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# Is Workforce Diversity Always Performance-enhancing?

## A Literature Review

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**Resumé** – Cet article passe en revue la littérature, principalement économique, concernant les effets de la diversité de la main-d'œuvre au sein des entreprises sur la productivité, les salaires et les profits. La diversité est définie en termes d'âge, d'éducation et de genre. Malgré la variété des approches empiriques, la plupart des études suggèrent que l'impact de la diversité d'âge et de genre est négatif pour la productivité, alors que la diversité en termes d'éducation ou de compétences a un impact positif. Les travaux récents pour la Belgique et la France suggèrent en outre que les entreprises dans les secteurs hautement technologiques sont plus susceptibles de bénéficier de la diversité en termes de genre. Les effets semblent également dépendre de la forme de propriété de l'entreprise, les entreprises familiales étant plus enclines à bénéficier de la diversité de genre.

**Mots clés** : diversité de la main-d'œuvre, productivité, salaires, profits

**Codes JEL** : D24, J24, J31, M12

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**Abstract** – This article reviews the literature, mainly economic, regarding the effects of workforce diversity within firms on productivity, wages and profits. Diversity is defined in terms of age, education and gender. Despite a variety of empirical approaches, most studies tend to suggest that the impact of age and gender diversity is negative for productivity, while educational or skills diversity tends to be positive. Recent studies on Belgium and France further suggest that firms in high-tech sectors are more likely to benefit from gender diversity. The outcome also appears to depend on the ownership structure of the firm, with family firms being more conducive for gender diversity.

**Keywords**: workforce diversity, productivity, wages, profits

**JEL Codes**: D24, J24, J31, M12

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## 1 INTRODUCTION

Today's labour force is getting more and more heterogeneous not only in terms of ethnicity but also in terms of age, education and gender: ageing, women's increased labour participation and technological change are key drivers of this phenomenon. Moreover, in an increasing number of countries companies are under legislative pressure to diversify their workforce either through quotas or forms of affirmative action. Workforce diversity has thus become an essential business concern. Firms have to manage diversity both internally (i.e. among management and staff) and externally (i.e. by addressing the needs of diverse customers, suppliers or contractors). Diversity Charters to ban discrimination on the workplace and to implement adapted human resources policies have flourished in a series of European countries.<sup>1</sup> As a result, an increasing number of firms employ a "diversity manager" whose task is to ensure that diversity does not hamper productivity but may contribute to the attainment of the firm's objectives.

From the workers' point of view, labour diversity may also generate benefits or losses. The latter may be the result of a more (or less) enjoyable working environment, but they may also derive from a higher (or lower) wage. According to competitive labour market theory, workers are paid at their marginal revenue products. Hence, if labour diversity affects productivity, it may also influence workers' earnings.

The empirical evidence regarding the impact of age, education and gender diversity on productivity and wages is still quite scarce, especially when key econometric issues are controlled for. In this paper we summarise the main theoretical arguments (Section 2) and empirical literature (Section 3), with a particular focus on the case of Belgium and France (Section 4).

## 2 THE EFFECTS OF DIVERSITY IN THEORY...

There are different economic forces underlying the relationship between workforce diversity (in terms of age, gender and education) and productivity. As highlighted by Alesina and La Ferrara (2005), these forces may derive from: individual *preferences* (either people may attribute positive [negative] utility to the well-being of members of their own group [of other groups] or they may value diversity as a social good as such), individual *strategies* (even when people have no taste for or against diversity, it may be more efficient, notably in the presence of market imperfections, to interact preferably with members of one's own group)<sup>2</sup>, or the

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1. The list of countries and a series of facts and figures can be found at: [http://ec.europa.eu/justice/discrimination/diversity/facts/index\\_en.htm](http://ec.europa.eu/justice/discrimination/diversity/facts/index_en.htm)
  2. Osborne (2000), for instance, builds a model, with full information regarding both the supply and demand-side of the market, to examine workforce-diversity patterns of profit-maximizing firms. His model shows that the optimal degree of labour force mix depends on the diversity in groups' physical productivity but also on demand-side factors, i.e. the characteristics of the product that is sold, the extent to which different markets value them, and the extent to which groups intrinsically vary in their capacity to provide them. To illustrate this conclusion, Osborne provides the

characteristics of the *production function* (i.e. the complementarity in people's skills).<sup>3</sup>

Lazear (1999) follows the production function approach and develops a theoretical model in which a global (i.e. multinational) firm is presented as a diverse (i.e. multi-cultural) team. He argues that labour diversity is beneficial for firm performance if skills and information sets are group- (i.e. culture-) specific. More precisely, he demonstrates theoretically that the gains from diversity are greatest when three conditions are fulfilled: a) individuals have completely different (i.e. disjoint) skills and information sets, b) the latter are all relevant for the tasks that have to be performed within the firm, and c) individuals are able to communicate with (i.e. to understand) each other.

Young workers are thought to learn faster (Skirbekk, 2003) and to have better cognitive and physical abilities (Hoyer and Lincourt, 1998), while older workers are typically considered to have more job experience and knowledge about intra-firm structures, relevant markets and networks (Czaja and Sharit, 1998; Grund and Westergaard-Nielsen, 2008). Given that these complementary skills are relevant for most firms, Lazear's (1999) model suggests that age diversity may generate some gains. However, the net effect on productivity will only be positive if these gains outweigh additional communication costs (and difficulties related to emotional conflicts) incurred by a more diverse workforce. It has repeatedly been argued (see e.g. Lazear, 1999; Jehn *et al.*, 1999) that this condition is unlikely to be satisfied for demographic diversity (heterogeneity in terms of age, gender or ethnicity) but may well be fulfilled for educational (i.e. task-related) heterogeneity. The latter may indeed enhance efficiency if there is sufficient mutual learning and collaboration among workers with different educational backgrounds (Hamilton *et al.*, 2004).

Kremer (1993) develops the O-ring production function based on the assumption that quantity and quality of labour cannot be substituted. The underlying intuition is that many production processes involve a large number of tasks and that a small failure in one of these tasks may lead to a strong decrease in production value. Kremer gives the example of a company that may go bankrupt due to bad marketing, even if product design, manufacturing and accounting are excellent.<sup>4</sup> With this type of production function, it can be shown that profit-maximizing firms should match workers of similar skills/education together. Task-related heterogeneity would thus hamper productivity.

Social cognitive theory examines how the efficacy of a group (i.e. "a group's belief in their conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (Bandura, 1997, p. 477)) affects

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example of police officers of specific ethnic groups that may be better suited to patrol neighbourhoods essentially populated by those groups. Conversely, he notes that the ethnicity of an automobile worker who installs the clutch is unlikely, *ceteris paribus*, to affect his productivity and the consumers' willingness to buy the car.

3. The variety of ways in which people interpret problems and use their cognitive skills to solve them, may be an important source of innovation and productivity (Parrotta *et al.*, 2016).
4. The title of his paper refers to the space shuttle Challenger that exploded because of a slight imperfection in a single component, called the O-rings.

its performance. Results suggest that collective efficacy is not always beneficial for the outcome of a group. Moreover, mixed gender groups are found to foster the impact of group efficacy on performance (Lee and Farh, 2004). The argument is that gender diversity is likely to increase the heterogeneity in the values, beliefs and attitudes of the members of a group, which in turn may stimulate critical thinking and prevent the escalation of commitment (i.e. inflated perception of group efficacy resulting in poor decision making).

Conclusions regarding the optimal workforce mix are somewhat different if one follows the organizational demography or social comparison literature. The former (see e.g. Pfeffer, 1985) stresses the importance of social similarity (and thus of inter-personal attraction) to stimulate interaction, communication and cohesion among the workforce. Given that features such as age, education or gender help to explain similarity, diversity along these dimensions is expected to hamper job satisfaction, communication and firm performance. Social comparison theory (Festinger, 1954) posits that people evaluate and compare their opinions and abilities with those of similar others (e.g. individuals of the same age, education or gender). Moreover, it puts forward that people try to perform better than the members of their comparison group (Pelled *et al.*, 1999), which in turn leads to rivalry and conflicts likely to undermine performance (Choi, 2007). From this perspective, labour diversity may benefit the organisation. However, as highlighted by Grund and Westergaard-Nielsen (2008), a decision might be of better quality when it is the outcome of a confrontation between rivals' views. Various theories, such as tournaments (Lazear and Rosen, 1981), suggest in addition that rivalry among similar workers may be good for performance as it encourages workers to produce more effort.

### 3 ...AND IN PRACTICE

A number of papers in the HRM, sociology and psychology literatures investigate the impact of labour diversity (with respect to e.g. education, age, gender, race, sexual orientation, disability) on various outcomes at the worker (e.g. organizational commitment, turnover, creativity, frequency of communication) and company (e.g. financial indicators, ratings of group effectiveness) level.<sup>5</sup> Many of these field and experimental studies, however, rely on "small samples of workers in narrow occupational fields that often lack a longitudinal component" (Kurtulus, 2011: 685). Moreover, almost none of these analyses control for reverse causality. In this section, for the sake of brevity and methodological comparability, we focus on the relatively few studies that have been undertaken by economists and that address the productivity effects of education, age, and/or gender.

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5. For a review see e.g. Horwitz and Horwitz (2007), Ilmakunnas and Ilmakunnas (2011) and Roberge and van Dick (2010).

### 3.1 Results based on personnel records from single companies

A first strand of the economic literature analyses the diversity-performance nexus using case studies, i.e. personnel records from single companies. The advantage of this approach is that it enables to control for very detailed worker characteristics and *de facto* for firm time-invariant unobserved heterogeneity. However, focusing on data from a single company is likely to reduce the external validity of the results.

Hamilton *et al.* (2004) use weekly data from a Californian garment manufacturing plant for the years 1995-1997. Their results indicate that teams with greater diversity in workers' abilities and composed of only one ethnicity (namely Hispanics) are more productive (i.e. sew more garments per day). In contrast, team heterogeneity in workers' age is found to decrease productivity. Yet, results for team demographics (age and ethnicity) should be taken with care as they become insignificant when applying fixed effects. Leonard and Levine (2006) rely on longitudinal data (collected in 1996-1998) from a low-wage service-sector employer with establishments (retail stores or restaurants) throughout the U.S. They study the influence of demographic (race, gender and age) diversity between a workgroup and its customers and within a workgroup on an indirect measure of productivity, namely individual turnover within workgroups. Results (controlling for individual fixed effects) show that diversity does not consistently predict turnover. In contrast, isolation (i.e. being in a numerical minority) from co-workers and customers, especially with respect to race, often leads to higher turnover. Mas and Moretti (2009) investigate how the productivity of cashiers in a large supermarket chain in the U.S. is affected by their peers. Using high-frequency data between 2003 and 2006, they find evidence of positive spillovers from the introduction of highly productive workers (i.e. workers scanning a large number of items per second) in a shift. More precisely, first-difference estimates show that less capable workers become significantly more productive in the presence of highly productive co-workers while more capable workers are not affected by the presence of less productive co-workers. Skill diversity within shifts is thus found to increase productivity. Kurtulus (2011) uses detailed personal records of a large U.S. firm in the health service industry for the years 1989-1994. Her fixed effects estimates highlight that diversity within organisational divisions with respect to age, firm tenure, and performance is associated with lower worker's productivity (i.e. subjective performance evaluated by managers). In contrast, worker's performance would be boosted by intra-division differences in wages.

### 3.2 Results based on linked employer-employee data

Another strand of the literature relies on linked employer-employee data (LEED). These data have the advantage of being representative of a large part of the economy. Moreover, merged to firm-level accounting data, they allow to estimate the impact of labour diversity on quite precise measures of plant- or firm-level productivity (e.g. total factor productivity (TFP) or value-added) while controlling for a large set of worker and employer characteristics.

Barrington and Troske (2001) examine the impact of plant-level diversity (with respect to age and gender) on plant-level productivity (i.e. value-added and sales per worker and TFP) respectively in the manufacturing, retail trade and services industry. Based on cross-sectional LEED for 1999, their OLS estimates reject the hypothesis that workforce diversity would be detrimental for the productivity of U.S. plants. Grund and Westergaard-Nielsen (2008) use LEED for the Danish private sector over the period 1992-1997. They find (with a FE estimator) that firms with a medium age dispersion perform best (i.e. obtain the highest value-added and profits per employee).

The studies of Iranzo *et al.* (2008), Navon (2009), Ilmakunnas and Ilmakunnas (2011) and Parrotta *et al.* (2014) are among the most advanced available so far as they not only control for firm time-invariant unobserved heterogeneity but also for endogeneity. Iranzo *et al.* (2008) examine how productivity (measured by firm-level value-added) is influenced by the intra-firm dispersion in workers' skills (proxied by workers' fixed effects estimated from an individual wage regression). Using LEED from the Italian manufacturing industry over the period 1981-1997, their results (based respectively on the estimation methods developed by Olley and Pakes (1996) and Akerberg *et al.* (2006)) show that intra-firm skill dispersion within (between) occupational groups – production and non-production workers – is beneficial (detrimental) for firm productivity. Moreover, they find no differences in estimation results when splitting firms according to whether they belong to an ICT or non-ICT industry). Navon (2009) relies on LEED for the Israeli manufacturing industry over the period 2000-2003. Controlling for plant fixed effects and endogeneity (using Olley and Pakes (1996) and Levinsohn and Petrin (2003) semi-parametric estimation techniques), he finds that within-plant educational diversity among higher educated workers (i.e. the variability in academic disciplines in which the latter obtained their university degrees) is beneficial for plant-level value-added. Ilmakunnas and Ilmakunnas (2011) investigate whether firms and employees benefit from diversity using Finnish LEED covering the industrial sector (i.e. mining, manufacturing, energy and construction) for the years 1990-2004. Plant-level regressions (estimated with fixed effects, generalized methods of moments and Olley and Pakes estimators) show that the total factor productivity depends positively on age diversity and negatively on educational diversity. In contrast, the latter variables turn out to be statistically insignificant when the authors estimate individual wage regressions. Parrotta *et al.* (2014) use register-based LEED covering most of the Danish private sector between 1995 and 2005. Their results, based on the Akerberg *et al.* (2006) approach, show that diversity in education (ethnicity, age and gender) enhances (deteriorates) firm's value added. Moreover, dividing industries into two groups according to their aggregate level of R&D expenditures, they find no evidence that the impact of diversity would be different for firms in high-tech industries (i.e. in industries with above-average R&D expenditures), although the latter are typically thought to require more creative thinking and problem-solving skills.

## 4 THE CASE OF BELGIUM AND FRANCE

In Garnero, Kampelmann and Rycx (2014) and Garnero (2015) we have extended the analysis of the effect of workforce diversity in terms of education, age and gender on productivity, wages and profits to the cases of Belgium and France. Both papers are based on the separate estimation of a value added function, a wage equation and a profit equation (value added minus wages) at the firm level. This approach builds on the methods developed by Hellerstein and Neumark (1995), Hellerstein *et al.* (1999) and van Ours and Stoeldraijer (2011).

The firm-level standard deviation and *average* dissimilarity index are used to measure diversity. The standard deviation of workforce characteristics (education, age and gender) reflects group diversity (as it takes the same value for all workers within a firm). 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. Its value thus depends on the distance between a worker's characteristic and the mean value of the latter within a firm. In addition to the firm-level standard deviation and average dissimilarity index of workers' education, age and gender, both papers also test the robustness of the results using the gender diversity index, i.e. the share of women times the share of men within firms (Hoogendoorn *et al.*, 2011). This indicator, as well as the others, has the property that diversity is maximal when workers are equally distributed across groups (e.g. when proportions of men and women are equal) and minimal when all workers belong to the same group (e.g. when the workforce is only composed of women or men).

In the case of Belgium, the analysis is based on rich linked employer-employee panel data between 1999 and 2006. The generalized method of moments (GMM) estimator<sup>6</sup> proposed by Arellano and Bover (1995) and Blundell and Bond (1998), and a more structural approach suggested by Levinsohn and Petrin (2003)<sup>7</sup> are used to correct for endogeneity and heterogeneity bias in the estimations. For the study on France, the analysis is based on data from a comprehensive establishment-level survey (REPONSE) for 2011 that was matched with companies' balance sheet data. An IV strategy<sup>8</sup> is used to correct for endogeneity.

6. The GMM-SYS approach boils down to simultaneously estimating a system of two equations (one in level and one in first differences) and to relying on 'internal instruments' to control for endogeneity. More precisely, diversity variables in the differenced equation are instrumented by their lagged levels and diversity variables in the level equation are instrumented by their lagged differences. The implicit assumption is that changes (the level) in (of) the dependent variable – productivity or wages – in one period, although possibly correlated with contemporaneous variations (levels) in (of) diversity variables, are uncorrelated with lagged levels (differences) of the latter. Moreover, changes (levels) in (of) diversity variables are assumed to be reasonably correlated to their past levels (changes).
7. The Levinsohn and Petrin (2003) approach is an extension of the Olley and Pakes (1996) estimation strategy and consists in estimating a value added function with material inputs (i.e. inputs – such as energy, raw materials, semi-finished goods, and services – that are typically subtracted from gross output to obtain value added) as instruments for unobserved shocks.
8. The workforce composition of the focal firm is instrumented with the workforce composition of the other firms in the same sector excluding the focal firm (this strategy has already been followed by Cheng *et al.* 2014; Della Malva and Santarelli, 2016; Forman *et al.*, 2010; Yang and



Despite the different methodologies and years of analysis, the results for Belgium and France are strikingly similar. Findings for Belgium in Garnero, Kampelmann and Rycx (2014) show that educational diversity is beneficial for firm productivity and wages while age diversity is harmful. As of the consequences of gender diversity, they are found to depend on the technological/knowledge environment of firms. While gender diversity generates significant gains in high-tech/knowledge intensive sectors, the opposite result is obtained in more traditional industries. Overall, findings do not point to sizeable effects on profits except for age diversity. Results for France in Garnero (2015) also suggest that age and gender diversity negatively affect firm's productivity and wages. However, by looking at the management characteristics and the ownership structure of the firm, the paper finds an exception in the case of family firms where gender diversity has no negative effect on productivity. In France, education diversity has a positive effect on productivity, in particular in publicly listed companies. Contrary to some widespread beliefs, manager's characteristics do not appear to improve or worsen the impact of workforce diversity on productivity and wages.

Vandenberghe (2016) also studied the case of Belgium but with a quite different approach. He followed the literature on local stratification and growth (Bénabou, 1994, 1996). Hence, he tested the effect of diversity on economic efficiency through the concavity of the production function, i.e. by investigating whether the marginal productivity of increasing shares of more productive/skilled workers is decreasing. His findings differ substantially from those reported in the literature based on LEED and addressing key econometric issues (such as firm-fixed effects and endogeneity). Indeed, they suggest that there would be neither a strong nor a systematic impact of diversity (expressed in terms of age, gender and education) on the efficiency of firms.

## 5 DISCUSSION AND CONCLUSIONS

Studies on the effect of age, education and/or gender diversity on productivity, wages and profits, addressing key statistical issues, are still rare. However, despite different datasets, time periods, countries and econometric techniques they tend to converge in their conclusions: with the exception of Ilmakunnas and Ilmakunnas (2011) and Vandenberghe (2016), the analyses for Belgium, Denmark, France, Israel and the US tend to suggest that the impact of age and gender diversity is negative for firms' productivity while educational or skills diversity tends to be positive.

These results may have important implications for HR managers. Diversity, in contrast to a widespread belief, may not always be beneficial for companies and workers. Moreover, at least in the case of Belgium, consequences of diversity are found by Garnero *et al.* (2014) to substantially depend on the firm's economic

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Steensma, 2014). 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. Statistical tests also confirm that the instrument is exogenous.



environment: for instance, firms in high-tech or knowledge-intensive sectors are more likely to benefit from gender diversity than those in more traditional industries. In the case of France, according to Garnero (2015), they also appear to depend on the ownership structure of the firm, with family firms more conducive for gender diversity. Estimates also highlight that, in all countries that have been studied, the size of the effects associated with diversity is generally not negligible. Effective diversity management thus appears crucial for a firm's success. In particular, HR measures aimed at improving the impact of diversity (especially in terms of age and gender) on economic outcomes deserve special attention.

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