Inter-Industry Wage Differentials: What Do We Know?*

François Rycx ** and Ilan Tojerow ***

Abstract – Substantial wage differentials are observed in all countries between workers employed in different sectors. How can we explain these wage differentials? Do they entirely derive from the sectoral diversity in personal productive characteristics and task descriptions or do employer features also play a role? Are inter-industry wage differentials smaller in countries with centralised and coordinated collective bargaining? Are they shaped by international trade and product market regulations? What is their impact on gender and other types of inequality? Do they affect economic performance? These are the main questions that we address in this review of the literature.

Key words – inter-industry wage differentials, J31.

1 INTRODUCTION

According to the standard Walrasian (competitive) model of the labour market, in which the equilibrium wage is determined by marginal productivity, two agents with identical productive characteristics necessarily receive identical wages. However, so-called compensating differences may occur between similar individuals placed in different working conditions. Indeed, the disutility undergone by one individual following the performance of a task in an unfavourable situation may lead to wage compensation. This simple description of the wage determination process has been challenged by the pioneering observations of Slichter (1950) and more recently by Dickens and Katz (1987), Krueger and Summers (1987, 1988), and

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Katz and Summers (1989). These authors demonstrated that pay differentials existed in the U.S. between workers with the same observable individual characteristics and working conditions but employed in different sectors.

In recent years, comparable results have been obtained for a large number of countries (Arai et al., 1996; Ferro-Luzzi, 1994; Hartog et al., 1997; Lucifora, 1993; Rycx, 2002, 2003; Vainiomäki and Laaksonen, 1995). Accordingly, the existence of sectoral effects on workers’ wages has become a stylised fact in the economic literature. Moreover, there is a large agreement on the fact that these effects are quite persistent (Helwege, 1992; Plasman et al., 2006), strongly correlated between countries (Zanchi, 1992) and on a variable scale in the industrialised countries (Gannon et al., 2007).² A number of studies, except that of Björklund et al. (2007), suggest in addition that sectoral effects are significantly weaker in strongly corporatist countries, regardless of the period studied (Barth and Zweimüller, 1992; Edin and Zetterberg, 1992; Gannon et al., 2007; Kahn, 1998; Teulings and Hartog, 1998). Teulings and Hartog (1998), for example, report that from the most to the least corporatist country the dispersion in industry wage premia increases roughly at a ratio of 1:4.²

Overall, the existence of sectoral wage premia increasingly casts doubt on the assumption of a perfectly competitive labour market. Indeed, it suggests that individual wages are not solely determined by personal productive characteristics and task descriptions but also by employer features in each sector. Nevertheless, great uncertainty remains.

## 2 THE ROLE OF UNOBSERVED ABILITY

Uncertainty derives from the fact that the unobserved quality of the labour force might not be randomly distributed among industries. In other words, high-paying industries might simply be those in which unmeasured labour quality is highest. Almost all studies examining the unobserved quality explanation rely on panel data. They compute industry wage premia on the basis of a wage equation estimated in first-differences so as to control for time-invariant unobserved individual ability. Results put forth by these studies are mixed. Krueger and Summers (1988), for example, show for the U.S. that the magnitude of inter-industry wage differentials decreases only marginally when wage equations are estimated in first-differences rather than in levels. A similar result has been reported by Gibbons and Katz (1992)

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1. Cross-country comparisons of inter-industry wage differentials must, however, be considered with caution. The point is that results obtained for different countries are seldom strictly comparable because of differences in the specification of the wage equation, the sectoral nomenclature used, the field covered by the data, or the period under investigation.

2. The concept of corporatism, borrowed from political science, resembles the level of centralisation of collective bargaining as well as the degree of co-ordination between the social partners. However, as this concept has not been defined in one single way, there are differences in opinion as to the relative position of the industrialised countries on the scale of corporatism (OECD, 1997, 2004). The Scandinavian countries and Austria are nevertheless always in the category of strongly corporatist countries, whereas the U.S. and Canada are invariably at the bottom of the ranking.
on the basis of U.S. data from plant closings. In contrast, Abowd et al. (1999), Goux and Maurin (1999) and Murphy and Topel (1990) show that individual fixed effects explain a large fraction of the estimated inter-industry wage differentials in the U.S. and France. Using longitudinal data from the British Household Panel Survey, Benito (2000) and Carruth et al. (2004) also provide strong evidence in favour of the unobserved quality explanation.

Longitudinal data allow to control for fixed unobserved individual characteristics and thus present a major advantage with respect to cross-sectional data. Yet, the use of panel data generates specific problems that are not encountered with cross-sectional data. Indeed, first-difference estimates may be biased if: i) the number of workers changing industry is small; ii) workers who switch industries have non random characteristics; and iii) unobserved labour quality is not equally valued among industries. Fixed effects estimations are also more affected by measurement errors (i.e. errors in reporting changes in workers’ sectoral affiliation) since they exclusively focus on individuals switching industries. A final issue concerns the return-to-tenure component of the wage equation (Björklund et al., 2007). Indeed, it is argued that fixed effects estimates are biased since the tenure effect is likely to be underestimated among individuals who just switched industries.

To avoid the problems encountered with first-difference estimates, Björklund et al. (2007) examined the role of unobserved ability in explaining inter-industry wage differentials using data on siblings (brothers). The authors argue that industry wage premia computed from data on siblings are more accurate than those estimated on the basis of individuals switching industries because they do not depend on the exogenous job mobility assumption. Their results show that unobserved ability accounts for approximately 50% of inter-industry wage dispersion in the U.S. and for between 11 and 24% in the Scandinavian countries. Furthermore, in contrast to virtually all previous studies, the authors find that the contribution of inter-industry wage differentials to the overall wage variation is not significantly larger in the U.S. than in Scandinavian countries, after controlling for unobserved factors common to brothers.

The unobserved quality explanation has further been tested with cross-sectional data by Martins (2004a). Applying quantile regressions to a Portuguese matched employer-employee data set for 1995, the author rejects the hypothesis that high-wage industries draw disproportionately more on high-ability workers. Consequently, he suggests that non-competitive forces play an important role in

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3. His methodology is based on the following reasoning. On the one hand, workers with better unobserved characteristics (e.g. ability, motivation, industry-specific skills) are likely to be found at the top of the conditional wage distribution. On the other hand, according the unobserved quality explanation, workers with better unmeasured characteristics are over-represented in high-wage sectors. As a result if the unobserved quality explanation is valid, we would expect: i) industry wage differentials to be larger at the top end of the wage distribution; ii) the difference in industry wage premia across the wage distribution to be higher in high-wage sectors than in low-wage sectors; and iii) a highly positive correlation between industry wage differentials computed at the mean and at the 90th percentile of the wage distribution (or equivalently, a strong positive correlation between the mean premia and the difference between the premia at the top and bottom percentiles).
the wage determination process. Using the same methodology, Plasman et al. (2006) end up with a different conclusion for the Belgian economy. Their findings, based on matched employer-employee data for 1995 and 2002, suggest that unobserved ability is partially responsible for observed wage differentials across sectors.

3 THE ROLE OF EMPLOYERS’ CHARACTERISTICS

All in all, there is no consensus regarding to exact scale of the industry wage premia. Moreover, while studies on industry wage premia offer some evidence against the perfectly competitive model, they hardly allow to discriminate among alternative models supporting the existence of an effect of the employer’s characteristics on wages (Benito, 2000; Krueger and Summers, 1988; Lindbeck and Snower, 1990; Thaler, 1989; Walsh, 1999). Prima facie, wage disparities observed between sectors support the efficiency wage theory. Indeed, the latter shows that if the incentive conditions for effort vary between sectors, then two workers with identical productive characteristics and working conditions are likely to earn different wages. For instance, according to the effort version of the efficiency wage theory, large companies would find it in their interest to offer relatively higher wages to their employees because they face higher costs to monitor effort.

However, this theory does not explain why the scale of inter-industry wage differentials varies between countries and appears to be more compressed in corporatist countries. The motives for companies to pay efficient wages, i.e. wages above the competitive level, actually seem to be similar among industrialised countries. Therefore, some authors (e.g. Teulings and Hartog, 1998) believe that the explanation put forward by Holmlund and Zetterberg (1991), based upon the rent-sharing theory, is more compelling. Holmlund and Zetterberg (1991) showed that the influence of sectoral conditions (variations in prices and productivity) on wages is strong in the U.S., moderate in Germany and low in Scandinavian countries. The elasticity between sectoral environment and wages thus appears to be more pronounced in non-corporatist countries. To put it differently, determination of wages would depend more on the general macro-economic conditions in corporatist countries. This may be due to the fact that explicit or implicit co-ordination of wage bargaining in corporatist countries restricts workers’ insider power, or in other words their ability to obtain part of the sectoral rents. It is also argued that the policy of ‘wage solidarity’ pursued by unions in most corporatist countries reinforces this phenomenon. For instance, Vainiomäki and Laaksonen (1995: 172) emphasised the role of rent-sharing partly responsible for observed sectoral wage premia and for their apparently higher dispersion in non-corporatist countries.

However, this conclusion should be drawn with care for at least two reasons. Firstly, the hypothesis that the dispersion of industry wage differentials is signifi-
cantly lower in corporatist countries has been challenged by Björklund et al. (2007). Using data on siblings, the latter find that inter-industry wage differentials are not significantly larger in the U.S. than in Scandinavian countries, after controlling for unobserved factors shared by brothers. Secondly, more convincing evidence on the existence and magnitude of rent-sharing is provided by studies that directly estimate the elasticity between wages and profits (or value-added) with firm-level or matched employer-employee (panel) data (Abowd and Lemieux, 1993; Araï, 2003; Blanchflower et al., 1996; Christophides and Oswald, 1992; Fakhfakh and FritzRoy, 2004; Goos and Konings, 2001; Gürtzgen, 2005; Hildreth and Oswald, 1997; Margolis and Salvanes, 2001; Martins 2004b; Rycz and Tojerow, 2004; Teal, 1996; Van Reenen, 1996). The theoretical approach in these studies is a bargaining framework (often the right-to-manage or the efficient bargaining model) in which insiders (not necessarily a union) bargain over wages and eventually employment. Findings from this literature show that profitable firms pay higher wages even after detailed personal and firm characteristics are controlled for. Nevertheless, it is still unclear whether pay-profit elasticity is larger in countries with little centralisation or corporatism. Moreover, the evidence on how exactly rent-sharing contributed to the explanation of inter-industry wage differentials is very limited. Yet, several papers support the hypothesis that industry wage premia result from inter-sectoral variations in ‘ability to pay’, i.e. profits. For example, Kouwenberg and van Opstal (1999) show that industry wage differentials in the Netherlands are positively and significantly correlated to industry profits. A similar result is reported for the U.K. by Benito (2000) and for six member states of the European Union by Gannon et al. (2007). In contrast, Genre et al. (2005) find no significant relationship between industry wage premia and sectoral profits in the Euro area. However, this may be explained by data restrictions. A more explicit test of the contribution of rent-sharing to observed inter-industry wage differentials is provided by Plasman et al. (2006). Using matched employer-employee data from Belgium in 1995, they find that the magnitude, dispersion and significance of inter-industry wage differentials decrease sharply when (instrumented) profits are controlled for in an individual wage regression including many covariates. Therefore, they conclude that rent-sharing accounts for a large fraction of the inter-industry wage differentials.

Another strand of the literature has been focusing on the impact of international trade and product market regulations on industry wage premia. The empirical evidence in this field of research is relatively scarce. However, most results point out that workers in industries facing intensive import competition have lower wage premia, while their opposite numbers in export-intensive sectors enjoy larger wage premia (Abowd and Kramarz, 1999; Goldberg and Pavcnik, 2001; Grey, 1993; Katz and Summers, 1989; Lundin and Yun, 2004; Salvanes et al., 1998). In a cross-country perspective, they also suggest that product market regulations restricting competition have a significant and positive impact on wage premia both in the manufacturing and non manufacturing sectors (Jean and Nicoletti, 2002). Yet, findings from studies examining the effect of product market liberalisation on industry wage premia in specific countries or sectors are ambiguous (Hendricks, 1994; Peoples, 1998).
4 CONSEQUENCES FOR THE GENDER WAGE GAP

The evidence regarding the interaction between inter-industry wage differentials and the gender wage gap is surprisingly limited. The main contribution to this field of research has been provided by Fields and Wolff (1995). Using the 1988 U.S. Current Population Survey, the authors find significant industry wage differentials for women and men, after controlling for productivity-related individual characteristics. These differentials are highly correlated and their dispersion is of the same order of magnitude for both sexes. In spite of these similarities, the authors report significant gender wage gaps within industries. Moreover, their results suggest that around one-third of the overall gender wage gap is explained by industry effects. A similar study has been undertaken for six European countries by Gannon et al. (2007). Using the 1995 European Structure of Earnings Survey, the authors report significant inter-industry wage differentials in all countries for both sexes. They also find for most countries that a significant part of the gender wage gap can be explained by the segregation of women in lower paying industries. This part is estimated at around 16% in Italy, between 7 and 8% in Ireland, Spain and the U.K., and less than 3% in Belgium and Denmark. Differences in industry wage premia for male and female workers significantly affect the gender wage gap in Denmark and Ireland only. In these countries, gender differences in industry wage premia account for respectively 14 and 20% of the gender wage gap. To sum up, findings of Gannon et al. (2007) show that combined industry effects explain around 29% of the gender wage gap in Ireland, respectively 14 and 16% in Denmark and Italy, around 7% in the U.K. and almost no share in Belgium and Spain.

5 CONCLUSION

Inter-industry wage differentials have been intensively studied since the end of the 1980s. Nevertheless, their existence remains a complex and unresolved puzzle. Indeed, it has been emphasized that:

a) The role of unmeasured abilities in explaining inter-industry wage differentials is still unsettled. To put it differently, there is no consensus on whether high-wage sectors employ a larger fraction of workers with better unobserved abilities.

b) Studies on inter-industry wage differentials offer some evidence against the perfectly competitive wage determination model. However, they hardly allow do discriminate between alternative models that support the existence of an effect of employers’ characteristics on wages (e.g. rent-sharing, efficiency wage or monopsony models).

c) Findings regarding the effect of international trade, product market regulations and collective bargaining institutions on industry wage premia are scarce and/or mixed.

4. Other studies on this issue include Horrace and Oaxaca (2001), Edin and Richardson (2002) and Rycx and Tojerow (2002).
d) International comparisons of inter-industry wage differentials must be considered with caution. The point is that results obtained for different countries are seldom strictly comparable because of cross-country differences in: i) the characteristics of the data used, and ii) the specification of the wage equation. Another issue is that the contribution of unobserved abilities to the dispersion of industry wage premia may vary across countries.

e) The evidence regarding the implications of inter-industry wage differentials for gender and other types of inequality is surprisingly limited and would deserve more attention.

f) The economic consequences of inter-industry wage differentials are not easy to determine. This is principally due to the fact that their theoretical interpretation is still disputed.

To sum up, it appears that the existence and consequences of inter-industry wage differentials are still not clearly understood. Therefore additional research is needed particularly on the basis of matched employer-employee data. The European Structure of Earnings Survey\(^5\) has unique features (e.g. harmonised setting, international coverage, reliability and preciseness of information on wages, detailed sectoral nomenclature) to improve our comprehension of this phenomenon in a cross-national perspective. However, research based on matched employer-employee panel data and on data sets containing more information on worker (e.g. actual years of labour market experience, occupation at the ISCO 4-digit level) and firm characteristics (e.g. type of market on which the firm operates, value-added, profits) than in the ESES is also needed.

REFERENCES


\(^5\) More information on this data set is available at http://cep.lse.ac.uk/piep/.


OECD (1997), Employment Outlook, Paris, OECD.
OECD (2004), Employment Outlook, Paris, OECD.