DETERMINANTS OF EUROPEAN WAGE DIFFERENTIALS: A MICROECONOMIC ANALYSIS

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ABSTRACT

In this paper we further investigate the determinants of wage differences in Europe, by decomposing countries' wage differences across the wage distribution. Unlike previous studies, we analyse the contribution of covariates to the wage decomposition components (wage structure and wage composition) by employing a recent methodology proposed by Firpo et al (2009) and Fortin et al. (2011). We use data from the EU-SILC data base for male workers from 9 European countries. We conclude that both wage structure and wage composition effects contribute to explaining wage differentials, but that wage structure is more important. Differences in the estimated constant seem to be the most significant factor explaining the importance of the wage structure effect. The differences in the composition effect, in turn, are explained by differences in education, in occupational structure, in the percentage of workers with supervisory responsibilities and to a lesser extent by differences in the industrial structure and in workers' level of experience.

Keywords: wage differences, unconditional quantile regression, wage decompositions.

JEL Classification: C21; D31; J01; J31.

I. Introduction

Economic, social and territorial cohesion is a fundamental aim of the European Union. Over the years several programmes have transferred resources between member states to speed up economic convergence and promoting cohesion. Yet, although some progress has been achieved, sizeable economic disparities among member states still remain. Indeed, quite different levels of income per capita and wages still exist, particularly between Northern-European countries and Eastern and South-Western countries.

To achieve economic and social cohesion it is important to create an integrated labour market as well as to stimulate the free movement of workers. These objectives are clearly stated in the new EU strategy "Europe 2020" which gives the European Commission the duty "To facilitate and promote intra-EU labour mobility and better match labour supply with demand…" (European Commission, 2010, page 17). Therefore, a comprehensive understanding of the microeconomic determinants of European wages is of crucial importance to achieve labour market integration and promote an European migration policy.

Theoretically, the competitive model states that wages depend on productivity (marginal productivity), which, in turn, depends on workers' skills (education, experience, unobserved skills, etc) but also on job attributes (capital, production technology, quality of management, etc) and natural resources. Hence, a worker endowed with more human capital should be more productive and earn a higher wage (Mincer, 1974; Backer, 1993).The extension of this framework to the international level implies that countries with higher levels of productivity – mainly in the tradable sector - should have higher wages and prices (Balassa, 1964; Samuelson, 1964). Labour market

institutions may, however, cause departures from the competitive model. According to this view, minimum wages, employment protection legislation and unions may influence the labour market position of some groups of workers, putting them in a more favourable position than they would be in a pure competitive model.

Evidence, however, reveals that unions have lost power in the last decades, wage dispersion and inequality have increased and wages seem to be more sensitive to market forces (OECD, 2004; Leuven et al., 2004). Moreover, OECD (2004) results show there is no systematic role for wage setting institutions (trade union density, coverage by collective agreements, and the centralisation and co-ordination of wage bargaining) with regard to overall earnings. Nevertheless, there is evidence that institutions may have some impact on the relative earnings of certain groups (young people, women and older workers) and on inequality. The European Commission (2008) also finds weak evidence about the effects of wage setting institutions on nominal wage growth: the only significant effect found was of bargaining coverage.

The literature on international differences in wage inequality may also provide us with some insights regarding the study of European wage differentials, as the factors that influence international differences in wage inequality can also influence international differences in wages. These studies typically conclude that both market forces and institutional factors play a role in explaining international differences of wage inequality (Blau and Kahan, 1996; Leuven et al., 2004; Simón, 2010). Yet, the relative contribution of each of these components is unknown. Institutional factors may be more important at the lower end of wage distribution. Moreover, differences in the workforce's characteristics seem to play a minor role in explaining these international differences in wage inequality.

Empirical studies on wage differentials between European countries using microeconomic data are scarce, and therefore not much is known about the determinants of cross-country wage differences in Europe. The lack of comparable European data on wages has been a critical point in this issue (Brandollini et al., 2011). Recently, however, the office of statistics of the European Union (EUROSTAT) started to provide comparable European data on wages and on household incomes, namely through the *Community Statistics on Income and Living Conditions (EU-SILC)*[1]. Despite this development, it is not yet possible to have comparable and reliable information for all European Union countries regarding hourly wages.

Two empirical studies have analysed wage differentials between European countries: Behr and Potter (2010) and Brandolini et al. (2011). The first of these studies employs a proportional hazard model to decompose wage differences between European countries at different quantiles, using the European Household Panel for 2001. They conclude that returns-to-skill functions are the most important factor explaining wage differences; differences in individual characteristics contribute little to the estimated wage differentials even for low-wage countries. The second study, in turn, analyses the distribution of earnings using the EU-SILC for 2007. They carry out the estimation of recentered influence function regressions (Firpo et al., 2009) of wage equations for some percentiles and for the variance. An aggregate decomposition of the variance differences is also performed but not the correspondent decompositions for the wage differences between countries at each percentile. Therefore, apart from the variance, they do not compare wages of different countries at equal moments of the wage distribution. This study concludes that wage variance differences between countries are mainly due to returns to workers´ attributes.

[1]This survey started in 2004 replacing the European Community Household panel.

There are, however, two other studies analysing inter-countries wage gaps for non-European countries: one for urban China and India (Bargain et al., 2009) and another for urban China and Vietnam (Cai and Liu , 2015). The first analyses both the wage gap at the mean of the conditional wage distribution, using the traditional Blinder-Oaxaca decomposition, and the wage gap in other points of the wage distribution using conditional quantile regression techniques (Melly, 2006). The results indicate that in the late 1980s and on the first half of the 1990s the estimated wage differential at the mean of the conditional wage distribution was mainly explained by higher returns to education in India. Furthermore, there was no relevant role for workers' differences in characteristics on the estimated wage gap. After this period, there was a reversal in the wage gap in favour of Chinese workers due to the increase in the educational endowment and in the returns to education in this country. Cai and Liu , (2015), in turn, use unconditional quantile regression techniques (Firpo et al., 2009) to perform the wage decomposition along the wage distribution. The estimated wage gap favouring Chinese workers is mainly explained by higher returns to workers' characteristics in China, namely, to industry in the case of men and to education and experience in the case of women.

This paper aims at further analysis of wage differentials between European countries filling an important gap in the literature. We compare wages of several European countries, including Eastern and South-Western countries, with those of the UK, at equal moments of the wage distribution (specific quantiles). The estimated wage differentials are decomposed into the wage structure (price effect) and the composition effect (quantity effect). Moreover, unlike previous literature for Europe, the contribution of each variable (or group of variables) to the wage decomposition components is examined. We employ the approach recently proposed by Firpo et al. (2009) and Fortin et al (2011) to analyse wage differences along the wage distribution for unconditional quantile regression models. This methodology allows separating the contribution of

each covariate to the components of wage decomposition, which is not possible using the approaches of Machado and Mata (2005) and Melly (2005, 2006) based on conditional quantile regression models. Wage decompositions based on unconditional quantile regression models have recently been applied in studies about gender wage gaps and wage inequality (Chi et al, 2011; Firpo at al, 2011; Sakellariou, 2012), regional wage differences (Galego and Pereira, 2014) and also used by Cai and Liu (2015) for analysing the wage gap between urban China and Vietnam. However, to the best of our knowledge, this is the first application in the context of wage differences between European countries.

We use data from the *The European Union Statistics on Income and Living Conditions* (EU-SILC) from EUROSTAT for 2008, for the 9 countries with available data on monthly wages and hours of work. Hence, wage differences in relation to the UK are computed for Austria, Spain, Greece, Hungary, Ireland, Italy, Poland and Portugal. Due to the existing differences in the female labour market in Europe we focus on wage differences among male workers.

Our results show there are quite different situations in the European countries analysed. On the one hand, in the richest group of countries, Austria, Spain, Italy and Ireland, the estimated wage differences in relation to the UK are in general not significant for most of the wage distribution. On the other hand, these differences are quite large and significant for the Eastern countries (Hungary and Poland) and to a lesser extent for the South-Western European countries (Greece and Portugal). Both wage structure and composition effects contribute significantly to the estimated wage differential, but the first of these effects is relatively more important. This is in accordance with previous conclusions by Behr and Potter (2010) for 2001. However, our study reveals that differences in the parameter (estimated constant) determining the position of the

wage functions - which is higher in the UK - is the key element explaining the differences in the wage structure effect. Adding to previous literature, our results also show that the compositional differences are, in general, explained by differences in the educational level of the work force, in the percentage of workers with supervisory responsibility and in the percentage of workers performing top occupations between the UK and the other countries. Moreover, in relation to the South-Western countries, differences in the industrial structure and in the level of experience are also factors explaining the composition effect.

This paper is analysed as follows. In Section 2 the methodology used in this paper is presented. The following section presents and analyses the main characteristics of the data we use. Section 4 presents the results and finally, Section 5 concludes.

2. METHODOLOGY

Our aim is to analyse wage (earnings) differentials along the entire distribution and the role of human capital and other covariates in these differentials. We apply the approach proposed by Firpo et al. (2009) and Fortin et al. (2011) to decompose wage differentials along the entire distribution for unconditional quantile regression models. This approach permits dividing the wage structure and composition effects into the contribution of each covariate (or group of variables) and thus generalizing the classical Blinder (1973) and Oaxaca (1973) decomposition to distributional statistics other than the mean (Fortin et al., 2011). On the contrary, decomposition methods for conditional quantile regression methods (Machado and Mata, 2005; Melly, 2005, 2006) allow estimating the overall wage structure and composition effects along the wage

distribution, but not dividing up the composition effect or the wage structure effect into the contribution of each single covariate (Fortin et al., 2011).

The decomposition method proposed by Fortin et al. (2011) is based on a regression of the re-centred influence function (*RIF*) of the dependent variable (W: log hourly wage) on the explanatory variables (X) (Firpo et al., 2009). The *RIF* for the τth quantile is given by the following expression:

$$RIF(W_{i\in g}, q_\tau) = q_\tau + \frac{\tau - I(W_{i\in g} \leq q_\tau)}{f_W(q_\tau)} \qquad g = A, B \tag{1}$$

Where $f_W(q_\tau)$ is the marginal density of *W* at the point q_τ estimated by kernel methods; q_τ is the sample quantile; $I(W_{i\in g} \leq q_\tau)$ is an indicator function indicating whether the value of the outcome variable is below q_τ. The *RIF* provides a linear approximation to a non-linear functional ($v(W)$) (e.g. median) of the *W* distribution and thus allows computing partial effects for single covariates. The *RIF* quantile regression is implemented by running an OLS regression of the new dependent transformed variable on the covariates (*X*):

$$E\left[RIF\left(W_{i\in g}; q_\tau\right) | \, X_{i\in g} \right] = X_{i,g}\beta_{\tau,g} \quad g = A, B \tag{2}$$

Coefficients $\beta_{g,\tau}$ are the approximate marginal effects of the explanatory variables on the wages quantile q_τ for workers (*i*) in country $g = A, B$, and represent the rates of return (or wage premiums) to observed characteristics.

The wage differential between two countries is divided into a wage structure effect and a composition effect. The composition effect gives the part of the wage differential explained by differences in the observed characteristics of the country's workforce; the wage structure effect gives the part of the wage differential explained by differences of rewards for these characteristics. To carry out this division it is necessary to estimate a counterfactual wage distribution, that is, the distribution that we obtain combining the wage structure of country *A* with the distribution of characteristics of country *B* ($\bar{X}_B\hat{\beta}_A$). Assuming that the conditional expectation of wages is non-linear, this term can be estimated following the reweighting approach of Dinardo et al. (1996), as suggested by Barsky et al. (2002). In practice, an RIF regression on a reweighted sample has to be estimated applying the following reweighting factor:

$$\Psi(X_i) = \frac{\Pr(B=1|X_i)/\Pr(B=1)}{\Pr(B=0|X_i)/\Pr(B=0)} = \frac{\Pr(B=1|X_i)/\Pr(B=1)}{[1-\Pr(B=1|X_i)]/\Pr(B=0)} \quad (3)$$

Where $\Pr(B=1|X_i)$ represents the probability of a worker *i* belonging to country *B*. This probability can be calculated by pooling data from both countries and estimating a probability model (logit or probit). $\Pr(B=1)$ and $\Pr(B=0)$ are, respectively, the sample proportions for country *B* and country *A*.

The estimated reweighting factor is then applied to the data in country *A* to calculate the counterfactual wage distribution. The wage decomposition, similar to the classical Blinder (1973) and Oaxaca (1973) decomposition, for any unconditional quantile (τ) is obtained combining the RIF regressions estimated for workers in countries *A* and *B* with the counterfactual wage distribution, according to the following expression:

$$\hat{\Delta}_o^\tau = \left(\bar{X}_B\hat{\beta}_{\tau,B} - \bar{X}_A^C\hat{\beta}_{\tau,A}^C\right) + \left(\bar{X}_A^C\hat{\beta}_{\tau,A}^C - \bar{X}_A\hat{\beta}_{\tau,A}\right) \quad (4)$$
$$= \hat{\Delta}_S^\tau + \hat{\Delta}_X^\tau$$

Where superscript *C* stands for the reweighted sample estimates (counterfactual distribution) and $\bar{X}_g$ $(g = A, B)$ represents the covariates mean for each country. The term $\hat{\Delta}_X^\tau$ is the composition effect and $\hat{\Delta}_S^\tau$ the wage structure effect.

The wage structure effect can be further divided according to:

$$\hat{\Delta}_S^\tau = \bar{X}_B\left(\hat{\beta}_{\tau,B} - \hat{\beta}_{\tau,A}^C\right) + \left(\bar{X}_B - \bar{X}_A^C\right)\hat{\beta}_{\tau,A}^C$$
$$= \hat{\Delta}_{S,p}^\tau + \hat{\Delta}_{S,e}^\tau \quad (5)$$

$\hat{\Delta}_{S,p}^\tau$ is the pure wage structure effect resulting from the difference between $\hat{\beta}_{\tau,B}$ and $\hat{\beta}_{\tau,A}^C$ rather than $\hat{\beta}_A$ as in the classical Blinder (1973) and Oaxaca (1973) decomposition. This term estimates the part of the wage differential explained by differences in the returns to observed characteristics at the quantile τ . $\hat{\Delta}_{S,e}^\tau$, in turn, is the reweighting error, arising from the fact that the reweighted sample average ($\bar{X}_A^C$) may be different from $\bar{X}_B$.

Likewise, the composition effect can be represented according to:

$$\hat{\Delta}_X^\tau = \left(\bar{X}_A^C - \bar{X}_A\right)\hat{\beta}_{\tau,A} + \bar{X}_A^C\left(\hat{\beta}_{\tau,A}^C - \hat{\beta}_{\tau,A}\right) \quad (6)$$
$$= \hat{\Delta}_{X,p}^\tau + \hat{\Delta}_{X,e}^\tau$$

$\hat{\Delta}^{\tau}_{X,p}$ is the pure composition effect, identical to the composition effect in the classical Blinder (1973) and Oaxaca (1973) decomposition. It estimates the part of wage differential explained by differences in observed characteristics of workers of each country at quantile τ ; $\hat{\Delta}^{\tau}_{X,e}$ is the specification error, which should be zero in case the model is linear.

In order to test whether the effects of covariates are significant for the different elements of wage decomposition, standard errors were estimated by bootstrapping considering 100 replications.

Oaxaca and Ransom (1999) point out that the contribution of each dummy variable to the wage structure effect is not invariant to the choice of the reference group. Following Yun (2005), we deal with this problem by transforming the coefficients of the dummy variables so that they can reflect deviations from the mean instead of deviations from the reference group. Thus, all the transformed coefficients sum up to zero for each set of dummy variables.

3. Preliminary analysis of the Data

We use data from the *The European Union Statistics on Income and Living Conditions* (EU-SILC). This is an annual survey from EUROSTAT, starting in 2004, which provides cross-sectional and longitudinal, comparable European Union data on income, poverty, social exclusion and living conditions. The survey also provides information on workers' and other labour market characteristics such as occupation and industry in the cross-sectional dataset.

We perform the empirical analysis for 2008 using information from the cross-sectional dataset. The year 2008 is the year before the economic decline following the financial crisis which prompted external adjustment programmes in several European countries. Therefore, we choose to consider this year so that our analysis is not affected by the economic crisis.

Taking into account the existent differences in female labour market participation in Europe we concentrate our analysis on full-time male workers aged between 18 and 64 years. Workers from agriculture and fisheries, the self-employed, unpaid family workers and apprentices were excluded from the sample. To ensure the sample's representativeness, the sample weights provided in the survey were applied.

The empirical analysis is based on Mincer type wage equations estimated for several European countries and for several quantiles. The dependent variable is the logarithm of the hourly wage for employees corrected for purchasing power parity[2]. We measured the hourly wage by considering the gross monthly earnings received by employees in the main job, before tax and social insurance contributions were deducted, divided by the hours of work. Overtime pay, tips and commission as well as supplementary payments (13th and 14th month, holiday payments) are included on a monthly proportional basis. This information, however, is available for a limited group of countries: Austria (AT), Greece (GR), Spain (ES), Hungary (HU), Ireland (IE), Italy (IT), Poland (PL), Portugal (PT) and The United Kingdom (UK).

[2]Households' final consumption expenditure PPPs from the EUROSTAT were applied.

Alternatively, it would be possible to construct a measure of monthly earnings based on previous year cash or near cash income variable[3], which is available for a large number of countries, including France and Germany. However, for most countries there is a non-negligible number of observations with zero months of work and positive cash or near cash income. Furthermore, this variable refers to the income received in the previous year while individual information about industry and occupation is only available for the present year[4].

As explanatory variables we use a larger set of individual characteristics than other previous studies, including workers' experience, two dummies for the highest educational level achieved, 9 occupational dummies (ISCO-88), 9 dummies for industry affiliation (NACE Rev.1.1), a dummy for marital status, a dummy for supervisory responsibility and a dummy to identify native workers (born in the country of residence). A dummy to identify the public sector is also included. Since in the survey there is no direct information about public sector workers, we follow previous literature (Giordano et al., 2011, Brandolini et al., 2011) and consider as public sector employees those individuals working in one of the following sectors: public administration and defence, compulsory social security, education, human health and social work activities.

Table 1 presents the descriptive statistics of the main variables used in the analysis for each country. Analysing average hourly wages, we can conclude that Ireland shows the highest average hourly wage followed closely by the UK. Eastern European countries (Hungary and Poland) present the lowest wages, followed by Portugal, Greece, Italy, Spain and Austria in

[3] PY010G.

[4] In the longitudinal dataset industry information is not available. In addition, it is not possible to combine information from the longitudinal and the cross-section datasets.

ascending order. The differences in relation to Ireland and the UK are substantial, as the average wage in these countries is more than double that in Hungary, Poland and Portugal.

[table 1 around here]

Figure 1, in addition, shows several standard measures of hourly wage distribution: the 25th and 75th percentiles at the extremes of the box, the median (the thick horizontal) and the lower and upper adjacent values at the extremes of the thin vertical bar. Countries are ranked in ascending order of the median hourly wage from left to right. Once again, Ireland presents the highest median wage followed closely by the UK. The huge wage differences between European countries are particularly clear in this representation. For example, the median wage in Ireland and the UK is higher than the wage at the 75th percentile of Hungary, Poland, Portugal and Greece.

[figure 1 about here]

The differences in wage dispersion between European countries are also remarkable, even in countries with a similar median wage, as is the case of Italy and Spain: wage dispersion seems to be higher in Spain, although Italy does not have a mandatory minimum wage. Moreover, in general, wage structures seem to be more compressed at the lower end of wage distributions. Finally, differences in wage dispersion are more evident at the upper end of wage distribution, which is in line with previous work, such as Simon (2010) or the European Commission (2005).

This pattern seems to be consistent with the role played by wage-setting institutions in shaping wage inequality. In fact, different European wage-setting institutions, such as mandatory

minimum wages, union coverage and centralized/co-ordination collective bargaining may have some impact on countries' wages and wage dispersion (inequality). Theoretically, inequality should be lower (higher) in countries where these wage-setting institutions are stronger (weaker). The existing empirical evidence is not, however, so clear. In fact, the OECD (2004) concludes that there is no evidence of a systematic relationship between union density, coverage or centralisation/co-ordination and overall earnings. Furthermore, there is some (weak) evidence that higher union density and collective bargaining reduces earnings inequality. Therefore, the possible impact of these differences on wage differentials might be limited.

With regard to mandatory minimum wages, they may influence wages, unemployment and inequality, bringing up the bottom of the wage distribution. In our sample, with the exception of Italy and Austria, all other countries have mandatory minimum wages. However, in general, they are set at low levels by international standards. In the set of countries considered in our analysis the ratio of minimum to medium wage (Kaitz-Index) goes from 35.3 % in Spain to 52.1 % in Greece (see Table 2). Therefore, the contribution of this institutional factor to European wage differences might be quite limited, as the major differences in wage distributions are at the top and not at the bottom of the distribution (Simon, 2010).

[table 2 around here]

Referring to the main explanatory variables used in the empirical analysis, in general, higher wage countries (Austria, Ireland and the UK) show the highest percentage of workers with secondary education and university degrees (see Table 1). In spite of this, Eastern European countries (Hungary and Poland) present particularly high rates of workers with secondary

education, but considerably lower wages. This suggests that the wage premium of education may be more related to university degrees than to secondary education. The occupational structure also seems to have an important and positive influence on countries' wage level, particularly the percentage of workers in top occupations: Legislators, senior officials and managers, professionals, technicians and associate professionals. Likewise, wages also tend to be higher in countries with the highest share of workers having supervisory responsibilities.

Finally, regarding experience, birth in the country of residence (*native*), marital status (*married*), industrial structure and the percentage of workers in the public sector, it seems there is no clear link between these variables and the extent of the countries' wage differences.

4. Results

4.1 Unconditional quantile regression estimates

Table 3 presents the estimates of the unconditional quantile wage equations for the 10th, 50th, and 90th percentiles of the distribution. Due to the huge number of estimates, we only present the results for a set of selected variables[5]. Therefore, industry and occupational dummies coefficients are not shown, apart from those of "Senior officials and Managers", "Professionals" and "Technicians and associate professionals".

[table 3 around here]

[5]Complete results are available upon request.

In general, coefficient estimates are statistically significant and show the expected signals. Education, for example, increases the wage level, mainly for those with a university degree. In fact, the wage premium for secondary education is not statistically significant in some cases (UK-10, 50; PT-10, 50; IE-10; HU-10; GR-90; AT-90), which does not happen in the case of university degrees (with the exception of HU-10). Moreover, the premium for a university degree increases along the wage distribution, for all countries, except for Austria and Spain. Similarly, the wage premiums for those having supervisory responsibility and for those performing highly qualified occupations, namely, senior officials and managers, increase along the distribution. This pattern is less clear for professionals and still less for technicians and associate professionals. Experience, in turn, shows the usual positive and decreasing effect on wages. Wage differences between the public and private sector seem to be more evident for Spain, Italy, UK and Poland, where public sector workers show significantly higher wage returns for most of the distribution. Finally, the impact of being a native worker on wages varies from country to country and along the wage distribution. In most cases this variable is not significant, but being a native has a negative and significant effect on wages in some countries, such as in the UK at the 90th percentile and in Hungary at the 10th percentile.

We should mention that some specification problems may affect our results, namely sample selection bias and endogeneity. A selectivity bias problem is more likely when women and part-time workers are involved in the estimations. As our sample includes only males and full-time workers we believe our results will not be too much affected by this possible problem. Also, as we include controls for occupation and industry, they may capture some unobserved ability components and therefore contribute to correcting for sample selectivity (Duraton and Monastiriotis, 2002; Cahuc and Zyilberberg, 2004). Finally, it is possible that education might be endogenous. However, there are no proper instrumental variables available in the dataset that

could be used to overcome this possible problem. In addition, some previous studies have shown that instrumental variable estimates may be quite imprecise (Card, 2001).

4.2 Decomposition of the estimated wage gap

Figure 2 shows the estimated wage differentials in relation to the UK. We use the UK as the reference country to decompose wage differentials, as this is the largest economy included in the sample and the one with the highest wages, together with Ireland[6].

[figure 2 around here]

The analysis reveals the existence of three groups of countries according to the magnitude and significance of the estimated wage differentials. In the first group we have Austria, Spain, Ireland and Italy, whose estimated wage differences in relation to the UK are small and not even statistically significant for most of the wage distribution (see also Table 4).In fact, the estimated wage differences for Austria and Italy are not significant along the entire wage distribution, while for Spain and Ireland they are only significant at the 90th percentile. This latter result is mainly explained by the higher position of the wage function in the UK - the estimated constant.

The second group of countries includes Poland and Hungary, which show very high (and significant) estimated wage differences along the entire wage distribution. In these countries, the estimated wage level is less than half of that in the UK. Finally, in the third group we have the

[6]Previous studies, such as Behr and Potter (2010) have also considered the UK as the reference country.

countries in an intermediate position, Greece and Portugal, with high and significant wage differences, but not as high as for Eastern European countries. However, controlling for observed characteristics, at the 90th percentile, the wages of Portuguese workers are not statistically different from those in the UK. This result is in line with previous research for Portugal which points out that wages of Portuguese workers at the top of the wage distribution are very high, resulting in very high levels of wage inequality in Portugal when compared to other European and Anglo-saxon countries (Cardoso, 1998; Centeno and Novo, forthcoming).

[figure 3 around here]

[table 4 around here]

Regarding wage decomposition, for the first group of countries, the estimated composition effect is higher than the wage structure effect along the entire wage distribution (Figure 3). The composition effect reaches the highest values around the middle of the wage distribution and decreases for higher percentiles; at the top of the wage distribution both wage structure and composition effects are quite similar. Moreover, the wage structure effect is typically not significant, which indicates that workers with the same level of observable characteristics earn the same in these countries and in the UK.

Despite the fact that the estimated wage differences for this group of countries are, in general, not significant, there are some partial differences explained by these effects (composition and/or wage structure effects) which are significant. Indeed, at the median of the wage distribution for Austria, Spain, Italy and Ireland the composition effect contributes positively (the UK workforce is better endowed) to the estimated wage difference, whereas the wage structure effect contributes negatively (with the exception of Ireland). The workforce's level of education, the percentage of workers with supervisory responsibilities, and workers' occupations are the main factors

explaining these compositional differences (see Table 4). The negative and significant signal of the wage structure effect is explained by the higher reward for experience in Spain and Ireland, and by the higher wage premium associated with marriage in Austria, Spain, Ireland, and Italy.

In the second group of countries (Poland and Hungary) the wage structure effect dominates along the entire wage distribution (see Figure 3). Moreover, this effect is very high for both countries, but particularly for Hungary: it ranges from 113.8% at the 10th percentile to 87% at the 90th percentile; in Poland it ranges from 87% at the median to 97% at the extremes of wage distribution (10th and 90th percentile). Consequently, there are huge wage differences between observable equivalent workers in these countries and in the UK. Although there are some differences in the reward for experience at the 10th percentile (Hungary and Poland) and in the *native* variable at the 90th percentile, these two covariates play a minor role in explaining the wage structure effect – the bulk of the effect is explained by the estimated constant. Therefore, the differences in rewards for workers with the same level of observable characteristics arise from the parameter determining the position of the wage functions at each quantile. This parameter is what Mincer (1974) called the *initial earnings capacity* and can be considered as an average ability parameter (Willis, 1986). It represents the average earnings capacity for those without school and experience and hence can be interpreted as the wage floor in the economy.

Mandatory minimum wages can influence this estimate, as they establish a wage floor for wage distribution and may also push it to the right. However, the information in Table 2 regarding the ratio of minimum to medium wage (Kaitz-Index) in each country is not compatible with this hypothesis. In fact, in the UK the ratio of minimum to medium wage is one of the lowest, 37%,

below the ratio levels in Eastern European countries (of about 44%)[7]. Furthermore, the findings presented in the European Commission (2008) show there is a general trend towards convergence of relative minimum wages – the ratio of minimum to medium wage. Therefore, it is not possible to sustain the hypothesis that the higher estimated constants in the UK result from a higher relative minimum wage. Also, it is difficult to consider that this result is related to other institutional factors (like union power or the system of collective bargaining) as the UK is recognised as a country with flexible labour market institutions.

Finally, nor is it plausible to admit that workers in these countries have such low levels of unobserved skills that could explain the lower *initial earnings capacity*. Therefore, the only reasonable explanation for such wage differences seems to be factors related to countries' general productivity level (capital, production technology, quality of management, etc.) other than the purely human capital explanation. Indeed, this wage level may be influenced by the productivity level of tradable and non-tradable sectors, as productivity determines wages. Richer countries have higher productivity levels and, therefore, higher wages and prices (Balassa and Samuelson, 1964). Hence, admitting two countries with different productivity levels but whose workers have the same level of observed (and unobserved) characteristics as well as the same returns to these characteristics, they should have different wage levels if they have different initial earnings capacity. Bargain et al (2009) find a similar effect for the estimated intercepts on the explanation of the wage structure effect (price-effect) between Chinese and Indian wage earners, suggesting an analogous explanation.

[7] Austria and Italy do not have a legal mandatory minimum wage. In practice, however, minimum wages are set by sector-based collective agreements and, according to the European Commission (2008), minimum wages determined in this manner tend to be higher than statutory minimum wages.

The huge difference in the wage floor between the UK and the two Eastern European countries implies that most of the workers in these countries are potential migrants. Obviously, it is not clear that all these workers are able to transfer their skills to the UK labour market, particularly due to the language barriers, but the incentive to migrate exists. This incentive is transversal to all workers, changes according to the worker's position on the wage distribution, but is almost independent of the workers' observable characteristics.

Regarding the composition effect, this is also significant and increases along wage distribution for both Hungary and Poland. Furthermore, apart from the 10th percentile, it is higher for Hungary than for Poland, so the disadvantage of workers' observable characteristics is higher in Hungary. Three main factors explain the composition effect in these countries: the percentage of workers with secondary education and a university degree (education), the percentage of workers with supervisory responsibility and occupations. The occupational structure is the main factor explaining the composition effect in both countries for most of the wage distribution: in Hungary it dominates up to the 70th percentile, whereas in Poland it dominates after the 30th percentile. In spite of this, the contribution of occupations to the composition effect is relatively stable in a wide range of the wage distribution in both countries (see Figure 4).

[figure 4 around here]

Evolution along the wage distribution of the contribution of education and supervisory responsibility to the composition effect is somewhat different in these countries. Indeed, whereas in Hungary the contribution of education decreases along the wage distribution, in Poland it increases. However, both countries have similar rates of workers with secondary education and a

university degree. With regard to the contribution of the supervisory responsibility covariate, this is stable along wage distribution in Hungary, but slightly decreasing in Poland.

Finally, in the third group of countries, Portugal and Greece, the wage structure effect also dominates in most of the distribution. In Greece the wage structure effect dominates along the entire wage distribution, whereas in Portugal this dominance finishes somewhere between the median of the wage distribution and the 70th percentile.

Analysing in detail the wage structure and composition effects for Portugal and Greece (see Figure 4 and Table 4), we can observe several similarities with the situation of Poland and Hungary. Firstly, as for Eastern European countries, the most important factor explaining the wage structure effect in both countries is the estimated constant (apart from Greece at the 10th percentile, where the return to occupations is lower in this country). Similarly to Poland and Hungary, it is difficult to identify any other explanation of this result that is not related to factors influencing the countries' general productivity, other than human capital. Institutional factors such as a higher relative minimum wage in the UK cannot be responsible for this result, since the ratio of minimum to medium wage is 37% in the UK, while in Portugal it is 43,7% and 52.1% in Greece (Table 2). Therefore, if any bias was introduced by mandatory minimum wages in this matter, it would be favourable to lower income countries and not the opposite.

Secondly, similarly to Poland and Hungary, migration is an option that all workers may consider, as the wage differential in relation to the UK has an important and fundamental component – the estimated constant -, which is independent of their observed characteristics. The notable

exception is that of Portuguese workers at the top of the wage distribution whose wage differences in relation to UK workers with the same level of observable characteristics are not significant. Finally, the factors that contribute significantly to the composition effect in both countries are: the workforce's level of education, workers with supervisory responsibility, the occupational[8] and industrial structure and the average level of experience (unfavourable to the UK) of the work force. Except for the last two factors, they are also the most important and significant factors explaining the composition effect in Hungary and Poland. For both Portugal and Greece, the weight of the educational level, of the industrial structure and of supervisory responsibility decreases along the wage distribution, whereas the weight of occupations increases. There are, however, some differences between Portugal and Greece. The most important difference is that the gap in Portuguese workers' characteristics is greater than in that of Greeks. Furthermore, the supervisory responsibility factor is relatively more important in Greece than in Portugal.

Table 4 also provides information about specification and reweighting errors (equations 5 and 6). In the majority of cases they are either not significant or, if significant, small. However, for Portugal at the 50th and 90th percentiles the reweighting errors are relatively high. Nonetheless, the analysis of the specification errors is more important (Fortin et al., 2011) and it is not unusual for studies employing this methodology to report high errors (Sakellariou, 2012; Galego and Pereira, 2014).

[8]Galego and Pereira (2014) in an analysis of inter-regional wage differences in Portugal also found that education and the occupational structure were important factors explaining composition differences (and wage differences) in the regions.

These results on the causes of European wage differences have implications for economic policy. First, policies to foster human capital may contribute to wage and economic convergence. The most obvious route seems to be to increase the number of workers with a university degree, as Eastern European countries have a higher percentage of workers with secondary education than the UK. Secondly, as the greatest amount of the estimated wage differences for Eastern and South-western European countries cannot be directly accounted for by human capital factors, but by other variables influencing these countries' general level of productivity, economic changes that promote general productivity in each country will positively influence wages. Finally, since wage differentials are mostly determined by the wage structure effect (in particular the estimated constant), a large number of workers in Greece, Hungary, Poland and Portugal may consider migration as a valid option. Migration policies should, therefore, take these results into consideration.

5. Conclusions

In this work we analyse the determinants of wages differences between European countries from a microeconomic perspective. These differences are in some cases quite impressive and are not in accordance with the general aims of the European Union, namely as regards the principle of economic, social and territorial cohesion. Therefore, a comprehensive understanding of these determinants is particularly important and may provide a path for public policy intervention.

We used data from the *The European Union Statistics on Income and Living Conditions* (EU-SILC) for 2008, referring to nine European Union countries and applying the methodological

approach proposed by Firpo et al. (2009) and Fortin et al. (2011). This approach allows separating the contribution of each covariate to wage structure and composition effects along the entire wage distribution.

Our results confirm that European countries present quite different situations as regards estimated wage differences in relation to the UK. Firstly, in the richest group of countries considered in the sample, namely, Austria, Spain, Ireland and Italy, the estimated wage differences are not statistically significant for most of the wage distribution. Secondly, South-Western and particularly the Eastern European countries analysed show important wage differentials in relation to the UK. In line with previous evidence, we conclude that both wage structure and composition effects significantly contribute to these differences, but the wage structure effect dominates along the entire wage distribution. However, in this study, we further investigate the factors determining wage differences by analysing the contribution of the covariates to both wage decomposition components.

In general, the higher position of the wage equations (the estimated constant) in the UK is the key factor responsible for the importance of the wage structure effect. Therefore, the origin of these differences cannot be accounted for by differences of returns to observed characteristics, but to the general wage level (wage floor) which depends on productivity-determining factors other than the typical human capital variables. Furthermore, it is not likely that institutional factors such as mandatory minimum wage differences play a relevant role in these results, since the ratio of minimum to medium wage in the UK is one of the lowest of the countries analysed.

This positive wage structure effect also implies there are incentives for workers to migrate to the UK and these incentives are particularly high for Eastern European workers. Besides, these incentives change according to the worker's position in the wage distribution, but are independent of the observed characteristics. These results may help to improve the design of migration policies in Europe.

The compositional advantages of the UK, in turn, are explained by the workforce's higher level of education – mainly, a higher percentage of university degrees -, by a higher percentage of workers with supervisory responsibility and by a higher percentage of workers performing top occupations. These advantages are common in relation to the Eastern (Hungary and Poland) and to the South-Western (Greece and Portugal) European countries. To these factors is added the industrial structure, also favourable to the UK, in the case of Portugal and Greece. Level of experience is the only significant variable for which workers in Greece and Portugal have an advantage when compared to UK workers.

Summing up, these decomposition results allow a deeper understanding of the European microeconomic structure of wages and their determinants. Specifically, we may conclude that economic changes that promote increased productivity will have consequences for wages at least in the long run. Indeed, the results of this work suggest that the existing wage differences between European countries are, to a large extent, beyond being explained by human capital.

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Tables and Figures

APPENDIX

Definition of variables

ln hourly wage	The dependent variable is the logarithm of the hourly wage for employees corrected for purchasing power parity for 2008. The measure of wages corresponds to the gross monthly earnings received by employees in the main job before tax and social insurance contributions were deducted, divided by hours of work. Overtime pay, tips and commission as well as supplementary payments (13th and 14th month, holiday payments) are included on a monthly proportional basis. Household final consumption expenditure PPPs from the EUROSTAT were applied.
Exper	year of the survey- Year when highest level of education was attained
Exper2	$exper^2/100$
Secondary education	dummy variable; equals one if individual completed upper secondary education (isced3); post-secondary non tertiary education included.
University degree	dummy variable; equals one if individual has a university degree (isced5 or isced6)
Married	dummy variable; equals one if individual is married or living in a consensual union.
Native	dummy variable; equals one if individual has born in the country of residence.
Supervisory	dummy variable; equals one if individual has a Supervisory responsibility.
Public sector	dummy variable; equals one if individual if individual works in one of the following sectors: public administration and defense, compulsory social security, education , human health and social work activities.
occupational dummies	The estimations were carried out using dummies identifying occupations at one digit level of aggregation according to the International Standard Classification of Occupations (ISCO-88).
industry dummies	The estimations were carried out using dummies at one digit level of aggregation identifying the economic sector (NACE REV.1.1).

Table 1: Descriptive statistics for selected variables, 2008

	AT	ES	GR	HU	IE	IT	PL	PT	UK
ln Hourly wage	14,35	12.52	9,74	5.07	17,12	11,69	6.06	7.82	16.91
	(8,51)	(6.50)	(5,29)	(4.00)	(11.0)	(5,24)	(4.11)	(6.99)	(10.87)
Experience	20.4	20.9	23.2	20.3	19.0	22.3	19.2	25.2	17.1
	(12.3)	(12.7)	(13.2)	(12.0)	(15.0)	(12.6)	(13.0)	(17.2)	(13.2)
Secondary education	0.65	0.25	0.41	0.64	0.37	0.45	0.69	0.16	0.54
	(0.48)	(0.43)	(0.49)	(0.48)	(0.48)	(0.50)	(0.46)	(0.37)	(0.50)
University degree	0.20	0.35	0.28	0.22	0.35	0.17	0.23	0.15	0.34
	(0.40)	(0.47)	(0.45)	(0.41)	(0.48)	(0.38)	(0.42)	(0.35)	(0.47)
Supervisory	0.40	0.23	0.17	0.18	0.28	0.22	0.19	0.16	0.34
	(0.49)	(0.42)	(0.37)	(0.38)	(0.45)	(0.42)	(0.39)	(0.36)	(0.47)
Legislators,	0.06	0.05	0.08	0.05	0.18	0.07	0.06	0.06	0.14
senior officials and managers	(0.24)	(0.22)	(0.27)	(0.23)	(0.38)	(0.26)	(0.23)	(0.23)	(0.35)
Professionals	0.10	0.13	0.16	0.13	0.19	0.11	0.15	0.09	0.15
	(0.30)	(0.34)	(0.37)	(0.33)	(0.39)	(0.31)	(0.36)	(0.29)	(0.36)
Technicians and associate	0.20	0.11	0.08	0.13	0.05	0.21	0.11	0.09	0.14
professionals	(0.40)	(0.32)	(0.27)	(0.34)	(0.22)	(0.40)	(0.32)	(0.29)	(0.34)
Clerks	0.13	0.13	0.11	0.09	0.12	0.12	0.07	0.09	0.14
	(0.34)	(0.34)	(0.31)	(0.28)	(0.33)	(0.32)	(0.26)	(0.30)	(0.35)
Service workers and shop and	0.14	0.16	0.14	0.15	0.19	0.11	0.12	0.16	0.16
market sales workers	(0.35)	(0.37)	(0.35)	(0.36)	(0.39)	(0.32)	(0.32)	(0.36)	(0.37)
Skilled agricultural and fishery	0.04	0.025	0.12	0.03	0.01	0.02	0.12	0.08	0.01
workers	(0.20)	(0.16)	(0.32)	(0.17)	(0.07)	(0.14)	(0.32)	(0.26)	(0.10)
Craft and related trades	0.14	0.16	0.16	0.19	0.12	0.18	0.18	0.21	0.09
workers	(0.34)	(0.36)	(0.37)	(0.39)	(0.32)	(0.38)	(0.38)	(0.41)	(0.29)
Plant and machine operators	0.06	0.07	0.06	0.13	0.05	0.09	0.11	0.08	0.06
and assemblers	(0.24)	(0.26)	(0.24)	(0.34)	(0.32)	(0.29)	(0.31)	(0.28)	(0.25)
Public sector	0.22	0.22	0.22	0.22	0.28	0.22	0.19	0.20	0.29
	(0.42)	(0.41)	(0.41)	(0.41)	(0.45)	(0.41)	(0.39)	(0.40)	(0.45)
Native	0.83	0.91	0.89	0.98	0.87	0.90	0.99	0.92	0.90
	(0.38)	(0.29)	(0.31)	(0.14)	(0.34)	(0.30)	(0.06)	(0.27)	(0.31)
Married	0.52	0.57	0.65	0.56	0.50	0.58	0.67	0.66	0.53
	(0.50)	(0.50)	(0.48)	(0.50)	(0.50)	(0.50)	(0.47)	(0.47)	(0.50)
Industrial sector	0.29	0.29	0.23	0.35	0.21	0.32	0.38	0.35	0.23
	(0.45)	(0.45)	(0.42)	(0.48)	(0.41)	(0.47)	(0.49)	(0.48)	(0.42)
Services sector	0.71	0.71	0.77	0.65	0.79	0.68	0.62	0.65	0.77
	(0.45)	(0.45)	(0.42)	(0.48)	(0.41)	(0.47)	(0.49)	(0.48)	(0.42)

Note: standard errors are in parentheses.

Table 2: Minimum Wage by country – 2008

	AT	ES	GR	HU	IE	IT	PL	PT	UK
Minimum wage (monthly)	(*)	735,5	864,7	394,81	1126.0	(*)	462,4	565	1109,8
Kaitz-Index		35.3	52.1	47,0	40,0		44.8	43.7	37.0

Notes: (*) There is not mandatory minimum wage; minimum wage corrected for purchasing power parity. (Kaitz-Index) =Minimum monthly wage / medium monthly wage *100.

Source: EUROSTAT

Table 3: Unconditional quantile regression : selected coefficients from RIF regression

	AT			ES			GR			HU			IE		
	10th	**50th**	**90th**	**10th**	**50th**	**90th**	**10th**	**50th**	**90th**	**10th**	**50th**	**90th**	**10th**	**50th**	**90th**
Constant	0.516*** (0.193)	1.551*** (0.066)	2.373*** (0.123)	1.224*** (0.108)	1.744*** (0.074)	2.203*** (0.077)	1.258*** (0.094)	1.258*** (0.085)	1.817*** (0.147)	0.774*** (0.076)	0.653*** (0.131)	1.370*** (0.183)	0.914*** (0.265)	1.636*** (0.14)	2.392*** (0.172)
Exper	0.037*** (0.007)	0.018*** (0.003)	0.022*** (0.005)	0.018*** (0.004)	0.012*** (0.003)	0.024*** (0.004)	0.016*** (0.005)	0.017*** (0.004)	0.035*** (0.007)	0.001 (0.002)	0.017*** (0.004)	0.028*** (0.007)	0.047*** (0.008)	0.030*** (0.006)	0.039*** (0.009)
Exper2	-0.065*** (0.015)	-0.025*** (0.008)	-0.023** (0.011)	-0.027*** (0.007)	-0.013** (0.006)	-0.0326*** (0.008)	-0.023*** (0.009)	-0.016** (0.008)	-0.047*** (0.012)	-0.001 (0.006)	-0.039*** (0.009)	-0.062*** (0.014)	-0.087*** (0.016)	-0.047*** (0.012)	-0.060*** (0.017)
Secondary education	0.798*** (0.097)	0.209*** (0.027)	-0.0014 (0.023)	0.175*** (0.031)	0.146*** (0.025)	0.055** (0.028)	0.074** (0.036)	0.091*** (0.031)	0.069 (0.045)	0.046 (0.035)	0.101** (0.046)	0.072*** (0.023)	-0.082 (0.087)	0.093 (0.059)	0.183** (0.093)
University degree	0.867*** (0.108)	0.392*** (0.038)	0.279*** (0.060)	0.202*** (0.036)	0.173*** (0.027)	0.187*** (0.036)	0.192*** (0.047)	0.233*** (0.044)	0.343*** (0.086)	0.071 (0.048)	0.383*** (0.066)	1.116*** (0.122)	0.156* (0.092)	0.369*** (0.068)	0.503*** (0.150)
Married	0.141*** (0.042)	0.084*** (0.023)	0.020 (0.040)	0.103*** (0.023)	0.125*** (0.022)	0.085*** (0.032)	0.107*** (0.028)	0.212*** (0.029)	0.106** (0.045)	0.028 (0.019)	0.126*** (0.029)	0.024 (0.048)	0.171*** (0.054)	0.230*** (0.048)	0.012 (0.089)
Supervisory	0.131*** (0.037)	0.148*** (0.023)	0.188*** (0.033)	0.083*** (0.018)	0.176*** (0.020)	0.199*** (0.036)	0.037 (0.026)	0.169*** (0.031)	0.304*** (0.074)	0.027 (0.020)	0.128*** (0.034)	0.225*** (0.074)	0.123*** (0.043)	0.228*** (0.050)	0.223*** (0.085)
Public sector	0.179 (0.135)	0.072 (0.058)	-0.043 (0.119)	0.169** (0.070)	0.205*** (0.059)	0.296*** (0.069)	0.003 (0.064)	0.204*** (0.068)	-0.181 (0.135)	0.064 (0.052)	0.077 (0.075)	0.161 (0.146)	0.512*** (0.220)	0.183 (0.113)	0.254 (0.163)
Senior officials and Managers	-0.147 (0.114)	0.239*** (0.050)	0.662*** (0.104)	0.090 (0.056)	0.330*** (0.056)	0.913*** (0.156)	0.075 (0.089)	0.315*** (0.077)	0.608*** (0.211)	0.181*** (0.054)	0.545*** (0.076)	0.793*** (0.175)	-0.020 (0.109)	0.284*** (0.089)	0.243** (0.108)
Professionals	0.069 (0.090)	0.407*** (0.046)	0.713*** (0.099)	0.127** (0.051)	0.429*** (0.042)	0.705*** (0.071)	0.135** (0.062)	0.303*** (0.057)	0.712*** (0.120)	0.168*** (0.055)	0.562*** (0.071)	0.295* (0.153)	0.064 (0.103)	0.372*** (0.087)	0.305** (0.155)
Technicians and associate professionals	0.035 (0.082)	0.307*** (0.037)	0.341*** (0.051)	0.167*** (0.045)	0.285* (0.041)	0.140* (0.049)	0.157** (0.065)	0.310*** (0.055)	0.321*** (0.102)	0.133** (0.056)	0.521*** (0.068)	0.202*** (0.093)	0.018 (0.116)	0.385*** (0.092)	-0.161 (0.103)
Native	0.168*** (0.070)	0.17*** (0.027)	0.034 (0.037)	0.077 (0.055)	0.064** (0.031)	0.003 (0.038)	-0.033 (0.042)	0.124*** (0.035)	0.046 (0.041)	-0.097*** (0.023)	0.046 (0.090)	0.002 (0.134)	0.194** (0.086)	0.097* (0.057)	0.093 (0.078)
N	2429			5440			2018			3175			1412		

Notes: robust standard errors in parentheses. Industry dummies and other professional dummies were included but not reported.

(***) , (**), (*) significant at 1% , 5% and 10% of significance level, respectively.

Table 3: Unconditional quantile regression : selected coefficients from RIF regression (cont.)

	IT			PL			PT			UK		
	10th	**50th**	**90th**	**10th**	**50th**	**90th**	**10th**	**50th**	**90th**	**10th**	**50th**	**90th**
Constant	1.277*** (0.092)	1.771*** (0.035)	2.124*** (0.058)	0.436*** (0.139)	0.739*** (0.205)	1.566*** (0.400)	0.982*** (0.126)	1.276*** (0.156)	1.751*** (0.282)	0.670*** (0.276)	1.528* (0.120)	2.674*** (0.139)
Exper	0.019*** (0.003)	0.012 (0.002)	0.027*** (0.003)	0.005 (0.003)	0.011*** (0.003)	0.027*** (0.005)	0.009** (0.004)	0.013*** (0.005)	0.040*** (0.010)	0.024*** (0.005)	0.014* (0.004)	0.019*** (0.006)
Exper2	-0.027*** (0.007)	-0.015*** (0.004)	-0.041*** (0.006)	-0.008 (0.008)	-0.018*** (0.007)	-0.056*** (0.001)	-0.014** (0.007)	-0.021*** (0.009)	-0.068*** (0.018)	-0.043*** (0.012)	-0.025* (0.009)	-0.044*** (0.014)
Secondary education	0.093*** (0.024)	0.098*** (0.013)	0.167*** (0.019)	0.263*** (0.054)	0.188*** (0.033)	0.059** (0.028)	0.021 (0.041)	0.089 (0.055)	0.332*** (0.127)	0.189 (0.221)	0.152*** (0.091)	0.137** (0.069)
University degree	0.156*** (0.035)	0.239*** (0.023)	0.590*** (0.065)	0.331*** (0.062)	0.388*** (0.049)	0.414*** (0.080)	0.116* (0.066)	0.312*** (0.086)	0.656*** (0.263)	0.288 (0.221)	0.378* (0.095)	0.480*** (0.086)
Married	0.117*** (0.019)	0.091*** (0.012)	0.110*** (0.022)	0.073*** (0.025)	0.163*** (0.023)	0.126*** (0.036)	0.077** (0.033)	0.90** (0.045)	0.125 (0.083)	0.123 (0.32)	0.121* (0.027)	0.182* (0.045)
Supervisory	0.102*** (0.017)	0.109*** (0.013)	0.215*** (0.030)	0.054*** (0.020)	0.191*** (0.025)	0.167*** (0.049)	0.042 (0.029)	0.183*** (0.045)	0.432*** (0.131)	0.135*** (0.033)	0.136* (0.028)	0.122*** (0.047)
Public sector	0.128*** (0.046)	0.135*** (0.028)	0.068 (0.056)	0.125** (0.063)	0.124*** (0.053)	0.206*** (0.086)	0.124 (0.091)	0.099 (0.122)	0.510*** (0.232)	0.438*** (0.127)	0.323* (0.069)	0.052 (0.095)
Senior officials and Managers	0.181*** (0.068)	0.180*** (0.035)	0.845*** (0.124)	0.255*** (0.053)	0.543*** (0.054)	0.765*** (0.121)	0.047 (0.105)	0.613*** (0.103)	1.111*** (0.355)	0.486*** (0.091)	0.586* (0.050)	0.500*** (0.078)
Professionals	0.200*** (0.056)	0.194*** (0.030)	0.501*** (0.076)	0.255*** (0.055)	0.651*** (0.050)	0.622*** (0.096)	0.139 (0.087)	0.616*** (0.096)	1.295*** (0.323)	0.504*** (0.093)	0.528* (0.054)	0.145** (0.069)
Technicians and associate professionals	0.250*** (0.053)	0.214*** (0.024)	0.118*** (0.041)	0.213*** (0.051)	0.528*** (0.044)	0.207*** (0.061)	0.183*** (0.067)	0.549*** (0.074)	0.524*** (0.142)	0.447*** (0.099)	0.371* (0.054)	0.112* (0.068)
Native	0.041 (0.042)	0.076*** (0.020)	-0.004 (0.032)	0.027 (0.105)	0.015 (0.0195)	-0.078 (0.390)	-0.042 (0.060)	-0.084 (0.078)	-0.229 (0.178)	0.110* (0.064)	0.040 (0.051)	-0.218*** (0.098)
N	7085			5449			1572			2593		

Notes: robust standard errors in parentheses. Industry dummies and other professional dummies were included but not reported.
(***) , (**), (*) significant at 1% , 5% and 10% of significance level, respectively.

Table 4: *Detailed Decomposition of Countries' Wage Differentials*

	AT	ES	GR	HU	IE	IT	PL	PT
Quantile .1								
Overall difference	**0.001 (0.035)**	**0.004 (0.041)**	**0.403***(0.018)**	**1.196***(0.025)**	**0.008 (0.039)**	**-0.003 (0.039)**	**1.021***(0.015)**	**0.787***(0.205)**
Composition	**0.0299 (0.033)**	**0.035 (0.036**	**0.006 (0.020)**	**0.059***(0.014)**	**0.040 (0.036)**	**0.032 (0.035)**	**0.067***(0.012)**	**0.042 (0.028)**
Experience	0.011 (0.014	0.013 (0.015)	-0.036***(0.009)	-0.002 (0.003)	0.018 (0.013)	0.013 (0.014)	-0.003 (0.002)	-0.017*(0.010)
Education	-0.012 (0.028)	-0.010 (0.026)	0.045***(0.013)	0.020 (0.013)	-0.011 (0.023)	-0.008 (0.025)	0.034***(0.009)	0.041 (0.032)
Married	0.008 (0.006	0.009 (0.007)	-0.008 (0.004)	0.001 (0.001)	0.010*(0.006)	0.009 (0.006)	-0.004 (0.002)	-0.008 (0.006)
Supervisory	0.008 (0.006)	0.008 (0.005)	0.009 (0.007)	0.008 (0.006)	0.009*(0.005)	0.008 (0.006)	0.016***(0.006)	0.012 (0.009)
Occupation	0.007 (0.011)	0.008(0.011)	-0.011 (0.016)	0.027***(0.009)	0.006 (0.013)	0.005 (0.012)	0.028***(0.009)	-0.001 (0.027)
Industry	0.002 (0.014)	0.002 (0.015	0.009 (0.008)	-0.002 (0.005)	0.005 (0.016)	0.001 (0.014)	0.001 (0.006)	0.013 (0.009)
Native	0.004 (0.004)	0.005 (0.005)	0.003 (0.003)	0.006**(0.003)	0.004 (0.005)	0.004 (0.004)	0.002 (0.008)	0.001 (0.003)
error	-0.013 (0.014)	-0.014 (0.012)	-0.006 (0.008)	-0.010 (0.004)	-0.017 (0.013	-0.013 (0.014)	-0.019***(0.005)	0.008 (0.014)
Structure	**-0.017 (0.039)**	**-0.017 (0.044)**	**0.386***(0.024)**	**1.138***(0.022)**	**-0.017 (0.040)**	**-0.017 (0.039)**	**0.972***(0.022)**	**0.711***(0.054)**
Experience	-0.251**(0.102)	-0.260**(0.112)	0.083 (0.071)	0.130**(0.052)	-0.241 (0.120)	-0.232**(0.105)	0.113*(0.065)	0.150 (0.133)
Education	0.089 (0.078)	0.112 (0.084)	-0.007 (0.067)	-0.071 (0.078)	0.107 (0.078)	0.084 (0.072)	-0.062 (0.078)	0.050 (0.076)
Married	-0.017 (0.014)	-0.018 (0.014)	-0.002 (0.003)	0.001 (0.004)	-0.015 (0.011)	-0.017 (0.012)	0.002 (0.006)	-0.006 (0.012)
Supervisory	-0.000 (0.003)	-0.000 (0.003)	-0.000 (0.002)	0.001 (0.002)	-0.000 (0.003)	-0.000 (0.003)	0.000 (0.001)	-0.002 (0.008)
Occupation	0.115*(0.065)	0.110 (0.074)	0.382***(0.056)	-0.043 (0.066)	0.105 (0.072)	0.117*(0.071)	0.024 (0.038)	-0.022 (0.156)
Industry	0.012 (0.049)	0.014 (0.042)	0.010 (0.035)	0.062**(0.025)	0.006 (0.040)	0.009 (0.055)	0.019 (0.031)	0.002 (0.053)
Native	0.010 (0.046)	0.011 (0.044)	0.077 (0.056)	0.150***(0.031)	0.011 (0.046)	0.016 (0.038)	-0.021 (0.068)	0.069 (0.060)
Constant	0.026 (0.134)	0.014 (0.161)	0.186 (0.124)	0.910***(0.119)	0.010 (0.170)	0.006 (0.155)	0.896***(0.134)	0.470**(0.223)
error	0.001 (0.026)	-0.000 (0.028)	0.017 (0.018)	0.009 (0.021)	-0.017 (0.013)	0.002 (0.023)	0.000 (0.019)	0.026 (0.048)
Quantile .5								
Overall difference	**0.011 (0.030)**	**0.012 (0.040)**	**0.576***(0.022)**	**1.263***(0.024)**	**0.018 (0.028)**	**0.016 (0.044)**	**1.049***(0.020)**	**0.897***(0.026)**
Composition	**0.088***(0.031)**	**0.092***(0.034)**	**0.104***(0.027)**	**0.228***(0.019)**	**0.095***(0.029)**	**0.089*** (0.030)**	**0.188*** (0.024)**	**0.283*** (0.047)**
Experience	-0.003 (0.011)	0.001 (0.013)	-0.049***(0.009)	-0.014***(0.005)	0.001 (0.010)	-0.001 (0.011)	-0.007 (0.003)	-0.029**(0.014)
Education	0.030**(0.015)	0.027 (0.017)	0.049***(0.012)	0.088***(0.016)	0.029*(0.016)	0.028 (0.018)	0.064***(0.011)	0.105**(0.043)
Married	0.011 (0.008)	0.013 (0.010)	-0.015 (0.006)	0.004 (0.003)	0.015*(0.008)	0.013 (0.008)	-0.010**(0.004)	-0.008 (0.006)
Supervisory	0.019**(0.009)	0.020**(0.010)	0.050***(0.011)	0.037***(0.011)	0.021***(0.009)	0.019**(0.009)	0.054***(0.008)	0.052***(0.017)
Occupation	0.016 (0.011)	0.014 (0.012)	0.042**(0.018)	0.110***(0.018)	0.013 (0.010)	0.015*(0.009)	0.089***(0.016)	0.105***(0.031)
Industry	0.012 (0.011)	0.015 (0.011)	0.019**(0.009)	0.003 (0.007)	0.014 (0.011)	0.013 (0.011)	-0.001(0.007)	0.057***(0.016)
Native	0.003 (0.003)	0.002 (0.003)	0.008 (0.003)	-0.001 (0.004)	0.003 (0.003)	0.003 (0.003)	-0.001 (0.016)	0.001 (0.003)
error	-0.019 (0.018)	-0.022 (0.017)	-0.020 (0.016)	-0.051***(0.010)	-0.025 (0.017)	-0.021 (0.018)	-0.047*** (0.013)	-0.018 (0.035)
Structure	**-0.057*(0.033)**	**-0.060*(0.034)**	**0.469***(0.033)**	**1.005***(0.024)**	**-0.059*(0.033)**	**-0.053 (0.036)**	**0.866***(0.024)**	**0.355***(0.098)**
Experience	-0.139 (0.090)	-0.133*(0.074)	-0.076 (0.089	-0.031 (0.068)	0.147*(0.078)	-0.130 (0.086)	0.035 (0.045)	-0.292 (0.237)
Education	-0.003 (0.044)	0.001 (0.046)	0.014 (0.040)	-0.005 (0.040)	-0.004 (0.043)	0.003 (0.044)	0.038 (0.036)	-0.042 (0.079)
Married	-0.026***(0.010)	-0.030***(0.010)	-0.010 (0.007)	0.001 (0.004)	-0.028***0.009)	-0.028***(0.010)	-0.008 (0.006)	-0.008 (0.015)
Supervisory	0.004 (0.005)	0.005 (0.005)	0.001 (0.003)	0.000 (0.001)	0.004 (0.004	0.004 (0.005)	0.000 (0.002)	0.001 (0.009)
Occupation	0.047 (0.044)	0.039 (0.035)	0.037 (0.027)	0.010 (0.041)	0.057 (0.039)	0.048 (0.040)	-0.058 (0.036)	-0.137 (0.090)
Industry	-0.017 (0.024)	-0.021 (0.028)	0.003 (0.026)	0.010 (0.020)	-0.021 (0.026)	-0.020 (0.025)	0.030 (0.020)	-0.023 (0.062)
Native	-0.041 (0.049)	-0.042 (0.042)	-0.050 (0.042)	0.038 (0.065)	-0.041 (0.041)	-0.037 (0.040)	0.052 (0.082)	0.061 (0.131)
Constant	0.117 (0.116)	0.121 (0.098)	0.551***(0.111)	0.980***(0.103)	0.121 (0.105)	0.107 (0.116)	0.778***(0.127)	0.797***(0.328)
error	0.000 (0.023)	0.002 (0.026)	0.023 (0.024)	0.081***(0.023)	0.007 (0.027)	0.000 (0.023)	0.043*(0.023)	0.278***(0.098)
Quantile .9								
Overall difference	**0.093 (0.057)**	**0.103*(0.057)**	**0.772***(0.042)**	**1.230***(0.039)**	**0.102*(0.053)**	**0.109 (0.075)**	**1.159***(0.031)**	**0.586***(0.059)**
Composition	**0.068 (0.044)**	**0.072(0.053)**	**0.278***(0.077)**	**0.548***(0.066)**	**0.079*(0.042)**	**0.070 (0.056)**	**0.313***(0.048)**	**0.770***(0.193)**
Experience	-0.004***(0.015)	-0.003(0.020)	-0.078***(0.016)	-0.025***(0.009)	0.003 (0.016)	0.000 (0.017)	-0.010**(0.004)	-0.079**(0.032)
Education	0.059**(0.028)	0.061***(0.023)	0.071***(0.019)	0.303***(0.046)	0.062**(0.030)	0.053** (0.027)	0.099*** (0.024)	0.268**(0.113)
Married	0.000 (0.006)	0.002 (0.006)	-0.008 (0.005)	0.000 (0.002)	0.000 (0.006)	0.001 (0.006)	-0.007 (0.003)	-0.003 (0.012)
Supervisory	0.018*(0.010)	0.018 (0.011)	0.085***(0.026)	0.065**(0.026)	0.020*(0.012)	0.018 (0.011)	0.050***(0.016)	0.112**(0.047)
Occupation	-0.003 (0.024)	-0.006 (0.036)	0.162***(0.055)	0.177***(0.050)	0.004 (0.015)	-0.001 (0.026)	0.155***(0.031)	0.407***(0.116)
Industry	-0.007 (0.011)	-0.005 (0.013)	0.043**(0.017)	0.017 (0.022)	0.006***(0.014)	-0.006 (0.014)	0.023 (0.015)	0.061*(0.037)
Native	0.005 (0.004)	0.005 (0.004)	0.004 (0.003)	0.012 (0.014)	0.005 (0.005)	0.004 (0.004)	0.003 (0.033)	0.004 (0.009)
error	-0.013 (0.018)	-0.014 (0.020)	-0.070***(0.027)	-0.121***(0.032)	0.018 (0.016)	-0.014 (0.021)	-0.056***(0.020)	-0.064 (0.099)
Structure	**0.060 (0.049)**	**0.069*(0.041)**	**0.577***(0.049)**	**0.866***(0.063)**	**0.066 (0.044)**	**0.074 (0.053)**	**0.974***(0.050)**	**0.207 (0.158)**
Experience	-0.180 (0.106)	-0.170 (0.131)	-0.056 (0.150)	-0.174 (0.139)	-0.158 (0.115)	-0.178 (0.116)	-0.146 (0.123)	-0.081 (0.240)
Education	-0.036 (0.060)	-0.027 (0.059)	0.030 (0.059)	-0.014 (0.061)	-0.024 (0.064)	-0.020 (0.062)	0.041 (0.047)	-0.031 (0.122)
Married	0.022 (0.012)	0.020 (0.014)	0.002 (0.006)	0.016 (0.010)	0.211***(0.011)	0.022 (0.013)	0.019 (0.012)	0.009 (0.015)
Supervisory	0.001 (0.004)	0.002 (0.006)	0.001 (0.004)	0.001 (0.003)	0.001 (0.004)	0.001 (0.004)	-0.001 (0.002)	-0.000 (0.008)
Occupation	-0.001 (0.035)	-0.000 (0.030)	0.041 (0.033)	0.044 (0.054)	0.000 (0.370)	0.005 (0.033)	-0.010 (0.032)	0.008 (0.071)
Industry	-0.033 (0.028)	-0.033 (0.033)	-0.069 (0.048)	-0.004 (0.051)	-0.028 (0.033)	-0.043 (0.035)	-0.029 (0.037)	-0.040 (0.091)
Native	-0.053 (0.052)	-0.057 (0.055)	-0.090*(0.053)	0.094 (0.160	-0.051 (0.057)	-0.066 (0.056)	-0.266***(0.058)	-0.071 (0.111)
Constant	0.341*** (0.117)	0.333**(0.143)	0.718***(0.203)	0.903***(0.230)	0.305**(0.123)	0.353**(0.141)	1.366***(0.157)	0.414 (0.280)
error	-0.022 (0.026)	-0.025 (0.025)	-0.013 (0.058)	-0.063 (0.055)	-0.025 (0.029)	-0.021 (0.023)	-0.072 (0.054)	-0.327 *(0.197)

Notes: bootstrapped standard errors (100 reps.) are in parentheses. (***) , (**) , (*) significant at 1%, 5% and 10% significance level, respectively

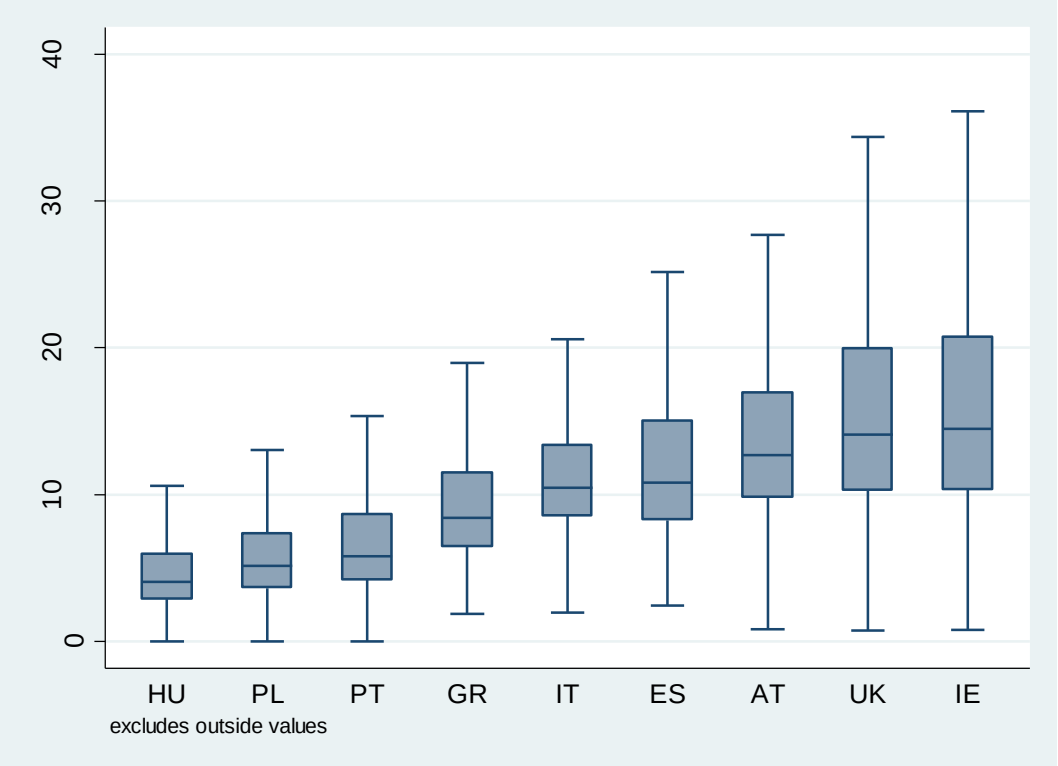

Figure 1: Distribution of hourly wages (ppp corrected)

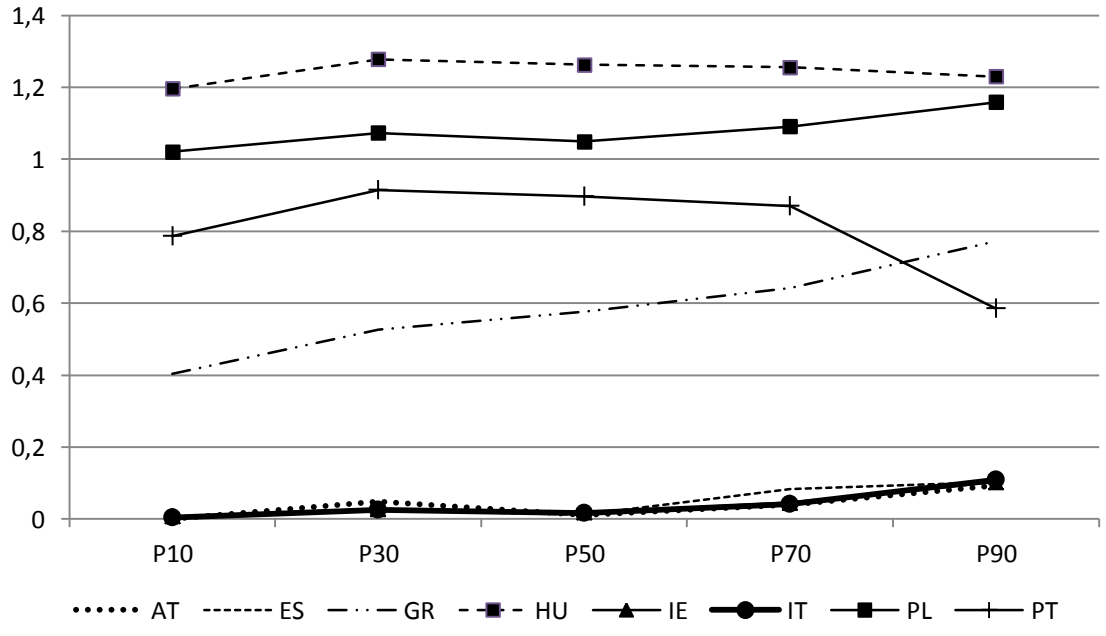

Figure 2 : Estimated countries' wage differentials

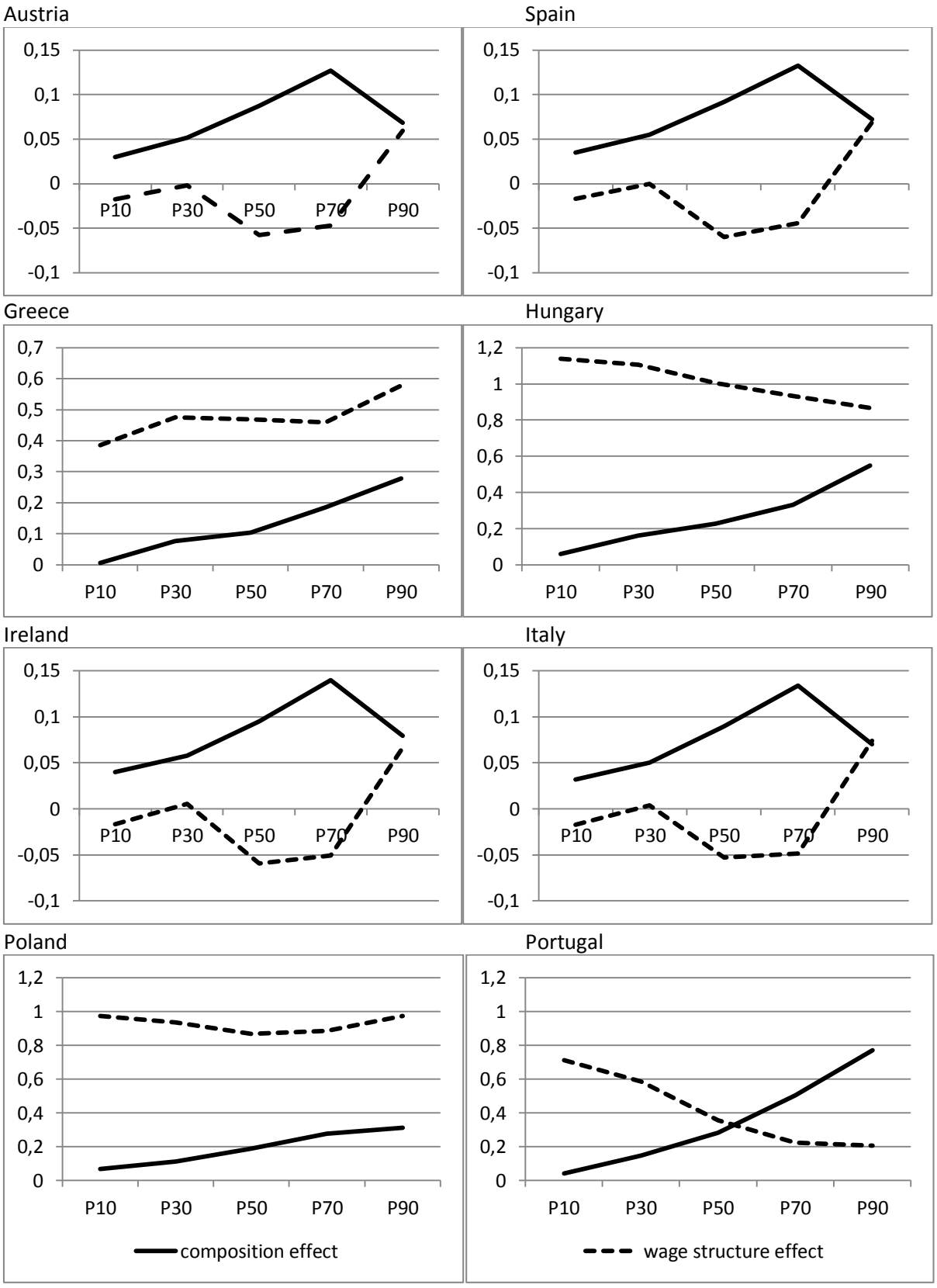

Figure 3: Wage structure and composition effects

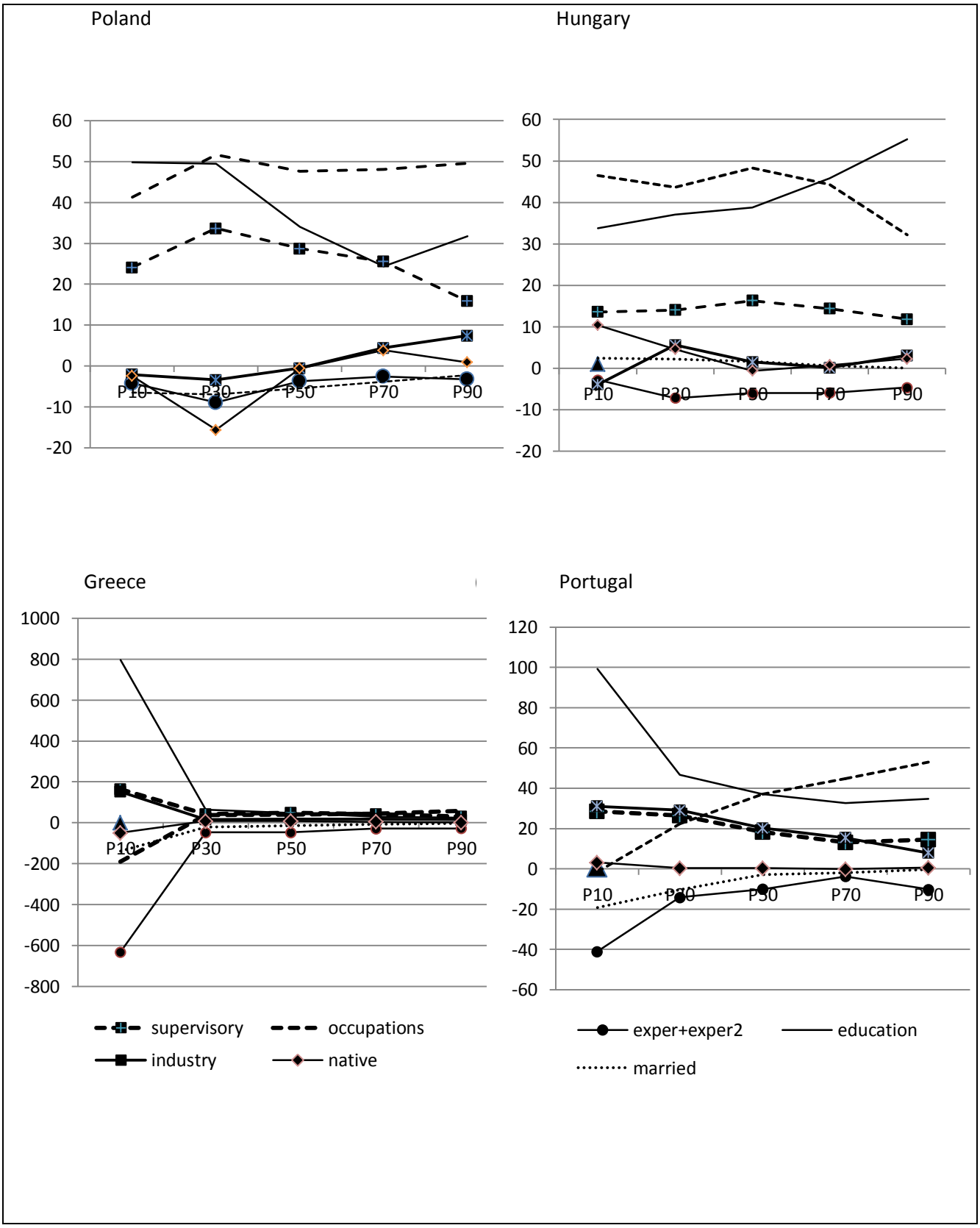

Figure 4: Contributors to the composition effect -Eastern and South-Western European Countries