm productivity depends to a large extent on firm-specific, time-invariant characteristics that are not measured in micro-level surveys (advantageous location, firm-specific assets like the ownership of a patent, or other firm idiosyncrasies). Unfortunately no time dimension is available in the data to estimate fixed effects or GMM models (keeping only firms present also in the previous wave of Reponse and matched in the RISK database would have shrunk the sample too much). Therefore, to correct for endogeneity we instrument the workforce composition of the focal firm with the workforce composition of the other firms in the same sector (Cheng et al. 2014; Della Malva and Santarelli, 2013; Forman et al., 2010; Yang and Steensma, 2014 also followed a similar strategy). When defining its workforce, a firm is to some extent constrained by its own technology and work content that might require younger or more experienced workers, skilled or unskilled workers, more men or more women. Therefore, using the workforce composition of other firms in the same sector to proxy for the composition of the focal firm may provide a satisfying first-stage (which can also be statistically tested). It is more difficult to ensure that the instrument also satisfies the exclusion restriction, i.e. that the instrument does not have a direct causal effect on the outcome and in particular that it does not fall in a typical Manski reflection problem.[4] However, we believe that by excluding the focal firm and by controlling for sectoral and regional dummies and sector-by-region dummies we are able to net out some potential endogeneity of the instrument (some unobserved factors that affect both the other firms' workforce composition and the productivity of the firm of interest). On top of this we will also test for overidentifying restrictions to test the validity of the instrument, i.e. that they are uncorrelated with the error term. To test for overidentifying restrictions the equations must not be exactly identified and hence we need more instruments than endogenous variables. As a consequence, we also add as an instrument the average dissimilarity index[5] of other firms in the same sector computed using the individual data of Reponse on a sample of workers working in each establishment. Unfortunately this information is not very precise since it covers just a very small sample of workers covered in the original database (18,536 respondents in the 4,023 establishments, so 4.6 workers on average by establishment) whereas for standard deviations we use information come from social security data which cover all workers. However, even if less precise, the dissimilarity index can be used to further instrument our variables of interest. If it turns out to be too imprecise and hence a weak instrument, the first stage will alert us. On the other hand there are no reasons to think that the index would perform better or worse in terms of exogeneity than our basic instruments.

[4] The problem arises when one wants to predict the behaviour of an individual (or in this case a firm) by the behaviour of the group of which he is a member, notably to study the role of peer effects.

[5] The dissimilarity index (also called Euclidean distance) refers to relational demography and it measures the degree to which a worker differs from his peers within a firm (Ilmakunnas and Ilmakunnas, 2011 and Garnero et al., 2014). Its value thus depends on the distance between a worker's characteristic and the mean value of the latter within a firm. The *average* dissimilarity index corresponds to the firm-level average over all workers of the individual-level dissimilarity index.

3. Data and descriptive statistics

The data we use come from several sources as it is necessary to combine information on productivity, wages and a wide set of firms' and workers' characteristics.

The first data source that we use is the 2011 wave of the Reponse survey (*RElations PrOfessionnelles et NégociationS d'Entreprise)*, a survey on workplace relations and polices produced by the French Ministry of Labour. The sample is a random selection from the exhaustive INSEE establishment records, excluding agriculture and public-sector enterprises, and is stratified by establishment size. Reponse is primarily designed to provide consistent information to the French Ministry of Labour on labour relations and on the internal organization and recent technological changes in production. Reponse has been used extensively in previous economic research (e.g. Caroli and Van Reenen 2001; Askenazy et al. 2006; Bassanini et al. 2013). Questions about firm ownership and manager characteristics, as well as establishment characteristics were asked to one top manager per establishment in face-to-face interviews.

The Reponse dataset has been matched by the database provider with social security records (*Déclarations Annuelles de Données Sociales*, DADS) to obtain precise information on gender and age composition of the workforce.

We have further matched the Reponse (and DADS) data with information on productivity (defined as valued added per worker at the firm level) and wage bills from the RISK database which contains publicly-available company accounts (i.e., *liasse fiscale*) that firms must provide to the commercial courts (i.e., *greffes des tribunaux de commerce*). The RISK database is not exhaustive because firms may choose to keep secret their corporate information and incur a (small) fine as a consequence (in fact, we lose around half of the initial Reponse sample). Since financial information are registered at firm level and may therefore refer to several establishments we keep only firms with a single establishment.

After merging the two data sets and omitting missing observations or observations with negative value-added, the final sample consists of 1,164 firms covering all sectors and regions in France (except Corsica and overseas territories) in 2011. Our final sample does not differ much from the initial Reponse one (only the share of women, the share of temporary and part-time workers are slightly lower) and it is representative of sectoral and regional labour force composition in France. The only two exceptions are the manufacturing sector which is overrepresented in Reponse (31 percent compared to 18 percent in the French Labour Force Survey) and professional activities which are underrepresented in Reponse (10 percent compared to almost 19 percent).

TABLE 1 ABOUT HERE

Table 1 sets out the mean, standard deviation, the minimum and the maximum of selected variables. We observe that in 2011 firms have a mean value added per worker of 96,810 euros and that workers' mean gross wage stands at 38,550 euros. As regards diversity indicators, we find that the intra-firm standard deviation reaches respectively 11.92 for age, 2.59 for education, and 0.82 for gender. Employees in our sample have on average 10.91 years of education, they are 40.23 years old, and are essentially concentrated in the manufacturing industry (34 percent), wholesale and retail trade, repair of motor vehicles, motorcycles (17 percent), construction (13 percent), transport (11 percent), and professional, scientific and technical activities (10 percent). 18 percent of firms are located in the region of Ile-de-France (Paris) and the rest is more or less evenly spread in the other 20 regions. Moreover, firms employ on average 685 workers, 34 per cent of women, 37 percent of white-collar workers, 12.51 years of mean tenure, 11 percent of workers with a fixed-term employment contract, and 10 percent of part-time workers.

Table 2 summarizes the gender, the number of years of education, the age and the tenure of the top manager (defined as the respondent to the manager questionnaire of Reponse who has no more than one hierarchical level above her or him, i.e. presidents, managing directors or heads of human resources). 27 percent of the managers in our sample are women, they are on average 45.9 year-old, they have 12.36 years of education (corresponding to the high-school diploma, *Bac*) and a mean tenure in the firm of 14.63 years.

TABLE 2 ABOUT HERE

Table 3 describe the proprietary structure of the firms in the sample: we distinguish between firms owned by an individual or a family, firms listed on the stock exchange, firms owned by foreigners or firms where workers own part of the shares as reported in the Reponse manager questionnaire. The proprietary structure can also be more complicated: almost 14% of firms is owned by an individual or a family and also listed on the stock exchange. Around 4% are owned by foreigners and listed on the stock exchange. Finally 18.6% of the firms in the sample does not fall in any of these categories: these are notably firms where there are no shareholders, or where the Government or local authorities are the shareholders (less than 5%), or where French financial or non-financial institutes are the shareholders.

TABLE 3 ABOUT HERE

4. Empirical results

4.1. Baseline results

We start estimating equations (1) and (2) and the difference between the two, the productivity-wage gap, using OLS and robust standard errors. Table 4 shows the impact of age,

education and gender diversity on productivity, mean wages and productivity-wage gaps controlling for workers' and firms' characteristics and industry and region dummies to control for regional and sectoral specificities (results without controls and isolating diversity from mean values are shown in Table A2).

TABLE 4 ABOUT HERE

Findings show that age and gender diversity are negatively correlated with firm's productivity while educational diversity is positively correlated. More precisely, results in column 7 indicate that when age diversity increases by one standard deviation (2.42 years), productivity on average decreases by 9.6 percent.[6] When gender diversity increases by one standard deviation (that is by 0.08 which roughly correspond to the case of a firm in which the share of women doubles from 15 to 30 percent), productivity on average decreases by 4 percent.[7]

On the contrary, when education diversity increases by one standard deviation (2.44 years), productivity on average increases by 2.4 percent. Column 8 shows that an increasing age diversity reduces mean wages by 4.84 percent while education and gender diversity have no significant effect on gender. Therefore this asymmetry between productivity and wages generates a positive productivity-wage gap (which results in higher profits for firms) for education diversity and a negative one (and hence reduced profits) for gender diversity.

Similar results are obtained using the Gender Diversity Index, i.e. the share of women times the share of men within firms (Hoogendoorn et al., 2011), instead of gender standard deviation (see Table A3 in the Annex).[8]

Increasing the mean age and the share of women also contributes to reduce firm's productivity while increasing workers' mean education is positive for firm's productivity. Similar results are found for mean wages: age diversity and the share of women negatively affect mean wages, while mean education has a positive effect. Women are paid less than men but, if we believe to these results, less than what their negative effect on productivity would suggest. This is consistent with the results obtained for France by Crépon et al. (2003) who find that women are paid less but are also less productive while older workers tend to be overpaid with respect to their productivity. The results on the wage gap for women are also in line with Meurs and Ponthieux (2000) who use an Oaxaca-Blinder decomposition and find that the unexplained wage gap once controlling for hours worked and other observed characteristics is 4.2 percent which goes up to 16 percent when excluding education, experience, social and occupational category, tenure, type of contract, number of children and marital

[6] -0.04*2.42 = -0.096 (i.e. point estimate*standard deviation)
[7] -0.50*0.08 = -0.04
[8] The results are also robust to the use of the “percent maximum standard deviation”, an alternative indicator developed by Delhey and Kohler (2011) to correct for the structural dependency of standard deviation to the mean.

status. Our point estimates lie in between the unexplained and the partially explained wage gaps and confirm the plausibility of our estimations.

It is interesting to notice that other firms' and workers' observed characteristics show no significant effect on productivity and wages. The only exception is the log of capital per worker which exactly reflects the coefficients of a Cobb-Douglas production function (around 0.33), tentatively comforting our choice of the functional form of the production function.

As discussed, OLS estimators are likely to suffer from potential heterogeneity and endogeneity bias. Table 5 shows the results using as an instrument for firm *j*'s workforce composition (the first and the second moments of age, education and gender), the mean, the standard deviation and the dissimilarity index of age, education and gender of the other firms (therefore excluding firm *j*) in the same sector. IV estimations do not vary if we use just the minimal number of instruments (but, as discussed, in this case we would not be able to run an overidentifying test).

In order to assess the soundness of this approach we performed a range of statistical tests. The first stage results are very strong (well above the rule of thumb of 10 for the F-test statistics). The weak identification test, whose null hypothesis is that the equation is underidentified, also confirms that the equation is identified. The third test concerns the validity of additional instruments and uses the Hansen (1982) test of overidentifying restrictions. Under the null hypothesis the instruments are valid, i.e. uncorrelated with the error term. With a p-value well above 10 percent we can accept the null hypothesis that the instruments are valid. A final test checks if the workforce composition is indeed endogenous so that an IV approach is warranted. Under the null hypothesis the explanatory variables can actually be treated as exogenous but the null hypothesis is rejected.

TABLE 5 ABOUT HERE

The IV results confirm the sign and the magnitude (if anything just marginally lower, as expected) of OLS results but education diversity turns out to have no significant effect on productivity anymore. When age diversity increases by one standard deviation (2.42 years), productivity on average decreases by 7.2 percent.[9] When gender diversity increases by one standard deviation (see above), productivity on average decreases by 3.8 percent.[10] Slightly more different results are found for the mean-wage equation: the IV results show a negative effect of age diversity on wages of the same magnitude as the effect on productivity with no effect on the value-added-wage gap. Education diversity seems to have a small but significant negative effect on wages, thus entailing a small rent for employers: when education diversity increases by one standard deviation, 2.44 years of education, wages decrease by 2.44 percent. More surprisingly gender diversity has a positive effect on wages,

[9] -0.03*2.42 = -0.072
[10] -0.48*0.08 = -0.038

though not very big in size: when gender diversity increases by one standard deviation (0.08, e.g. when the share of women doubles from 15 to 30 percent) wages increase by 2.9 percent and this widens the gap in favour of workers.

4.2. The role of managers vs. the role of the proprietary structure of the firm

In the previous section, we have estimated the average effect of diversity on productivity and wages. However, as discussed in the introduction, there might be strong differences according to the type of management or proprietary structure of the firm.

In our analysis on the role of managers we focus on their gender, education and age to see if and how they have a differential impact on the diversity-productivity-wage nexus. To formally test for differences between firms run by women or by more (or less) educated managers or by older (or younger) workers we add to our benchmark specification a control for the gender, the years of education or the age of the top manager and the interaction with these managers' characteristics and the first and second moments of age, education and gender variables.

From an econometric point of view, interacting workforce characteristics with top management characteristic adds another source of endogeneity. Shareholders do not draw managers randomly but carefully choose them. For instance, companies performing better in terms of diversity might more easily pick a woman to manage it or a more educated manager. Correcting for this further source of endogeneity would require another set of instruments which is not available. The following results will therefore present some correlations which should not be interpreted as direct causal effects.

Results in Table 6 show no significant differential impact of the gender, education and age of managers with respect to the diversity-productivity-wage nexus. Female top managers (columns 1 to 3) are not associated with an increase in productivity or wages of other women and the same for other characteristics. This might be in line with Flabbi et al. (2014) who find that female executives increase the variance of women's wages within firms because of a positive impact on wages at the top of the distribution, and a negative impact on wages at the bottom or, more in general, to the results by Bertrand et al. (2014) who find no significant impact of board quotas on female labor market outcomes in Norway. This can also be the result of women penalized for promoting diversity as Hekman et al. (2014) find: managers' characteristics, hence, do not play a role since promoting diversity is not rewarded.

TABLE 6 ABOUT HERE

On the contrary, we find that a woman top manager is associated with a strong positive effect on firms' value-added per capita. This contradicts previous findings by Wolfers (2006), Albanesi and

Olivetti (2009), Adams and Ferreira (2009) and Bertrand et al. (2014) but it is in line with Smith et al. (2006) who find that the proportion of women in top management jobs tends to have positive effects on firm performance in Denmark or Flabbi et al. (2014) who find that a strong positive effect of a female CEO on sales per employee, though limited in firms where half of the workers are women or with Dezso and Ross (2012) who find that female representation in top management improves firm performance (but only to the extent that a firm's strategy is focused on innovation). The education (columns 4 to 6) and the age (columns 7 to 9) of managers also do not have a differential effect on productivity and wages. Having an older manager (then probably also a more experienced one) or a more educated one does not go along with improved productivity or higher wages of a diverse workforce. We also tested for the existence of an effect connected to the manager's tenure (columns 10 to 12) to proxy for his/her company-specific experience and again we do not find significant results.

In conclusions, if one believes to these results, having a woman as top manager does not generate positive (nor negative) effects of gender diversity. Nor having an older or younger manager or a more (or less) educated one improves (or worsen) the effect of age and education diversity. Managers' characteristics, therefore, seem not to have a significant differential impact on diversity management.

However, even if they are not on the front-line of the day-to-day management of the firm, shareholders may have an impact. As discussed in the introduction, shareholders may not only be interested in maximizing profits as most principal-agent models posit, but also play a significant role in defining companies' business culture and values, also with respect to workforce diversity (the dashed arrow in Figure 1). In what follows we are going to estimate the effect of diversity on productivity and wages by different proprietary structures of the firm by interacting the workforce characteristics with dummies for firm ownership. We distinguish between firms owned by an individual or a family, firms listed on the stock exchange, firms owned by foreigners or firms where workers own part of the shares. The four types of proprietary structures are not fully independent one from the other. In particular a significant share of firms are owned by a family and also listed on the stock exchange. In our econometric analysis we will focus on the main, and arguably more interesting, categories: family firms, firms listed on the stock exchange, firms owned by foreigners and firms with workers as shareholders (results for family firms also listed on the stock exchange are in the Annex).

TABLE 7 ABOUT HERE

Results in Columns 1 to 3 in Table 7 show that in family firms (or firms owned by an individual) age diversity does not have a significantly different effect than in non-family firms while the negative effect for gender diversity cancels out. No significant differences are found for mean age

and education or the share of women. Family firms globally do not differ much from non-family firms. If anything they seem not to suffer from the negative effect of gender diversity on firms' value-added. We know from Bassanini et al. (2013) that family firms offer greater job security with reduced dismissal (but with lower wages). Therefore family firms may potentially be a more conducive environment for women (Hollander and Bukovitz, 1990). Interestingly, the point estimate of the family firm dummy is negative as found in most of the previous literature: family firms are less productive than other companies.

On the other hand, columns 4 to 6 in Table 7 show that the positive impact of education diversity is concentrated in firms which are listed on the stock exchange: increasing education diversity by one standard deviation (2.44 years) increases productivity by 9.7 percent.[11] These companies are probably more able than other firms to benefit from mutual learning and collaboration among workers with different educational tracks, especially if the tasks to be performed are complex (not routine) and the output is innovative (Jehn et al. 1999). On the contrary, gender diversity seems to reduce wages in public listed companies: an increase of gender diversity by one standard deviation (0.08, i.e. from 15 percent to 30 percent) results in a decrease of the mean wage bill by 4.16 percent.[12] The average wage bill also seems to increase with the mean age of the workforce in public listed companies (8.5 percent increase for an increase in mean age by one standard deviation, i.e. 4.27 years). Family firms listed on the stock exchange broadly replicate the same pattern of other firms listed on the stock exchange (see Table A4).

Contrary to the literature on Japan (Mum and Jung, 2013 and Olcott and Oliver, 2014) we do not find any differential impact of foreign ownership on the diversity-productivity-wage nexus (columns 7 to 10). Diversity in firms owned by foreign entities does not have a different impact than diversity in firms owned by French nationals. France is (very) different from Japan where in the past (but with visible effects until recently) the cultural mainstream considered women only as housewives and mothers and where a foreign-owned company probably had very different values compared to national ones. In France, on the contrary, women labour force participation is 6 percentage points higher than the OECD average and 3 points higher than G7 average and foreign companies probably do not bring considerable differences in human resource management of gender (but also age and education) diversity. The lack of results might also be due to a relatively loose definition of foreign ownership which might not be linked to an effective impact on the company's culture and values (for instance, it is very different if the shareholders are foreign private equity funds or foreign pension funds).

[11] 0.04*2.44=-0.0976
[12] (0.37-0.89)*0.08=-0.0416

Finally, we also look for differential impact in firms where workers are among the shareholders (we do not know how much of the shares are owned by workers but just that they are among the shareholders). According to the estimates in columns 10 to 12, age diversity further decreases firm productivity in firms which are owned by workers: when age diversity increases by one standard deviation (2.42 years), productivity decreases by 29 percent.[13] Education diversity, on the contrary, does not differ between worker-owned firms and the rest of the sample. Gender diversity seems to have a negative impact on wages only in worker-owned firms: an increase by one standard deviation in gender diversity decreases wages by 8.7 percent.[14] These results should be interpreted with even more caution: there is just a small share of firms in our sample (3.69 percent of the total) and hence the possibility that few "particular" firms drive the results is higher.

5. Conclusions

This paper estimates the impact of workforce diversity in terms of age, gender and education on productivity, wages and productivity-wage gap for a sample of French firms. It contributes to the literature by bringing some evidence on the impact of workforce diversity in terms of age, gender and education on productivity and wages to France, one of the largest industrialized countries. It also examines how the benefits or losses of labour diversity are shared between workers and firms (i.e. the analysis is extended to wages and productivity-wage gaps). Secondly, it extends the literature on the diversity-productivity-wage nexus by examining the role of managers' characteristics and different proprietary structures, using representative data at establishment-level.

Findings with OLS and IV suggest that on average demographic diversity (age and gender) has a negative effect on productivity while educational diversity has a positive effect. Age diversity has also a negative effect on wages with no significant effect on the productivity-wage gap. Results with IV also find a negative effect of education diversity (and hence a positive productivity-wage gap) and a positive one of gender diversity on wages (and hence a negative productivity-wage gap).

Despite different datasets, time period, countries and econometric techniques these results are in line with Garnero et al. (2014) for Belgium, Parrotta et al. (2014) for Denmark, Navon (2009) for Israel or Hamilton et al. (2004), Kurtulus (2011) and Leonard and Levine (2003) for the USA. The only exception are Ilmakunnas and Ilmakunnas (2011) for Finland who show a positive effect of age diversity and a negative one of educational diversity.

In this paper we extend this literature by also looking at the role of managers and the proprietary structure of the firm. Managers are on the front-line in the companies and might have a

[13] (-0.04-0.08)*2.42=-0.2904
[14] -1.09*0.08=-0.0872

preference for similar employees and hence favour them, or, on the contrary, suffer from the queen bee syndrome and prefer employees different from them. We do not find evidence for any of these theoretical arguments. Manager's gender, age, education and tenure do not seem to affect how diversity impacts productivity and wage. This result might also tell that in France “diverse” managers refrain from promoting and valuing diversity not because they perceive similar workers as a threat, but because, despite the “politically-correct” attitude, it is still better for their own career prospects. If this proves correct, then the impact of diversity on firm's productivity may depend more on those who select and reward managers.

Indeed we find some significant differential impact according to the type of shareholders of the firm. Shareholders, despite not usually running the day-to-day business can influence the values and attitudes towards diversity of a company. They can even put in place forms of remuneration plans linked to diversity objectives. In particular we find that family firms seem to be able to neutralize the negative effect of gender diversity on productivity which we register in other firms. Family firms offer greater job security and potentially a better working environment for both men and women. On the opposite, we find that companies listed on the stock exchange seem better able to reap the benefits of more educational diverse workforce. This can be due to a relatively more efficient human resource management of publicly listed companies for whom pursuing profit maximisation and shareholders value is more important than for family firms. This applies also to family firms which are publicly listed which suggest that by going on the stock exchange they lose their initial characteristics and attitudes of family firms. Finally, foreign owners do not significantly change the impact of diversity on productivity and wages while companies where workers own part of the shares see a negative impact of age diversity.

Overall we can conclude that the company proprietary structure, which is likely to determine the firm-specific culture and values, is somehow more relevant than the characteristics of the managers who run the day-to-day operations for an effective workplace diversity management. So far most of the attention has been put on managers and human resource practices. They are certainly very important but it appears that diversity management is something deeper than a list of policies that can be changed by changing managers, for instance hiring a younger CEO or having a woman at the head of the company. The company culture, defined by the shareholders objectives and values, seems to play a stronger role. Those firms which allow more latitude for personal concerns like family firms provide a better environment for gender diversity. On the opposite, in those firms where revenues and profits are subject to a more intense control like in firms listed on the stock exchange, education diversity and its productivity-enhancing effect plays a more important role.

Future empirical research should further explore the link between workplace diversity, manager characteristics and the proprietary structure of the firm. This issue increasingly raises

concerns for shareholders and executives, but so far the evidence is still very weak. In particular the focus has been mainly on managers and human resource practices. Stronger actions on shareholders may prove more effective.

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TABLES

Table 1: Descriptive statistics

Variable	N	Mean	SD	Min	Max
Value added per worker ('000)	1164	96.81	638.8	3	20388
Average wage per workers ('000)	1164	38.55	122.8	8.02	4138
Average age	1164	40.23	4.27	22.14	51.63
Average education	1164	10.91	3.37	0	17
% women	1164	34	25	2	94
Std. dev. of age	1164	11.92	2.42	4.95	23.67
Std. dev. of education	1164	2.59	2.44	0	12.02
Std. dev. of gender	1164	0.82	0.08	0.71	0.98
Dissimilarity of age	1162	8.91	6.41	0	31.18
Dissimilarity of education	1164	3.31	3.11	0	14.72
Dissimilarity of gender	1162	0.33	0.36	0	0.87
% temporary workers	1164	11	69	0	99
% part time workers	1164	1	23	0	100
Firm size	1164	685	1708	25	10000
Workers Tenure	1164	12.51	7.04	1	42
% white collar	1164	37	37	0	100
Capital ('000)	1164	190	1230	95	30700

Table 2: Top managers' characteristics

	N	Mean	SD
Women top manager (%)	1164	27	44
Education top manager (years)	1164	14.63	3.13
Top manager age (years)	1164	45.9	8.99
Tenure top manager (years)	1164	12.36	10.03
Age establishment (years)	1164	33.55	16.16

Table 3: Proprietary structure of the firms

	N	%
Individual/Family	513	44.07
Family listed on stock exchange	161	13.83
Listed on stock exchange	88	7.56
Foreigners	86	7.39
Listed and foreigners	46	3.95
Workers	27	2.32
Family and workers	9	0.77
Family and foreigners	7	0.6
Listed and workers	6	0.52
Family, listed and foreigners	3	0.26
Family, listed and workers	1	0.09
None of the above	217	18.64

Note: None of the above includes 34 firms without shareholders, 20 firms owned by the Government or local authorities, 41 by French financial institutes, 67 by French non-financial institutes and 34 others (not specified).

Table 4: Baseline results with controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Value-added	**Wage**	**Value-added - wage**	**Value-added**	**Wage**	**Value-added - wage**	**Value-added**	**Wage**	**Value-added - wage**
Age diversity (sd)	-0.03***	-0.03***	-0.01	-0.04***	-0.03***	-0.01	-0.04***	-0.02**	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)
Education diversity (sd)	0.02**	0.00	0.01*	0.02**	0.00	0.02**	0.01**	-0.00	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Gender diversity (sd)	-0.05	0.46*	-0.51*	-0.16	0.41*	-0.58**	-0.50*	0.16	-0.65**
	(0.30)	(0.24)	(0.26)	(0.29)	(0.22)	(0.28)	(0.29)	(0.19)	(0.29)
Mean age	-0.01**	-0.00	-0.01	-0.02**	-0.01	-0.01	-0.02**	-0.00	-0.01*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Mean education	0.02**	0.02***	-0.00	0.01	0.01***	-0.00	0.02**	0.01***	0.00
	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)
% women	-0.26**	-0.06	-0.19*	-0.22**	-0.03	-0.20*	-0.30***	-0.12*	-0.18*
	(0.11)	(0.07)	(0.10)	(0.10)	(0.08)	(0.11)	(0.10)	(0.07)	(0.10)
Temporary workers	0.00	-0.03	0.03**	0.01	-0.02	0.03**	0.01	-0.03**	0.04*
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)
Part time	0.06	-0.04	0.09	0.06	-0.00	0.07	0.12	0.01	0.10
	(0.07)	(0.06)	(0.07)	(0.07)	(0.06)	(0.07)	(0.09)	(0.06)	(0.09)
Firm size	-0.00	0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Tenur	-0.01**	-0.00**	-0.00	-0.01**	-0.00**	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
White collar	0.12*	0.13***	-0.01	0.11	0.09**	0.02	0.09	0.08*	0.01
	(0.06)	(0.04)	(0.06)	(0.07)	(0.04)	(0.07)	(0.08)	(0.04)	(0.09)
Capital/worker	0.30***	0.18***	0.13***	0.32***	0.18***	0.14***	0.31***	0.18***	0.12***
	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)
Sector dummies	no	no	no	yes	yes	yes	yes	yes	yes
Regional dummies	no	no	no	yes	yes	yes	yes	yes	yes
Sector*Region dummies	no	no	no	no	no	no	yes	yes	yes
Constant	3.42***	2.53***	0.90*	3.55***	2.86***	0.69	3.64***	2.69***	0.96*
	(0.50)	(0.39)	(0.54)	(0.49)	(0.34)	(0.53)	(0.50)	(0.36)	(0.53)
Adj. R-squared	0.34	0.29	0.08	0.40	0.38	0.10	0.47	0.52	0.18
Observations	1164	1164	1164	1164	1164	1164	1164	1164	1164

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are reported in parenthesis.

Table 5: IV results

	(1)	(2)	(3)
	Value-added	**Wage**	**Value-added - wage**
Age diversity (sd)	-0.03***	-0.03***	0.01
	(0.01)	(0.01)	(0.01)
Education diversity (sd)	0.00	-0.01**	0.01**
	(0.01)	(0.00)	(0.01)
Gender diversity (sd)	-0.48**	0.37**	-0.86***
	(0.24)	(0.16)	(0.24)
Mean age	-0.01**	-0.01**	-0.00
	(0.01)	(0.00)	(0.01)
Mean education	0.02***	0.02***	0.00
	(0.01)	(0.00)	(0.01)
% women	-0.21**	-0.01	-0.20**
	(0.09)	(0.06)	(0.09)
Temporary workers	0.01	-0.03**	0.04**
	(0.02)	(0.01)	(0.02)
Part time	0.09	0.01	0.08
	(0.05)	(0.04)	(0.06)
Firm size	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)
Tenure	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)
White collar	0.07	0.06*	0.01
	(0.04)	(0.03)	(0.04)
Capital	0.31***	0.19***	0.12***
	(0.02)	(0.01)	(0.02)
Sector dummies	yes	yes	yes
Regional dummies	yes	yes	yes
Sector*Region dummies	yes	yes	yes
Constant	3.44***	2.90***	0.55
	(0.46)	(0.32)	(0.47)
Adj. R-squared	0.46	0.51	0.17
Observations	1164	1164	1164
Underid. (p-value)	0.0000	0.0000	0.0000
Weak id test (F stat)	76.851	76.851	76.851
Overid (p-value)	0.4313	0.4131	0.2232
endogeneity (p-value)	0.0054	0.0000	0.0080
F-tests 1st stage:			
Age diversity (sd)		278.03	
Education diversity (sd)		199.65	
Gender diversity (sd)		240.55	
Mean age		152.68	
Mean education		166.28	
% women		230.47	

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are reported in parenthesis. Instruments: 1st and 2nd moments of age, gender and education in the other firms of the same sector and age, gender and education dissimilarity.

Table 6: Results by top manager's characteristics

	Women			Mgt education			Mgt age			Tenure		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Value-added	**Wage**	**VA-W**	**Value-added**	**Wage**	**VA-W**	**Value-added**	**Wage**	**VA-W**	**Value-added**	**Wage**	**VA-W**
Age diversity (sd)	-0.03**	-0.03**	-0.00	-0.04***	-0.03**	-0.01	-0.04***	-0.03**	-0.00	-0.04***	-0.03**	-0.01
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)
Education diversity (sd)	0.02**	-0.00	0.02**	0.02*	-0.00	0.02**	0.01	-0.00	0.01	0.01	0.00	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Gender diversity (sd)	-0.25	0.20	-0.45	-0.26	0.32	-0.58	-0.52	0.32	-0.84**	-0.44	0.20	-0.64*
	(0.29)	(0.22)	(0.30)	(0.36)	(0.26)	(0.41)	(0.37)	(0.27)	(0.42)	(0.34)	(0.23)	(0.37)
Mean age	-0.01	-0.00	-0.01	-0.02***	-0.00	-0.02**	-0.02**	-0.00	-0.02	-0.02**	-0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Mean education	0.03***	0.01***	0.01*	0.02***	0.01***	0.01	0.03***	0.02***	0.01	0.02**	0.02***	-0.00
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)
% women	-0.24**	-0.12	-0.12	-0.30**	-0.09	-0.21*	-0.38***	-0.10	-0.28**	-0.26**	-0.09	-0.17*
	(0.10)	(0.08)	(0.09)	(0.13)	(0.09)	(0.12)	(0.13)	(0.09)	(0.12)	(0.11)	(0.07)	(0.10)
Top manager characteristic	3.04*	0.05	2.99*	0.00	-0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
	(1.72)	(0.70)	(1.67)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age diversity (sd) * top manager characteristic	-0.06	0.01	-0.07	0.00	0.00	-0.00	-0.00	0.00	-0.00	-0.00	0.00	-0.00
	(0.04)	(0.02)	(0.04)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Education diversity (sd) * top manager characteristic	-0.01	-0.01	-0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	-0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Gender diversity (sd) * top manager characteristic	-0.99	-0.03	-0.96*	-0.04	-0.02	-0.02	-0.00	-0.01	0.01	-0.01	-0.00	-0.01
	(0.63)	(0.39)	(0.55)	(0.03)	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Mean age * top manager characteristic	-0.03	-0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.02)	(0.01)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Mean education * top manager characteristic	-0.05*	0.00	-0.05*	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.00
	(0.03)	(0.01)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
% women * top manager characteristic	-0.15	-0.02	-0.13	-0.00	-0.00	0.00	0.00	-0.00	0.00	-0.01	-0.00	-0.00
	(0.30)	(0.15)	(0.28)	(0.02)	(0.01)	(0.02)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
Firm and workers controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sector dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Regional dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sector*Region dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	3.10***	2.57***	0.53	3.68***	2.68***	1.00*	3.65***	2.66***	1.00*	3.61***	2.72***	0.90*
	(0.58)	(0.41)	(0.62)	(0.54)	(0.36)	(0.57)	(0.54)	(0.37)	(0.58)	(0.52)	(0.36)	(0.54)
Adj. R-squared	0.48	0.52	0.23	0.47	0.52	0.19	0.47	0.52	0.19	0.47	0.52	0.18
Observations	1164	1164	1164	1161	1161	1161	1161	1161	1161	1161	1161	1161

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are reported in parenthesis. Worker and firm characteristics include: % non-open-ended, % part-time, firm size, mean tenure, % white collars, capital/worker.

Table 7: Results by shareholder type

	Family			Stock exchange			Foreign owner			Workers shareholders		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Value-added	**Wage**	**VA-W**	**Value-added**	**Wage**	**VA-W**	**Value-added**	**Wage**	**VA-W**	**Value-added**	**Wage**	**VA-W**
Age diversity (sd)	-0.07**	-0.02	-0.04	-0.03***	-0.03***	-0.00	-0.04***	-0.02**	-0.02	-0.04***	-0.02**	-0.01
	(0.03)	(0.02)	(0.03)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)
Education diversity (sd)	0.01	-0.00	0.01	0.01	-0.01	0.01	0.01*	-0.00	0.02**	0.01**	-0.00	0.02**
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Gender diversity (sd)	-1.17**	0.23	-1.40**	-0.30	0.37*	-0.67**	-0.48	0.17	-0.65**	-0.46	0.19	-0.64**
	(0.51)	(0.31)	(0.54)	(0.29)	(0.22)	(0.29)	(0.30)	(0.19)	(0.31)	(0.30)	(0.19)	(0.30)
Mean age	-0.03**	0.00	-0.03**	-0.02**	-0.01	-0.01	-0.02**	-0.00	-0.02*	-0.01**	-0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Mean education	0.00	0.02***	-0.02	0.02***	0.01***	0.01	0.01*	0.01***	0.00	0.02**	0.01***	0.00
	(0.02)	(0.01)	(0.02)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)
% women	-0.29*	-0.09	-0.20	-0.31***	-0.10	-0.20**	-0.29***	-0.13*	-0.17*	-0.28***	-0.11*	-0.17*
	(0.17)	(0.08)	(0.17)	(0.11)	(0.08)	(0.10)	(0.11)	(0.07)	(0.10)	(0.10)	(0.07)	(0.10)
Shareholder	-2.10*	0.43	-2.52*	0.56	-0.62	1.18	-1.44	0.43	-1.87	3.92**	1.64	2.28
	(1.26)	(0.72)	(1.35)	(1.28)	(0.77)	(1.35)	(1.20)	(1.01)	(1.30)	(1.74)	(1.04)	(1.43)
Age diversity (sd) * shareholder	0.04	-0.00	0.04	-0.04	0.03	-0.07	0.05	-0.01	0.07	-0.08**	-0.02	-0.07*
	(0.03)	(0.02)	(0.04)	(0.04)	(0.02)	(0.05)	(0.04)	(0.03)	(0.04)	(0.04)	(0.02)	(0.04)
Education diversity (sd) * shareholder	0.00	-0.00	0.00	0.04**	0.01	0.03	0.00	-0.00	0.01	0.02	0.00	0.02
	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.03)	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)
Gender diversity (sd) * shareholder	0.97*	-0.12	1.09*	-0.35	-0.89**	0.54	-0.84	-0.39	-0.45	-1.44	-1.09*	-0.35
	(0.59)	(0.35)	(0.58)	(0.68)	(0.41)	(0.69)	(0.96)	(0.73)	(0.94)	(1.13)	(0.64)	(1.01)
Mean age * shareholder	0.02	-0.00	0.02	0.01	0.02**	-0.02	0.03	-0.00	0.03	-0.04	-0.01	-0.02
	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
Mean education * shareholder	0.02	-0.01	0.03	-0.02	0.00	-0.02	0.02	0.01	0.00	-0.01	0.00	-0.01
	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.03)	(0.03)	(0.02)	(0.04)	(0.02)	(0.01)	(0.02)
% women * shareholder	0.03	-0.03	0.06	0.13	-0.04	0.17	-0.05	0.11	-0.15	-0.56*	0.06	-0.63*
	(0.22)	(0.11)	(0.22)	(0.29)	(0.15)	(0.28)	(0.32)	(0.21)	(0.36)	(0.30)	(0.21)	(0.35)
Firm and workers controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sector dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Regional dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sector*Region dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	5.12***	2.36***	2.76**	3.35***	2.75***	0.60	3.75***	2.62***	1.13**	3.54***	2.67***	0.88
	(1.08)	(0.64)	(1.15)	(0.54)	(0.39)	(0.57)	(0.53)	(0.37)	(0.57)	(0.51)	(0.37)	(0.54)
Adj. R-squared	0.47	0.52	0.19	0.49	0.52	0.20	0.46	0.52	0.18	0.47	0.52	0.18
Observations	1164	1164	1164	1164	1164	1164	1164	1164	1164	1164	1164	1164

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are reported in parenthesis. Worker and firm characteristics include: % non-open-ended, % part-time, firm size, mean tenure, % white collars, capital/worker.

ANNEX

Table A1: Summary of the empirical literature

Study	Country and year	Firm/Sector	Performance indicator	Characteristics considered	Diversity index	Method	Results
Company level							
Hamilton et al. (2004)	USA (1995-1997)	Garment manufact.	Piece rate production (at individual and team level)	Worker abilities, age, ethnicity	Ability: ratio of the maximum to the minimum average individual productivity levels of the team members; Age: std.dev.; Ethnicity: % of Hispanic	OLS Median FE	Ability: positive effect. Age: negative. Ethnicity: positive. (but for age and ethnicity not robust)
Kurtulus (2011)	USA (1989-1994)	Health services	Worker performance evaluation	Demographic (age, race, gender) and non demographic (education, work function, firm tenure, division tenure, performance and wages)	Dissimilarity	OLS FE	Age, firm tenure and performance: negative effect. Wage: positive effect.
Leonard and Levine (2006)	USA (1996-1998, monthly)	Large retail firm	Monthly sales	Age, race, gender	Gender and race: Herfindahl; Age: std. dev.	OLS FD	Age: negative. Race and gender: not significant.
Linked Employer-Employee Data							
Barrington and Troske (2001)	USA (1990)	Manufact., retail trade and services	Value-added and total sales per capita	Payroll and occupation	Unique index	OLS	No significant relationship

Grund and Westergaard-Nielsen (2008)	Denmark (1992-1997)	All	Value-added per capita	Age structure (mean and dispersion)	Std. Dev.	OLS FE	U-shaped relation with firm performance
Ilmakunnas and Ilmakunnas (2011)	Finland (1995-2004)	All	TFP (+ wages for workers)	Age, education	Std. Dev., dissimilarity, Blau and two dimensional age-education index	OLS FE GMM OP	Age positive on TFP and wage and education negative on TFP
Navon (2009)	Israel (2000-2003)	Manufacturing	Value-added	Knowledge (type of degree)	Herfindahl	OLS LP OP	Positive effect of knowledge diversity
Parrotta et al. (2014)	Denmark (from 1994 for construction, 1995 for manufacturing, 1998 for wholesale trade, 1999 for services to 2005)	All	TFP (estimated with Wooldridge (2009) approach)	Cultural backgrund, skills/education and demographics	Herfindahl	IV	Positive for skills/education; mixed for demographics and ethnicity
Garnero et al. (2014)	Belgium (1999-2006)	All firms >10 employess excluding agricolture	Value-added per hour, mean wage per hour	Age, education and gender	Std. Dev., dissimilarity, gender diversity index	OLS GMM LP	Age negative on productivity; education positive; gender positive in high-tech/knowledge-intensive sectors, but negative in more traditional industries

Note: FE: fixed effects; FD: first differences; OP: Olley and Pakes (1996) method; LP: Levinsohn and Petrin (2003) method.

Table A2: Baseline results without controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Value-added	**Wage**	**Value-added - wage**	**Value-added**	**Wage**	**Value-added - wage**	**Value-added**	**Wage**	**Value-added - wage**
Age diversity (sd)	-0.02***	-0.03***	0.00				-0.03**	-0.03**	-0.01
	(0.01)	(0.01)	(0.01)				(0.01)	(0.01)	(0.01)
Education diversity (sd)	-0.00	-0.01**	0.01				0.02**	0.00	0.01*
	(0.01)	(0.01)	(0.01)				(0.01)	(0.01)	(0.01)
Gender diversity (sd)	-0.86***	-0.31	-0.55***				-1.06***	-0.19	-0.87***
	(0.25)	(0.19)	(0.21)				(0.32)	(0.23)	(0.25)
Mean age				0.01**	0.01***	-0.00	-0.01	-0.00	-0.01
				(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
Mean education				0.04***	0.04***	0.00	0.04***	0.04***	0.00
				(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)
% women				-0.19*	-0.11*	-0.08	-0.38***	-0.15*	-0.23***
				(0.10)	(0.06)	(0.09)	(0.12)	(0.08)	(0.09)
Sector dummies	no	no	no	no	no	no	no	no	no
Regional dummies	no	no	no	no	no	no	no	no	no
Sector*Region dummies	no	no	no	no	no	no	no	no	no
Constant	5.06***	4.03***	1.03***	3.28***	2.63***	0.65***	5.29***	3.68***	1.61***
	(0.25)	(0.18)	(0.21)	(0.18)	(0.13)	(0.14)	(0.58)	(0.46)	(0.53)
Adj. R-squared	0.03	0.04	0.01	0.07	0.11	0.00	0.11	0.13	0.02
Observations	1164	1164	1164	1164	1164	1164	1164	1164	1164

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are reported in parenthesis.

Table A3: Baseline results with the gender diversity index

	(1)	(2)	(3)
	Value-added	**Wage**	**Value-added - wage**
Age diversity (sd)	-0.04***	-0.02**	-0.01
	(0.01)	(0.01)	(0.02)
Education diversity (sd)	0.01**	-0.00	0.02**
	(0.01)	(0.01)	(0.01)
Gender diversity index	-0.59*	0.18	-0.77**
	(0.34)	(0.22)	(0.35)
Mean age	-0.02**	-0.00	-0.01*
	(0.01)	(0.01)	(0.01)
Mean education	0.02**	0.01***	0.00
	(0.01)	(0.00)	(0.01)
% women	-0.29***	-0.12*	-0.18*
	(0.10)	(0.07)	(0.10)
Temporary workers	0.01	-0.03**	0.04
	(0.02)	(0.01)	(0.02)
Part time	0.12	0.01	0.10
	(0.09)	(0.06)	(0.09)
Firm size	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)
Tenure	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)
White collar	0.09	0.08*	0.01
	(0.08)	(0.04)	(0.09)
Capital/worker	0.31***	0.18***	0.12***
	(0.03)	(0.03)	(0.04)
Constant	3.14***	2.85***	0.29
	(0.46)	(0.35)	(0.53)
Adj. R-squared	0.47	0.52	0.18
Observations	1164	1164	1164

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are reported in parenthesis.

Table A4: Results for family firms listed on the stock exchange

	(1)	(2)	(3)
	Value-added	**Wage**	**Value-added - wage**
Age diversity (sd)	-0.04***	-0.03**	-0.01
	(0.01)	(0.01)	(0.02)
Education diversity (sd)	0.01	-0.00	0.01
	(0.01)	(0.01)	(0.01)
Gender diversity (sd)	-0.38	0.33	-0.71**
	(0.29)	(0.20)	(0.29)
Mean age	-0.02**	-0.00	-0.01*
	(0.01)	(0.01)	(0.01)
Mean education	0.01	0.02***	-0.01
	(0.01)	(0.00)	(0.01)
% women	-0.28***	-0.10	-0.18*
	(0.10)	(0.07)	(0.09)
Shareholder	-0.37	0.01	-0.38
	(1.43)	(1.08)	(1.31)
Age diversity (sd) * shareholder	-0.00	0.02	-0.02
	(0.04)	(0.03)	(0.04)
Education diversity (sd) * shareholder	0.04**	0.02	0.02
	(0.02)	(0.01)	(0.02)
Gender diversity (sd) * shareholder	-0.54	-1.22***	0.68
	(1.00)	(0.46)	(1.01)
Mean age * shareholder	0.01	0.02	-0.01
	(0.02)	(0.02)	(0.02)
Mean education * shareholder	0.03*	-0.01	0.04***
	(0.01)	(0.01)	(0.01)
% women * shareholder	-0.10	-0.15	0.04
	(0.41)	(0.19)	(0.40)
Firm and workers controls	yes	yes	yes
Sector dummies	yes	yes	yes
Regional dummies	yes	yes	yes
Sector*Region dummies	yes	yes	yes
Constant	3.69***	2.59***	1.10**
	(0.52)	(0.37)	(0.56)
Adj. R-squared	0.47	0.52	0.18
Observations	1164	1164	1164

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are reported in parenthesis.