

DISCUSSION PAPER SERIES

IZA DP No. 11122

**Revisiting Interregional Wage Differentials:
New Evidence from Spain with Matched
Employer-Employee Data**

Inés P. Murillo Huertas
Raúl Ramos
Hipólito Simón

OCTOBER 2017

DISCUSSION PAPER SERIES

IZA DP No. 11122

Revisiting Interregional Wage Differentials: New Evidence from Spain with Matched Employer-Employee Data

Inés P. Murillo Huertas

Universidad de Extremadura

Raúl Ramos

AQR-IREA, Universitat de Barcelona and IZA

Hipólito Simón

Universidad de Alicante-IEI-IEB

OCTOBER 2017

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ABSTRACT

Revisiting Interregional Wage Differentials: New Evidence from Spain with Matched Employer-Employee Data*

This study examines wage differences across Spain's regions along the entire wage distribution based on matched employer-employee microdata from 2006 to 2014. Unlike previous studies, we control for differences in regional purchasing power parities, which are very large in practice. Although many of the raw wage differences observed are explained by differences between regional productive structures and, to a lesser extent, in labour forces, noteworthy regional differences net of composition effects remain after controlling for a broad set of individual and firm characteristics. Unexplained wage differences are generally very similar throughout the wage distribution and are strongly persistent over time, despite significant changes in both economic cycle and labour regulations that occurred in Spain during the examined period. This evidence suggests the presence of common mechanisms in the generation of regional wage differentials that affect the whole labour force and that are strongly persistent over time, which is consistent with a key role of collective bargaining

JEL Classification: J31, J52

Keywords: interregional wage differentials, decomposition methods, matched employer-employee data, wage setting institutions

Corresponding author:

Hipólito Simón
Departamento de Análisis Económico Aplicado
Facultad de Ciencias Económicas y Empresariales
Universidad de Alicante.
Ap.Correos 99
03080, Alicante
Spain
E-mail: hsimon@ua.es

* This work was supported by the Spanish Ministry of Economy and Competitiveness under grants ECO2014-53702-P; CSO2014-55780-C3-2-P and ECO2016-75805-R.

1. Introduction

Regional disparities in economic performance have attracted increasing attention in the research agenda. A deeper understanding of regional inequalities is essential to improving overall competitiveness and economic development in any given country (Porter, 2003). In this regard, interregional wage differentials matter, particularly because regional wage inequalities are one of the main factors driving internal migration and employment creation at a regional level, so that wage adjustments across regions are a useful tool for reducing regional employment differences (OECD, 2005).

Differences in wages between a country's regions exist for a number of reasons, and are related to regional differences in human capital, amenities, and agglomeration economies (see, for example, Groot et al., 2014). The particular reasons behind interregional wage differentials and their changes over the years are of great interest, as policy implications depend upon the nature of these factors. Hence, as Pereira and Galego (2011) note, differences in interregional wages caused by amenities such as the climate do not require policy interventions, whereas measures to improve competitiveness can alleviate interregional wage disparities caused by inefficiencies in the allocation of resources among regions. In the same line, policies devoted to enhancing worker and firm productivity in low-wage regions may be insufficient to close the gap if non-competitive factors, such as labour market institutions, also influence the lower magnitude of these relative wages (Simón et al., 2006).

Related to the above, a number of papers assess the extent to which wage differentials persist for equally productive workers located in different regions (see Blackaby and Murphy, 1990, 1995 pioneer works in this field). More recently, a few articles have provided novel evidence in this regard, although these focus on some particular countries, such as the Netherlands (Groot and de Groot, 2011; Groot et al., 2014) and Portugal (Vieira et al., 2006; Pereira and Galego, 2011, 2014; Galego and Pereira, 2014).

This article examines regional wage differences in Spain in the period 2006-2014. The research extends previous studies on the topic by analysing these gaps after properly controlling for regional differences in purchasing power parities. This question is particularly important in the Spanish context. To restore external competitiveness and facilitate the adjustment of external imbalances of the Spanish economy under the policy limitations imposed by participation in the Euro zone, the Spanish government adopted after the Great Recession an internal devaluation strategy to lower wages and prices relative to trading partners. Yet, the effects of wage devaluation in real wages could have resulted in asymmetries across regions, considering that if wage devaluation does not fully pass through to lower prices real wages would fall (Decressin, et al., 2015 and Agnello et al, 2016), and that there could be a potential asymmetric pass-through of wage moderation policies into domestic prices in Spanish regions given their significant differences in

terms of productive specialisation and openness (Cuadrado-Roura and Maroto, 2016). Given these circumstances, it is very important to properly account for regional differences in the level and the evolution of the cost of living, an issue that has not been properly controlled for in previous studies (see Galego and Pereira, 2014 for more details).

Spain is a particularly interesting case for the study of interregional wage differences for a number of reasons. The first is related to the characteristics of Spain's labour market institutional framework and the consequent existence of important regional disparities in its functioning. The Spanish collective bargaining model differs from that of other European countries given that while Spain's model has similar high coverage rates and a predominance of sectoral agreements, the bulk of the country's collective agreements are subnational in scope, affecting specific regions or provinces (Du Caju et al., 2008). This allows for very significant and time-persistent regional differences in bargained wage floors, which in turn lead to enduring regional differences in wages actually earned by employees (Simón et al., 2006). Yet, regional wage differentials do not adjust properly in practice to regional economic conditions. This feature, coupled with low interregional migration flows, is considered one of the main reasons for the strong regional segmentation of the Spanish labour market (International Monetary Fund, 2015; Bover and Velilla, 2005; and Bentolila and Jimeno, 1998), where there are significant and persistent differences in regional employment and unemployment rates (Bentolila and Jimeno, 1998 and Bande et al., 2008).

A second reason to analyse the Spanish case is that during the period examined there have been profound cyclical and regulatory changes in the labour market that allow us to examine the extent to which regional wage differentials persist over time. On one hand, there have been profound regulatory changes in the labour market through successive reforms, most notably the labour reform approved in 2012. These reforms have modified many relevant aspects of collective bargaining, generally introducing greater flexibility in wage determination (for more details see OECD, 2014), and have produced significant changes in the overall functioning of the labour market (see Banco de España, 2016 and European Commission, 2016). Although available evidence suggests that regional wages continue to respond weakly after labour reforms to specific variations in regional economic circumstances (International Monetary Fund, 2015), these intense regulatory changes may be associated with significant changes in the regional wage structures. On the other hand, there has also been intense cyclical fluctuations in the Spanish labour market due to the effects of the double-dip recession associated with the Great Recession and the crisis in the Euro area, and the subsequent recent economic expansion (i.e. the unemployment rate before the Great Recession was 8%, reached a maximum of 26% during the crisis, and is currently 17%). Consequently, it is a matter of interest to analyse the extent to which regional wage differentials persist despite intense regulatory changes and cyclical fluctuations.

A final reason that Spain is an interesting case study is that available evidence based on harmonized microdata strictly comparable across countries suggests that wage differentials between regions are comparatively high in Spain relative to other European countries where collective bargaining does not have a regional dimension (Simón and Russell, 2005), a finding consistent with available international evidence that the characteristics of collective bargaining influence significantly wage differentiation between regions in each country (Vamvakidis, 2009).

The analysis of the origin of regional wage differences in Spain is developed in this research for both average wages and for wages along the wage distribution. This contrasts with the bulk of the literature, as only a few of the most recent studies focus on analysis throughout the distribution (as far as we know, they are limited to Motellón et al., 2011; Galego and Pereira, 2014; and Pereira and Galego, 2014). Examining what happens along the wage distribution is especially relevant in the Spanish context, because the aforementioned wage moderation policies adopted during the crisis have had a greater impact on low-wage earners and new entrants into the labour market. These policies could have increased wage inequality, and this effect could be asymmetric across regions. The empirical analysis is developed using matched employer-employee microdata from the *Encuesta de Estructura Salarial*, a database that provides rich information on employees and their jobs and firms, applying two econometric methodologies. The first methodology is the technique proposed by Fortin, Lemieux, and Firpo (2001), which provides a detailed breakdown of wage differences between regions along the wage distribution based on the individual contribution of each explanatory factor. The second is the methodology suggested by Haisken-DeNew and Schmidt (1997), which provides accurate estimations of both the magnitude of the whole set of interregional wage differentials net of composition effects and their dispersion. Although this technique was originally proposed for the analysis of differences in average wages, it is adapted here for the analysis of wage differentials along the unconditional wage distribution. With both methodologies regional differences in purchasing power parities are controlled for, an issue that has not been properly considered in the previous literature.

The article is organized as follows: the next section summarises the literature on regional wage differentials; the third and fourth sections present the methodology and data used in the empirical analysis; the fifth section presents and discusses the empirical evidence; the final section provides our conclusions.

2. Literature review

According to Groot et al. (2014), there are three main causes of interregional wage differentials: differences in productive characteristics, differences in nonhuman endowments, and agglomeration economies. Differences in productive characteristics are related to composition effects. Hence, interregional wage disparities can arise as individuals and firms are spatially sorted

in a non-homogeneous way. Labour force characteristics, such as education or experience, and firm and job requirements could notably vary across regions; thus, wages in regions with highly educated workers and industries demanding a more favourable skill composition tend to be higher, as wages are linked to productivity. The second is related to interregional disparities in amenities, such as climate, institutions, technology, or transportation, as more favourably endowed areas are likely to embrace more productive firms and workers. The third reason for interregional wage differences is the agglomeration externalities arising from labour market interactions, connections among firms, and/or knowledge spillovers. As Duranton and Puga (2004) mention, in dense areas a better matching between workers' skills and firm requirements can take place, and physical proximity—together with demand and supply scale effects—allow for reduced input and output transaction costs.¹ As a consequence, interregional wage differences can also occur, as firms in more concentrated areas can take advantage of those productivity gains.²

From an empirical perspective, it is important to consider how workers sort themselves out across areas, as sorting determines an important part of regional wage inequalities (Gibbons et al., 2010). In this sense, the use of microdata constitutes an important advantage given that they provide many variables regarding workers' productive characteristics. As a consequence, worker heterogeneity that remains unobserved at a more aggregated level (and that in practice may be sizeable: see De Groot et al., 2009 and Melo et al., 2009) can be better controlled for, and some insights can be provided on what variables most guide the sorting of workers across regions (see, for example, Fally et al., 2010; Lehmer and Möller, 2010; López-Bazo and Motellón, 2012; Galego and Pereira, 2014; Groot et al. 2014; Pereira and Galego, 2011, 2014; Rusinek and Torejow, 2014, and Herrera-Idárraga et al., 2016 for recent analysis of regional wage differentials taking advantage of microdata).

Also regarding empirical questions, different methodologies have been used in the literature to analyse interregional wage differentials. A number of studies have applied the Oaxaca (1973) and Blinder (1973) proposal (OB) to assess the extent to which average regional wage differentials are due either to differences in regional endowments or to differences by region in the returns paid to these endowments. Blackaby and Murphy (1990, 1995) conclude that, although different wages are paid to similar employees doing similar work in different regions, differences in occupational, industrial, and education structures play a major role on the explanation of regional wage disparities in Britain. In contrast, García and Molina (2002) point out that in the case of Spain, notable differences among regions on the returns paid to the same productive endowments stand out in some areas of the country. Moreover, López-Bazo and Motellón (2012) stress that

¹ See De Groot et al. (2014) for an exhaustive analysis of the effects of agglomeration externalities on productivity.

² Regarding which of these three potential factors (composition effects, amenities, or agglomeration economies) prevails in the explanation of spatial wage disparities, Combes et al. (2008) conclude that in France skill composition effect matters the most while the effect of amenities appears to be negligent.

differences in returns to human capital are one of the most important factors explaining wage disparities among Spanish regions. Using data for Portugal, Vieira et al. (2006) conclude that differences in both human capital endowments and returns to education play a key role in explaining interregional wage gaps in that country. Pereira and Galego (2011) also find evidence supporting this conclusion, underlining an asymmetric occupational structure and differences in firm size as other important factors influencing the interregional wage dispersion in Portugal.

As the typical method applied to determine the main factors influencing average regional wage differentials for a given year, the OB has severe limitations when it comes to explaining how spatial wage differentials evolve over time. However, the Juhn-Murphy-Pierce (1993) methodology (JMP) allows researchers to analyse these temporal changes. JMP decomposes changes in the interregional wage differentials into four components: two observed—(1) changes in productive endowments and (2) changes in returns to these endowments, and two unobserved—(3) changes in the relative position of the average worker for a given region in the distribution of wages corresponding to the region of reference and (4) changes in the wage dispersion. Using this methodology, Pereira and Galego (2011) analyse variations in interregional inequalities in Portugal between 1995 and 2002. They conclude that raw interregional wage differentials barely vary along the period, although this result hides counteracting factors that vary by gender. In the case of men, differences in regional endowments tend to increase the gap, but component (3) contributes to narrowing the gap. Similar patterns are found for women, although in this case the convergence in returns to productive characteristics also contributes to narrowing interregional wage inequalities. More recently, Kim et al. (2015) provide evidence on the decline in wage inequality between Seoul's metropolitan area and the rest of South Korea from 2000 to 2008. This decline is especially marked between 2004 and 2008, as both observed and unobserved components of the JMP decomposition contribute to narrow interregional wage differentials and for women.

Finally, the decomposition of wage differentials across the entire wage distribution has attracted increasing attention over time (see, for example, Machado and Mata, 2005; Melly, 2005, 2006; and Fortin et al. 2011), although only a few papers have dealt with this dimension in the study of interregional wage differentials. In particular, and to the best of our knowledge, only Motellón et al. (2011), Pereira and Galego (2014), and Galego and Pereira (2014) have decomposed regional wage differences across the whole wage distribution³. The former paper applies a non-parametric method suggested by Di Nardo et al. (2006) and Butcher and Di Nardo (2002), documenting increasing wage differentials along the wage distribution for the case of

³ Groot and De Groot (2011) analyse temporal trends in wage inequality in the Netherlands paying occasional attention to those differences found between large agglomerations and the periphery. Their results suggest that labour market institutions promoting collective wage agreements that do not differentiate between regions play a role in explaining the scarce regional wage differences found in the lower percentiles. In contrast, notable interregional wage differentials are documented for the upper tail of the wage distribution, being the inequality most notable for those agglomerations where high-quality jobs are more present and thus pay higher average wages. Dickey (2007) also applies quantile regressions to analyse regional wage inequalities, although focusing on the differences within regions.

Spain. In turn, Pereira and Galego (2014) follow a semi-parametric method suggested by Machado and Mata (2005) and Melly (2005, 2006), providing evidence on significant interregional wage differentials in Portugal that increase monotonically for men and decrease at the top of the wage distribution in some areas for women. The results provided by Motellón et al. (2011) and by Pereira and Galego (2014) detail which part of the wage differential along the wage distribution is due to regional differences in endowments of observable characteristics and which part is due to regional differences in the returns paid to these endowments. However, none of them shed light on what specific variable(s) most matter in the explanation of interregional wage differentials. By contrast, Galego and Pereira (2014) apply the Fortin et al. (2011) proposal, which allows for gauging the contribution of each explanatory variable considered in the wage equation on both the endowment and the return components along the entire wage distribution. In line with the results provided by Pereira and Galego (2011) for interregional wage differentials at the mean in Portugal, Galego and Pereira (2014) conclude that education, occupation, and firm size show the most important interregional differences in endowments. In addition, they uncover that the relative weight of these covariates is far from constant along the wage distribution. On the other hand, experience and tenure show the most important interregional differences in the return component, displaying an opposite pattern: differences in returns to experience are more relevant at the upper tail of the wage distribution, while differences in returns to tenure are more significant at the lower deciles.

For Spain, in addition to the aforementioned studies by García and Molina (2002), López-Bazo and Motellón (2012), and Motellón et al. (2011), the article by Simón et al. (2006) stands out. The authors document the presence of notable interregional differences in average wages in the Spanish labour market even when regional differences in endowments are controlled for. Applying the Haisken-DeNew and Schmidt (1997) methodology and using matched employer-employee microdata, they focus on the role of labour market institutions and conclude that regional wage differences are very similar to those observed in minimum wages agreed in industry level collective agreements operating at a subnational level.

3. Methodology

Our empirical approach to the analysis of interregional wage differentials in Spain consists of two steps. First, regional differences in wages are decomposed to ascertain the extent to which they are explained by regional endowments of the characteristics of labour forces and firms. To decompose differences in averages and quantiles along the wage distribution we use the standard Oaxaca (1973) and Blinder (1973) methodology and the extension proposed by Fortin et al. (2011) based on the use of the recentered influence function, respectively. Unlike related techniques (i.e., Juhn, Murphy and Pierce, 1993; Machado and Mata, 2005), the Fortin et al. (2011) extension provides

detailed evidence on the effect of individual explanatory variables that is not path-dependent (for details, see Fortin et al., 2011). Second, we employ the methodology suggested by Haisken-DeNew and Schmidt (1997), which rests upon the estimation of wage equations by restricted least squares and provides accurate estimations of both the magnitude of the whole set of interregional wage differentials net of composition effects and of their dispersion. One of the novelties of the use of this latter technique is that, aside from estimating wage equations for average wages as usual, they are also carried out using the unconditional quantile estimation technique proposed by Firpo et al. (2009) based on the recentred influence function, which provides estimations for wage quantiles along the unconditional wage distribution.

3.2. Decomposition of wage differences by region: The Fortin-Lemieux-Firpo methodology

To quantify the contribution of regional endowments of characteristics of labour forces and firms to interregional differentials in raw wages, we apply both the traditional Oaxaca-Blinder decomposition and the extension suggested by Fortin et al. (2011) based on the use of the recentred influence function and the estimation of unconditional quantile regressions (Firpo et al., 2009).

The Oaxaca-Blinder decomposition is formulated to decompose mean differences in wages between two groups after the estimation of a semi-logarithmic wage equation, as:

$$w_{ir} = X_{ir}\beta_r + \varepsilon_{ir} \quad (1)$$

wherein w_{ir} denotes the log of hourly wage of individual i in region r ; X_{ir} is a vector of controls including characteristics of individuals and their jobs and firms; β_r is a vector of returns to observed characteristics in region r (including an intercept); and ε_{ir} is a stochastic error term.

To decompose mean differences in wages between region r and the national average, after having estimated a non-discriminatory reference wage structure with the pool of the two geographical references involved in the comparison,⁴ based on the properties of the ordinary least square estimator, the difference in average wages between the region and the whole country may be broken down as follows:

$$\begin{aligned} \hat{\Delta}_O^{average} &= (\bar{w}_r - \bar{w}_S) = (\bar{X}_r - \bar{X}_S)\hat{\beta}^* + \left\{ \bar{X}_r(\hat{\beta}_S - \hat{\beta}^*) + \bar{X}_S(\hat{\beta}^* - \hat{\beta}_r) \right\} \\ &= \hat{\Delta}_X^{average} + \hat{\Delta}_S^{average} \end{aligned} \quad (2)$$

wherein \bar{w}_r and \bar{w}_S are the average wages of the region r and the Spain's whole economy; \bar{X}_r and \bar{X}_S are the average observed characteristics of individuals and firms of region r and the whole country (they comprise gender, age, education, nationality, tenure, type of contract, full- or

⁴ Thus, we follow Oaxaca and Ramson (1994) and Neumark's (1988) recommendation to use as the reference wage which corresponds to the pool of individuals of both groups. Moreover, a dummy variable relating to the group belonging to each observation is included in the estimation; failure to include a dummy variable could lead to bias in the breakdown, such as overvaluation of the characteristics component and the corresponding underestimation of the returns component caused by the omission of specific intercepts for each group (Elder et al., 2010).

part-time, supervisory tasks, occupation, sector, size, type of collective agreement, type of control, type of market, proportion of women and immigrants in the firm, the proportion of workers with fixed-term and with part-time contracts, proportion of workers employed in unskilled and skilled occupations in the firm, and proportion of workers with primary and tertiary education in the firm); and $\hat{\beta}_r$, $\hat{\beta}_s$ and $\hat{\beta}^*$ are the estimated coefficients following regression of wages on the set of explanatory variables for the region, the country, and the pool of both geographical references, respectively. The term $\hat{\Delta}_X^{average}$ is the composition effect, reflecting the effect on the average raw wage differential between region r and the whole country arising from differences in characteristics, whereas the term $\hat{\Delta}_S^{average}$ is the wage structure effect, which corresponds to differences in the wage structure.

The Fortin-Lemieux-Firpo methodology is an extension of the standard Oaxaca-Blinder decomposition that provides detailed decompositions of differences in distributional statistics such as the quantiles. The technique is based on the estimation of a regression in which the independent variable (the wage) is substituted by a transformation of the same, the *recentred influence function* (RIF). The influence function measures the effect on distributional statistics of small changes in the underlying distribution. Thus, for a given distributional statistic of the distribution F_W , $v(F)$, this function measures the importance of each observation in shaping the value of the statistic. Fortin, Lemieux, and Firpo (2011) suggest using a recentred version of the influence function adding the statistic of interest, $RIF(W)=v(F)+IF(W)$, since its expected value is the actual statistic $v(F)$ (insofar as the expectation of the function of influence with respect to distribution of W is, by definition, zero).

In the case of the quantiles q_τ of the unconditional marginal distribution F_W , the recentred function of influence, $RIF(w, q_\tau)$, is defined as follows:

$$RIF(w / q_\tau) = q_\tau + \frac{\tau - l\{W < q_\tau\}}{f_W(q_\tau)} \quad (3)$$

where $l\{\}$ is an indicator function and f_W is the function of density of the marginal distribution of w evaluated in q_τ . The RIF function may be computed empirically in the case of the quantiles by means of a local inversion following calculation of the dummy variable $l\{w < q_\tau\}$ (which specifies whether the value w is higher or lower than q_τ), the estimation of the quantile of the sample q_τ , and the estimation by means of kernel density functions of the corresponding density function f_W evaluated in q_τ .

Following the calculation of the RIF function for the quantile, a value is provided for the transformed variable for each observation of the sample. Insofar as the effect of the change in

distribution of an explanatory variable in the quantile may be expressed *ceteris paribus*, as the average partial effect of that variable in the conditional expectation on its RIF function, and assuming that the conditioned expectation of the RIF function may be modelled as a linear function of the explanatory variables, these values may be used for estimation by ordinary least squares of a regression of the RIF variable in a vector of explanatory variables. The estimated coefficients may be interpreted as the partial effect of an increase in the average value of an explanatory variable in the distribution quantile (Firpo et al., 2009), so that subsequently a standard Oaxaca-Blinder decomposition, as expressed in (2), could be developed for the quantiles of the wage distribution based on the regression results.

However, that decomposition would yield consistent results only if the true conditional expectation of the RIF function could be modelled as a linear function of the explanatory variables, implying that decomposition results based on linear regressions may be biased (Barsky et al., 2002). For that reason, Fortin et al. (2011) recommend a two-step procedure to carry out the decomposition. The first step consists of following the Di Nardo et al. (1996) reweighting procedure to account for potential non-linearities in the true conditional expectation of the RIF function.⁵ This reweighting procedure generates counterfactual observations that result if individuals in the whole country had the same distribution of observable characteristics as individuals in region r , and if it is based on the weights estimated via a probit model on the probability of being observed in region r .⁶ Having estimated the RIF regressions for workers in region r , the whole country, and the counterfactual wage distribution on the reweighted sample, in a second step a Oaxaca-Blinder-type decomposition analysis can be performed on the reweighted data for any unconditional quantile (τ) of the wage distribution:

$$\begin{aligned}\hat{\Delta}_O^\tau &= (\bar{X}_r \hat{\beta}_{\tau,r} - \bar{X}_S^C \hat{\beta}_{\tau,S}^C) + (\bar{X}_S^C \hat{\beta}_{\tau,r}^C - \bar{X}_S \hat{\beta}_{\tau,S}) \\ &= \hat{\Delta}_S^\tau + \hat{\Delta}_X^\tau\end{aligned}\quad (4)$$

Where superscript C stands for the reweighted sample estimates; \bar{X}_r and \bar{X}_S are the covariates mean in region r and the whole country; $\hat{\Delta}_S^\tau$ is the wage structure effect; and $\hat{\Delta}_X^\tau$ is the composition effect.

The wage structure effect can be further decomposed as:

$$\begin{aligned}\hat{\Delta}_S^\tau &= \bar{X}_r (\hat{\beta}_{\tau,r} - \hat{\beta}_{\tau,S}^C) + (\bar{X}_r - \bar{X}_S^C) \hat{\beta}_{\tau,S} \\ &= \hat{\Delta}_{S,p}^\tau + \hat{\Delta}_{S,e}^\tau\end{aligned}\quad (5)$$

⁵ Following Barsky et al. (2002), who suggest that these non-linearities could exist even in the case of the estimation of wage equations via ordinary least squares, the Di Nardo et al. (1996) reweighting procedure has also been applied in the empirical analysis for the decomposition of average wages with the standard Oaxaca-Blinder decomposition.

⁶ In estimating the probit the same covariates as in equation (2) have been employed.

where $\hat{\Delta}_{s,p}^\tau$ is the pure structure effect, which estimates the part of the wage differential explained by differences in the returns to observed characteristics at quantile τ and results from the difference between $\hat{\beta}_{\tau,r}$ and $\hat{\beta}_{\tau,s}^C$, and $\hat{\Delta}_{s,e}^\tau$ is the reweighting error, reflecting the fact that the reweighted sample average \bar{X}_s^C may be different from \bar{X}_r .

In a similar way, the composition effect can be expressed as:

$$\begin{aligned}\hat{\Delta}_X^\tau &= (\bar{X}_s^C - \bar{X}_r) \hat{\beta}_{\tau,s} + \bar{X}_s^C (\hat{\beta}_{\tau,s}^C - \hat{\beta}_{\tau,s}) \\ &= \hat{\Delta}_{X,p}^\tau + \hat{\Delta}_{X,e}^\tau\end{aligned}\tag{6}$$

where $\hat{\Delta}_{X,p}^\tau$ is the pure composition effect, which estimates the part of the wage differential explained by differences in the observed characteristics at quantile τ , and $\hat{\Delta}_{X,e}^\tau$ is the specification error, which should be zero in cases where the model is linear.⁷

3.2. The estimation of interregional wage differentials: The Haisken-DeNew and Schmidt technique

The additional methodology employed to quantify interregional wage differentials follows the procedure suggested by Haisken-DeNew and Schmidt (1997). This technique provides both an estimation of the whole set of specific wage differentials net of composition effects and an accurate calculation of the standard deviation of the estimated wage differentials. Note that when the log of the gross hourly wage is used as an exogenous variable in the estimation with ordinary least squares of the subsequent wage equation, as is typical in studies using this technique, the technique offers a quantification of interregional differentials in average wages relative to the national average and their dispersion. A novelty of using this methodology is that using the RIF functions of quantiles as dependent variables in the estimation with ordinary least squares of wage equations allows us to obtain unconditional quantile estimations (for more details, see Firpo et al., 2009). Similar evidence is obtained with respect to interregional wage differences along the wage distribution.

The Haisken-DeNew technique rests on the estimation obtained by restricted least squares of a wage equation:

$$w_{ir} = \mu + X_i \beta + Z_r \varphi + \varepsilon_{ir}\tag{7}$$

where w_{ir} denotes the log of the gross hourly wage (or, alternatively, the RIF function of the quantile τ) of worker i in region r ; X_i stands for a vector of controls (controls are the same used in the rest of the analysis); Z_r includes a set of mutually exclusive region dummies that cover all regions; μ is the constant; β and φ are vectors of parameters to be estimated; and ε_{ir} is a random disturbance term.

⁷ To test for the statistical significance of the different elements of both the composition and wage structure effects, standard errors have been estimated by bootstrapping considering 100 replications.

Since the cross-product matrix of regressors of equation (7) is not of full rank, the subsequent linear constraint is imposed: $\sum_r n_r \varphi_r = 0$ (where n_r is the employment share in region r), which allows model estimation. A summary statistic of the overall variability of regional wages is the employment-weighted and adjusted standard deviation of estimated region wage differentials:

$$SD(\varphi) = \sqrt{\text{var}(\varphi_r) - \sum_r s_r^2 / K + \sum_i \sum_r s_{ir} / K^2} \quad (8)$$

where $\text{var}(\varphi_r)$ is the variance of the estimated region coefficients; s_r^2 and s_{ir} are, respectively, the square of the standard error of the region coefficients and the product of the standard errors for regions i and r ; and K is the number of regions. The last two terms on the right-hand side of equation (8) correct for the fact that interregional wage differences are estimated with a sampling error that would otherwise lead to an overestimation of the standard deviation of wage differentials.

4. Data

The data used in this research come from the *Encuesta de Estructura Salarial* (Survey of Earnings Structure; hereafter EES), the sample for Spain of the European Structure of Earnings Survey, corresponding to 2006, 2010, and 2014. The EES is conducted every four years, providing independent cross-sectional data, currently available in five waves (1995, 2002, 2006, 2010, and 2014) whose information has increased over time in terms of variables and coverage; the last waves cover most sectors of the economy and firms of any size. We have considered the three last waves, as they contain more complete information and coverage of Spain's economy.

One of the main features of the EES is that it contains matched employer-employee microdata, as its design corresponds to a two-stage sampling of employees holding a job in workplaces registered in the social security system, and includes observations for various employees in each establishment. It is also noteworthy that the EES contains representative, disaggregated information at the regional level, serving as the reference the Spanish 17 autonomous communities/regions, equivalent to NUTS 2 units. As a consequence, regional analysis can be carried out using information about the region in which the workplace is located.

The two-stage stratified sampling method applied in the EES guarantees that the samples of employees per establishment are representative of the entire population of workers in each workplace. Thus, the first-stage units (workplaces registered in the social security system) are classified according to their economic activity, with each category stratified by region and size range (8 ranges). Stratum sample sizes are then obtained within this stratification with a maximum admissible error of 5%, being the survey exhaustive for workplaces with more than 499 workers. Second-stage units (workers) are selected among those working during the entire reference month (October), and sampling depends on the size of the firm, being exhaustive for micro-firms (i.e.,

those with fewer than 10 workers), up to 25 employees at bigger firms (the average observations per firm in the sample is around 15).

The dependent variable in our estimations is the gross hourly wage for October—the month that defines the survey population—divided by the number of hours worked that month. The independent variables gather rich information regarding both workers and their jobs and workplace characteristics. Worker characteristics variables include gender, nationality (natives vs. immigrants), education level (primary, secondary or higher education), and age (less than 30, 30–45, and more than 45 years old). Job characteristics variables include occupation (nine categories for major occupational groups), years of tenure in the current job and its square, type of contract (permanent or fixed-term), full- or part-time, and the eventual performance of supervisory tasks. Finally, firm characteristic variables include sector (twelve categories), size (six strata), type of collective agreement (firm agreement, national sectoral agreement, or subnational sectoral agreement), and a set of variables regarding the composition of the labour force in the workplace (proportion of women and immigrants in the firm, proportion of workers with fixed-term contracts and part-time jobs, proportion of workers performing skilled and unskilled occupations, and proportion of workers holding primary or tertiary education) as proxies of the quality of the labour force and, hence, its productivity (see Card and De la Rica, 2006).

In conducting the empirical analysis, certain individuals are excluded, namely, those under the age of 16 or over the age of 65, those with hourly wages of more than 200 euros and those living in the autonomous cities of Ceuta and Melilla. In the same vein, in order to use a homogeneous sectoral coverage for the three last waves, observations corresponding to section O of NACE-2009 (Public administration and defence, compulsory social security) have been removed from the 2010 and 2014 waves so that the analysis corresponds to the private sector. The final samples are formed by 139,989 employees in 2006, 164,266 in 2010, and 149,009 in 2014. Regional samples are ample: they range between 2,495 and 21,638 employees in 2006, between 2,502 and 29,830 in 2010, and between 2,520 and 28,402 in 2014. The descriptive statistics of the samples are shown in Tables A.1 to A.3 in the Appendix.

Results of estimating wage equations may be influenced by selection bias induced by two potential factors: unobserved differences between employees and non-participants in the labour market and between migrants and non-migrants, and spatially related factors correlated with wages. In our research, it is impossible to control for the potential selection bias; the dataset does not include information about unemployed people and migrants. Yet, following Galego and Pereira (2014), it is plausible that the results in this kind of analysis are not greatly affected by selectivity for different reasons. First, because the patterns of labour participation are similar across Spain's regions (e.g., in 2014 the average participation rate in Spain was 59.5% of the total labour force with a 0.052 coefficient of variation of the regional participation rates), which

precludes the existence of significantly different regional labour participation decisions by individuals. Second, because internal migration in Spain is very low (International Monetary Fund, 2015 and Bover and Velilla, 2005), which rules the plausibility that the evidence might be significantly affected by migration. Finally, given that wage equations include controls for occupations, which may capture unobserved ability components, the analysis could partially correct for possible spatial selection biases (Duranton and Monastiriotis, 2002).

5. Results

5.1. Descriptive evidence

Table 1 shows the values of average hourly wages of the Spanish regions in the years examined (2006, 2010, and 2014).⁸ In the left panel, wages are expressed in euros, while in the right panel they are deflated by regional purchasing power parities.⁹ The corresponding regional purchasing power parities are shown in Table A.4 of the Appendix. In the latter information, it is observed that there are significant differences in price levels across regions. In certain regions, prices are significantly higher than the regional average (in extreme cases, Navarre and Madrid are around 10% and 15%, respectively), and in others wages are significantly lower (around 15% and 20% in the Canary Islands and Extremadura). Regional differences in price levels are, in turn, remarkably persistent over time (correlations between regional values for different years are between 0.75 and 0.88 and are always statistically significant at 1%), suggesting the presence of remarkable regional homogeneity in inflation patterns.

The information in Table 1 shows the presence of very significant differences in raw average regional hourly wages, which are generally mitigated when regional purchasing power parities are considered. Thus, regional wages range between 23% above the national average and 28% below,¹⁰ they show differences between the maximum and minimum values of around 50% in 2006 and 2010 and 72% in 2014, and display relatively high values of different inequality measures (the coefficient of variation and the Gini index are between 0.11 and 0.12 and 0.05 and 0.06, respectively). However, when regional purchasing power parities are considered, the differences are markedly reduced (with wages varying between 14% above and 16% below the

⁸ Throughout the empirical analysis the sample weights provided in the ESS are used.

⁹ Regional purchasing power parities are derived from Costa et al. (2015) and originally correspond to 2012. In particular, the PPP used in this study correspond to those obtained by estimating microeconomic models for product prices using household level data on income, household composition, and individual characteristics from the Household Budget Surveys for the period 2009-2012. To calculate the values for 2006, 2010 and 2014 respectively, the change in the value of the Consumer Price Indexes (CPI) of each region between each year and 2012 has been applied (measured in each case from the average of all the months of the year), normalized with respect to the national average. Note that an alternative estimation of regional purchasing power parities for Spain based on the *Encuesta de Precios Regionales* (Regional Price Survey) exists, and it has been used in previous analyses on the topic in Spain (i.e., Simón et al., 2006 and Motellón et al., 2011). Yet, it presents relevant shortcomings, given that it was conducted in 1989 and the prices of each region were originally approximated from those of the capital city (more details can be found in Lorente, 1992).

¹⁰ These differences are apparently bigger than those found in Pereira and Galego (2014) for Portugal, where regional differentials between Lisbon and the other Portuguese regions range from 20% to 30%.

national average, differences between the regional maximum and minimum values between 20% and 31%, and inequality measures that are systematically halved). One point to be emphasized is that although there is some correspondence between regional wages depending on whether regional differences in prices are controlled (Figure A.1 of the appendix), the correspondence is relatively weak (the coefficients of correlation exhibit values around 0.55 in 2006 and 2014 and 0.35 in 2010 and are statistically significant only in the first two cases, at 5%). This is evident, for example, in high-wage regions such as Catalonia or Madrid where wages deflated by regional price levels are around the national average; conversely, in certain low-wage regions such as Castilla-La Mancha, Castilla y León, or Asturias, wages corrected by differences in purchasing parity are among the highest in the country. To the extent that this evidence reveals that the regional wage structure presents significant alterations in both the dispersion of the differentials and in regional wage ordering when controlling for regional price level differences, the empirical analysis in the research systematically accounts for regional wages controlling for regional purchasing power parities.

Table 2 shows raw regional wages deflated by regional price differences for each of the considered years at different points in the distribution of wages (10th percentile, median, and 90th percentile). This information reveals that there are significant regional wage differences across the wage structure and that their dispersion is relatively similar in the left and central parts of the distribution (although slightly lower in the centre). Regional wage differences tend to be larger in the right part (e.g., the Gini index in the 10th percentile, the median, and the 90th percentile of the wage distribution in 2014 is 0.037, 0.033, and 0.045). Moreover, although there is a certain correspondence between regional wage differences observed in the left and central parts of the distribution, where statistically significant correlations are observed (Table A.5 in the appendix), it is relatively weak in the rest of the wage distribution, particularly as regards to the parts of the distribution that are most remote from each other. These findings underline the appropriateness of carrying out an analysis of the origin of the regional wage differences throughout the wage distribution.

In turn, Tables A.1 to A.3 in the Appendix include the descriptive statistics of the explanatory variables in each year (due to space constraints, the information corresponds to the average of the variables). In general, there are no significant regional differences in labour force characteristics such as the relative presence of women or the age structure. However, there are notable differences in certain aspects, such as the relative presence of immigrants (with proportions of employees that, for example, in 2014 range from 2.7% in Galicia to 12.7% in the Balearic Islands) and of individuals with a university education (with a minimum in 2014 of 14.8%

in the Balearic Islands and a maximum above 40% in Madrid and the Basque Country).¹¹ Similarly, there are significant differences in the characteristics of jobs and firms, which are related in turn to the particularities of the productive structure in each region. Thus, in high-wage regions such as Madrid and the Basque Country there are occupational structures with a higher presence of highly-skilled jobs (directors and managers, technical and scientific professionals, and technicians and associate professionals); sectoral structures associated with high wages (like manufacturing in the case of the Basque Country); a greater presence of firms with their own collective agreements and more qualified labour forces inside firms (in Madrid there is also a lower incidence of temporary labour and a much greater presence of larger companies). On the contrary, in low-wage regions (such as Extremadura), there are higher incidences of temporary labour; occupational structures with fewer highly-skilled jobs; sectoral structures associated with low wages; greater relative presence of companies of a relatively smaller size and without their own collective agreements; and less qualified workers employed by firms.

5.2. Decomposition of inter-regional wage differences: Fortin et al. (2011) methodology

Figure 1 and Table 3 show the results of the decomposition of regional differences in average wages in the period examined. In order to make a homogeneous comparison for all regions, in all cases the reference in the comparison is Spain's average wage. A specification of the wage equation is used, which includes a broad set of explanatory variables grouped into socio-demographic characteristics of individuals (gender, nationality, age, and education) and firm characteristics (job and workplace attributes such as tenure, type of contract, full- or part-time, supervisory tasks, occupation, sector, size, type of collective agreement, and several characteristics of the workplace's workforce comprising the proportion of women and immigrants in the firm, the proportions of workers with fixed-term and with part-time contracts, the proportion of workers in unskilled and skilled occupations, and the proportion of workers with primary and tertiary degrees). As noted in the methodology section, the results of the decomposition are calculated taking into account the possible presence of errors in the estimation of the components of both characteristics and returns. As a consequence, the difference in the average wage of each region with respect to the national average is decomposed according to the four components that appear in equations (5) and (6): the "pure" component of characteristics (divided into the effect of individual characteristics and those of jobs and companies, respectively); the error term estimated in the characteristic component; the "pure" returns component; and the error term estimated in the returns component.

The evidence obtained using the decomposition technique shows that a significant part of regional wage deviations from the national average is due to the "pure" effect of differences in

¹¹ Specific analyses on the influence of these factors on wages in Spain can be found in Simón et al. (2008 and 2017) and Simón (2010 and 2012).

observed characteristics. However, the results of the detailed decomposition show that, as expected, this is due in particular to regional specificities in terms of productive structures and, to a much lesser extent, differences in labour forces (e.g., the characteristics of jobs and firms were related *ceteris paribus* with wages 7% higher than the national average in Madrid and Basque Country and between 7% and 8% lower in Extremadura and Asturias in 2006, while in all four cases the particularities of the regional labour forces had a negligible effect on wages in the regions). In the same vein, the term that includes the "pure" effect of the returns component also generally presents an outstanding explanatory capacity (with values associated with wages around 10% lower in Madrid and 10% higher for several regions depending on the year). This result suggests that in the Spanish labour market there are significant pure regional salary differences, net of effects of composition. These unexplained differences are also strongly persistent over time, with a pattern that is generally very similar for all years. Finally, it should also be noted that the error terms estimated in the components of characteristics and returns tend to be very small in all cases, and therefore have a negligible effect in general, implying that the "pure" components of characteristics and returns explain almost all regional wage differences observed in practice.

Similarly, Figures 2 to 4 and Tables 4 to 6 present the results of the decomposition between the wages of each region and those of Spain at different points in the wage distribution (the 10th percentile, the median, and the 90th percentile). Thus, in the lower part of the wage distribution, wage differences associated with composition effects are generally very small; the bulk of wage differences are due to the unexplained component (the "pure" component of returns). On the contrary, in the central part of the distribution, and especially in the upper part, the "pure" effects of the composition are relevant, again associated with the differences in job and firm characteristics, and not so much to those of the labour forces (note that the estimated error terms in the components of characteristics and returns are again generally very small). This explains why, despite the fact that descriptive evidence suggests that wages observed without controlling for composition effects are weakly related to the most distant parts of the wage distribution (Table 2), the pattern of unexplained components (which reflect pure regional wage differences) has in practice strong similarities throughout the distribution. Overall, this evidence suggests that regional wage differentials net of composition effects have a relatively similar profile across the wage distribution and over time.

5.3. Estimation of inter-regional wage differences: Haisken-DeNew and Schmidt (1997) methodology

Table 7 and Figure 5 contain the results of estimating wage differentials for each region relative to the national average using the Haisken-DeNew and Schmidt (1997) technique. Figure 5 shows the results of the estimation for all the deciles of the wage distribution, Table 1 presents the results for average wages and for certain deciles (first, fifth, and ninth). At the bottom of Table 1 is

the employment-weighted adjusted standard deviation, which, as indicated in the methodology section, is an appropriate measure of the dispersion of regional fixed effects. Note that in addition to allowing for an appropriate calculation of a dispersion measure, this technique allows the estimation of regional fixed effects expressed against the national average in line with the analysis in the previous subsection.

Thus, starting with the analysis of average wages (Table 7), the results confirm the existence of notable wage differences between regions net of compositional effects. Thus, regional fixed effects are, depending on the year, from 11% to 13% above the national average (Asturias and Castilla-La Mancha) to 13% to 14% below (Madrid). This means that observationally similar workers working in observationally similar firms earn wages well above or below the Spanish average. Such fixed effects exhibit a relatively high dispersion, which is also very stable over time. Thus, irrespective of the year, the adjusted standard deviation of the estimated regional fixed effects is 6% to 7%, and the differences between the regions with observed maximum and minimum wages are around 25%.

Similarly, the results of the estimation of regional fixed effects along the wage distribution confirm that, with a few exceptions, regional wage differences tend to coincide across all parts of the distribution. The correlation coefficients of the estimated regional effects are, in fact, consistently positive and statistically significant at conventional levels when comparing any point in the distribution; see Table A.6 in the Appendix. This implies that in regions where wages are above or below the national average, this applies to the whole wage distribution (Figure 5). It is also observed that although the degree of dispersion of regional differences is relatively similar across the entire wage distribution, in recent years the dispersion is somewhat more noticeable in the lower part of the wage distribution (e.g., in 2014, the adjusted standard deviation of regional fixed effects takes a value of 8.5% in the 10th percentile and around 7% in both the median and the 90th percentile; in the same vein, in the first percentile the maximum regional wage differences reach 33%, which compares to lower values in the rest of the distribution — see Table 7).

6. Conclusions

This article examines wage differences among the Spanish regions between 2006 and 2014. The case of analysis of Spain is particularly interesting, because the country's labour market has important wage differences between regions in whose origin labour institutional elements related to collective bargaining play a key role. During the period analysed, the Spanish labour market saw profound changes, both cyclical and regulatory, which permits us to examine the extent to which differences between regions persist over time.

One of the main novelties of the research is that, unlike previous studies, we control for differences in regional purchasing power parities. This is noteworthy, as in practice regional

differences in price levels in Spain are very significant and persistent over time (in spite of the potential asymmetric pass-through into regional real wages of recent wage moderation policies), and controlling for them leads to significant alterations in the structure of regional wage differentials. Consequently, controlling for regional differences in prices proves to be particularly relevant and allows us to provide novel evidence on the topic, complementary to that obtained in previous studies.

The analysis of the origin of regional wage differences covers the whole wage distribution, in line with the most recent studies on this topic. This is especially relevant in the Spanish context, because the wage moderation policies adopted in Spain during the crisis could have an asymmetric effect across the wage distribution across regions. The analysis is developed on the basis of matched employer-employee microdata with a wealth of information about employees and their jobs and firms. The use of these microdata, combined with the econometric technique proposed by Fortin, Lemieux and Firpo (2001), allows us to examine the importance of the composition effects associated with the characteristics of labour forces and, alternatively, the relevance of productive structures in the generation of wage differences between regions. Moreover, the methodology suggested by Haisken-DeNew and Schmidt (1997), which provides accurate estimations of both the magnitude of the whole set of interregional wage differentials net of composition effects and of their dispersion, is also used, adapted in a novel way for the analysis of wage differentials along the unconditional wage distribution.

The evidence obtained shows that controlling for regional purchasing power parities is important in the estimation of regional wage differences, given that it alters their structure significantly, reducing their dispersion. Furthermore, although a portion of the very significant regional wage differences observed in Spain are explained by regional differences in labour forces and, especially, productive structures, regional differences net of composition effects remain after controlling for a rich set of individual and firm characteristics. The unexplained part of regional differences is similar throughout the wage distribution and strongly persistent over time, despite the intense changes in the economic cycle and labour regulations that occurred in Spain during the period examined. The dispersion of regional wage differentials is rather stable over time and very similar throughout the wage distribution, although slightly higher in the lower part of the distribution.

Evidence that in Spain there are significant pure regional wage differences net of composition effects that are very similar throughout the wage distribution and that present a strong temporal persistence in different labour scenarios in both cyclical and regulatory terms suggests the presence of common mechanisms in the generation of pure regional wage differentials that affect the whole labour force and that are strongly persistent over time. In line with the results documented in previous studies, this evidence points to the key role of collective

bargaining in the generation of regional differences in Spain's labour market and, consequently, a potentially relevant role of non-competitive factors. This question sheds light on a little understood aspect of wage differences between regions: their origin. Thus, considering that wage differences do not appear to be due to compensatory factors (Simón et al., 2006 and Galego and Pereira, 2014) or to temporary disequilibrium situations, given the strong temporal persistence observed in several countries (for Portugal, see Pereira and Galego, 2011), the main hypotheses about their origin have usually focused on competitive factors related to sorting effects of workers and agglomeration economies that could increase productivity and wages (e.g., Pereira and Galego, 2014). The evidence obtained for the Spanish case suggests, on the contrary, that the specific institutional characteristics of the labour market, collective bargaining in particular, may play a key role, reinforcing the relevance of non-competitive factors. In any case, further research for other economies is required in order to provide a deeper and better understanding of the link between institutional labour characteristics and regional wage differentials.

References

- Agnello, L., Fazio, G., Sousa, R. M. (2016), National fiscal consolidations and regional inequality in Europe, *Cambridge Journal of Regions, Economy and Society*, 9 (1), pp. 59–80.
- Bande, R., Fernández, M. and Montuenga, V. (2008): “Regional unemployment in Spain: disparities, business cycle and wage setting”, *Labour Economics*, 15(5), 885-914.
- Banco de España (2016), *Annual report 2015*.
- Barsky, R.; Bound, J.; Charles, K. and Lupton, J. (2002): “Accounting for the black–white wealth gap: a nonparametric approach”, *Journal of the American Statistical Association*, 97, 663–673.
- Bentolila, S. and Jimeno, J.F. (1998): “Regional unemployment persistence (Spain, 1976-1994)”, *Labour Economics*, 5(1), 25-51.
- Blackaby, D.H. and Manning, D.N. (1990): The North-South Divide: Questions of Existence and Stability, 100 (401), 510-527.
- Blackaby, D.H. and Manning, D.N. (1995): Earnings, unemployment and Britain’s north-south divide: Real or imaginary?, *Oxford Bulletin of Economics and Statistics*, 57, 487-512.
- Blinder, A. S. (1973). Wage discrimination: reduced forms and structural estimates. *Journal of Human Resources*, Vol. 8, 436-55.
- Bover, O.; Velilla, P. (2005): “Migrations in Spain: Historical Background and Current Trends”, en K. Zimmermann (ed.) *European Migration. What Do We Know?*, ed. Oxford University Press.
- Card, D., de la Rica, S. (2006), "Firm-level contracting and the structure of wages in Spain." *ILR Review* 59 (4), pp. 573-592.
- Combes, P.-P., Duranton, G. and Gobillon, L. (2008): Spatial wage disparities: Sorting matters!, *Journal of Urban Economics*, 63, 723-742
- Costa, A.; García, H.; López, X.; Raymond, J.L. (2015): “Estimació de les paritats de poder adquisitiu per a les comunitats autònomes espanyoles”, Generalitat de Catalunya, Departament d’Economia i Coneixement, Monografia 17/2015.
- Cuadrado-Roura, J. R., Maroto, A. (2016), Unbalanced regional resilience to the economic crisis in Spain: a tale of specialisation and productivity, *Cambridge Journal of Regions, Economy and Society*, 9 (1), pp. 153–178.
- Decressin, J.; Espinoza, R. A.; Halikias, I.; Kumhof, M.; Leigh, D.; Loungani, P.; Medas, P. A.; Mursula, S.; Spilimbergo, A.; Xu, T. (2015), Wage Moderation in Crises: Policy Considerations and Applications to the Euro Area, Staff Discussion Notes No. 15/22.
- De la Fuente, A. (2002): “On the sources of convergence: A close look at the Spanish regions”, *European Economic Review*, 46, 569-599.
- De Groot, H., J. Poot and M.J. Smit (2009), ‘Agglomeration, innovation and regional development: theoretical perspectives and meta-analysis’, in R. Capello and P. Nijkamp (eds), *Handbook of regional growth and development theories*, Cheltenham: Edward Elgar, pp. 256–281.
- De Groot, H., Poot, J. and Smit, M. (2016): Which agglomeration externalities matter most and why?, *Journal of Economic Surveys*, 30-4, 756-782.
- Di Nardo, J., Fortin, N.M., & Lemieux, T. (1996). Labor market institutions and the distribution of wages, 1973-1992: A semi-parametric approach. *Econometrica*, 64 (5), 1011-1044.
- Dickey, H. (2007): Regional earnings inequality in Great Britain: Evidence from quantile regressions, *Journal of Regional Science*, 47, 775-806.
- Du Caju, P.; Gautier, E.; Momferatou, D.; Ward-Warmedinger, M. (2008): “Institutional features of wage bargaining in 23 European countries, the US and Japan”, ECB Working Paper No 974.
- Duranton, G.; Monastriotis, V. (2002): “Mind the gaps: the evolution of regional inequalities in the UK, 1982–1997”, *Journal of Regional Science*, 42(2), 219–256.
- Duranton, G. and Puga, D. (2004): Micro-foundations of urban agglomeration economies, in Henderson, J. and Thisse, J.-F. (eds.), *Handbook of Regional and Urban Economics*, Amsterdam: Elsevier, 2063-2117.
- Elder, T.E., Goddeeris, J.H., & Haider, S. J. (2010). Unexplained gaps and Oaxaca-Blinder decompositions. *Labour Economics*, 17(1), 284-290.
- European Commission (2016): *Country Report Spain 2016*.
- Fally, T., Paillacar, R. and Terra, C. (2010): Economic geography and wages in Brazil: Evidence from micro-data, *Journal of Development Economics*, 91, 155-168.
- Firpo, S.; Fortin, N., & Lemieux, T. (2009). Unconditional Quantile Regressions. *Econometrica*, 77(3), 953-973.
- Fortin, N.; Lemieux, T., & Firpo, S. (2011). Decomposition Methods in Economics. In D. Card and O. Ashenfelter (Eds.) *Handbook of Labor Economics*, Volume 4 (pp. 1-102). Elsevier.

- Galego, A.; Pereira, J. (2014): “Decomposition of regional wage differences along the wage distribution in Portugal: the importance of covariates”, *Environment and Planning A*, 46(10), 2514-2532.
- García, I. and Molina, J. (2002): Inter-regional wage differentials in Spain, *Applied Economic Letters*, 9, 209-215.
- Gibbons, S., Overman, H.G. and Pelkonen, P. (2010): Wage disparities in Britain: People or place?, SERC Discussion Paper n° 60, LSE.
- Groot, S. and de Groot, H. (2011): Wage inequality in the Netherlands: Evidence, trends and explanations, CPB Discussion paper n° 186.
- Groot, S.; de Groot, H. and Smit, M. (2014): Regional wage differences in the Netherlands: Micro evidence on agglomeration externalities, *Journal of Regional Science*, 54 (3), 503-523.
- Haisken-DeNew, J.P. and Schmidt, C (1997): “Interindustry and Interregion Differentials: Mechanics and Interpretation”, *Review of Economics and Statistics*, 79, pp. 516-521.
- Herrera-Idárraga, P., López-Bazo, E. and Motellón, E. (2016): Regional wage gaps, education and informality in an emerging country: The case of Colombia, *Journal of Spatial Economic Analysis*, 11 (4), 432-456.
- International Monetary Fund (2015): *Spain 2015 Article IV Consultation. Selected issues*.
- Juhn, C., Murphy, K., & Pierce, B. (1993). Wage inequality and the rise in returns to skill. *Journal of Political Economy*, 101, 410-442.
- Kim, K.S., Min, I. and Choi, Y.-S. (2015): Dynamic decomposition of regional wage differentials in Korea, *The Social Science Journal*, 52, 311-321.
- Lehmer, F. and Möller, J. (2010): Interrelations between the urban wage premium and firm-size wage differentials: A microdata cohort analysis for Germany, *Annals in Regional Science*, 45: 31-53.
- López-Bazo, E. and Motellón, E. (2012): Human capital and regional wage gaps, *Journal of Regional Studies*, 46 (10), 1347-1365.
- Lorente, J.R. (1992): “La dispersión geográfica de los salarios”, *Síntesis Mensual de Indicadores Económicos*, Ministerio de Economía y Hacienda.
- Machado, J. A., & Mata, J. (2005). Counterfactual decomposition of changes in wage distribution using quantile regression. *Journal of Applied Econometrics*, 20, 445-465.
- Melo, P.C., D.J. Graham and R.B. Noland (2009), ‘A meta-analysis of estimates of urban agglomeration externalities’, *Regional Science and Urban Economics*, vol. 39, pp. 332–342.
- Melly, B. (2005): Decomposition of differences in distribution using quantile regression, *Labour Economics*, 12, 577-590.
- Melly, B. (2006): Estimation of counterfactual distributions using quantiles regression, mimeo, University of St. Gallen, <http://www.alexandria.unisg.ch/Publikationen/22644> .
- Motellón, E.; Bazo, E.; Attar, M. (2011): “Regional heterogeneity in wage distributions: evidence from Spain”, *Journal of Regional Science*, 51(3), 558–584.
- Neumark, D. (1988). Employer’s discriminatory behaviour and the estimation of wage discrimination. *Journal of Human Resources*, 23, 279-295.
- Oaxaca, R. (1973). Male-female wage differentials in urban labour markets. *International Economic Review*, Vol. 14, pp. 693-709.
- Oaxaca, R., & Ramson, M. (1994). On discrimination and the decomposition of wage differentials. *Journal of Econometrics*, 61, 5-22.
- OECD (2005): How persistent are regional disparities in employment?, OECD Employment Outlook, OCDE, Paris.
- OECD (2014): “The 2012 Labour Market Reform in Spain: A Preliminary Assessment”, ed. OECD Publishing.
- OECD (2015): “Minimum wages after the crisis: Making them pay”, Directorate for Employment, Labour and Social Affairs, OECD.
- Pereira, J.; Galego, A. (2014): “Inter-regional wage differentials in Portugal: an analysis across the wage distribution”, *Regional Studies*, 48(9), 1529-1546.
- Pereira, J.; Galego, A. (2011): “Regional wage differentials in Portugal: static and dynamic approaches”, *Papers in Regional Science*, 90(3), 529–548.
- Plümper T. and Troeger, V. (2007): Efficient estimation of time-invariant and rarely changing variables in finite sample panel analyses with unit fixed effects, *Political Analysis*, 15, 124-139.
- Porter, M. (2003): The economic performance of regions, *Regional Studies*, 37, 549-578.
- Rusinek, M. and Torejow, I. (2014): The regional dimension of collective wage bargaining: The case of Belgium, *Journal of Regional Studies*, 48 (2), 301-317.
- Smith, J.P. and Welch, F.R. (1989): Black economic progress after Myrdal, *Journal of Economic Literature*, 27, 519-564.

- Simón, H., Ramos, R. and Sanromá, E. (2006): “Collective bargaining and regional wage differences in Spain: an empirical analysis”, *Applied Economics*, 38, 1749-1760.
- Simón, H., Sanromá, E. and Ramos, R. (2008): “Labour segregation and immigrant and native-born wage distributions in Spain: an analysis using matched employer-employee data”, *Spanish Economic Review*, Vol. 10 (2), pp. 135-168.
- Simón, H.; Sanromá, E.; Ramos, R. (2017): “Full- and part-time wage differences in Spain: An analysis along the wage distribution”, *International Journal of Manpower*, 38(3), pp. 449-469.
- Simón, H.; Russell, H. (2005): “Firms and the gender pay gap: A cross-national comparison”, *Pay Inequalities and Economic Performance Working Paper* 15.
- Simón, H. (2010): “International Differences in Wage Inequality: A New Glance with European Matched Employer-Employee Data”, *British Journal of Industrial Relations*, 48(2), págs. 310-346.
- Simón, H. (2012): “The gender gap in earnings: and international comparison with European matched employer-employee data”, *Applied Economics*, 44, 1985-1999.
- Vamvakidis, A. (2009): “Regional Wage Differentiation and Wage Bargaining Systems in the European Union”, *Financial Theory and Practice*, 33(1), 73-87.
- Vieira, J.A., Couto, J.P. and Tiago, M.T. (2006): Inter-Regional Wage Dispersion in Portugal, *Regional and Sectoral Economics Studies*, 6 (1).

Tables and Figures

Figure 1. Decomposition of inter-regional differences in average wages in Spain. 2006 (upper figure), 2010 (intermediate figure) and 2014 (lower figure). Oaxaca-Blinder methodology.



Figure 2. Decomposition of inter-regional wage differences in Spain. Percentile 10 of the wage distribution. 2006 (upper figure), 2010 (intermediate figure) and 2014 (lower figure). Fortin-Lemieux-Firpo methodology.



Figure 3. Decomposition of inter-regional wage differences in Spain. Percentile 50 of the wage distribution. 2006 (upper figure), 2010 (intermediate figure) and 2014 (lower figure). Fortin-Lemieux-Firpo methodology.

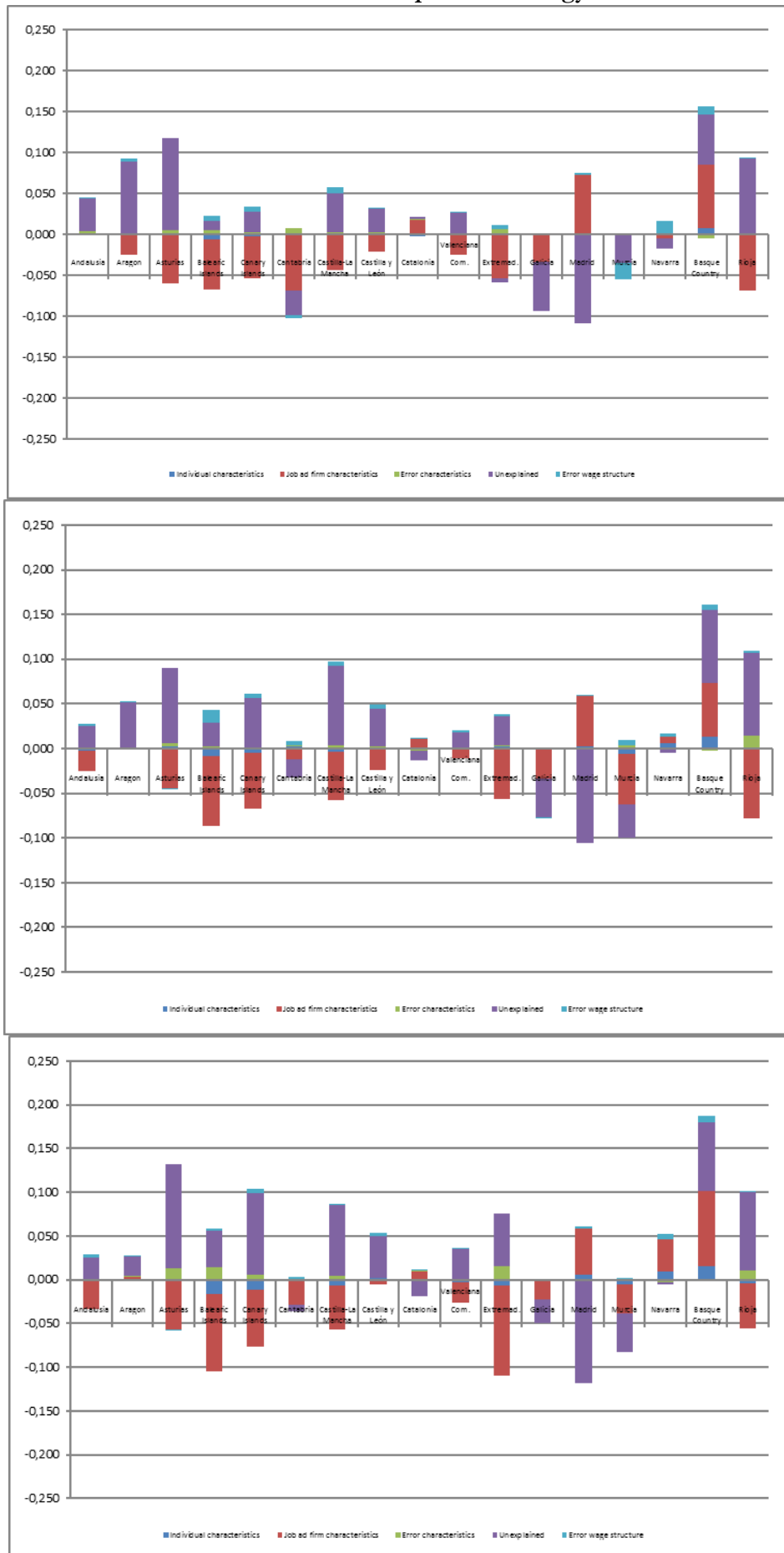


Figure 4. Decomposition of inter-regional wage differences in Spain. Percentile 90 of the wage distribution. 2006 (upper figure), 2010 (intermediate figure) and 2014 (lower figure). Fortin-Lemieux-Firpo methodology.

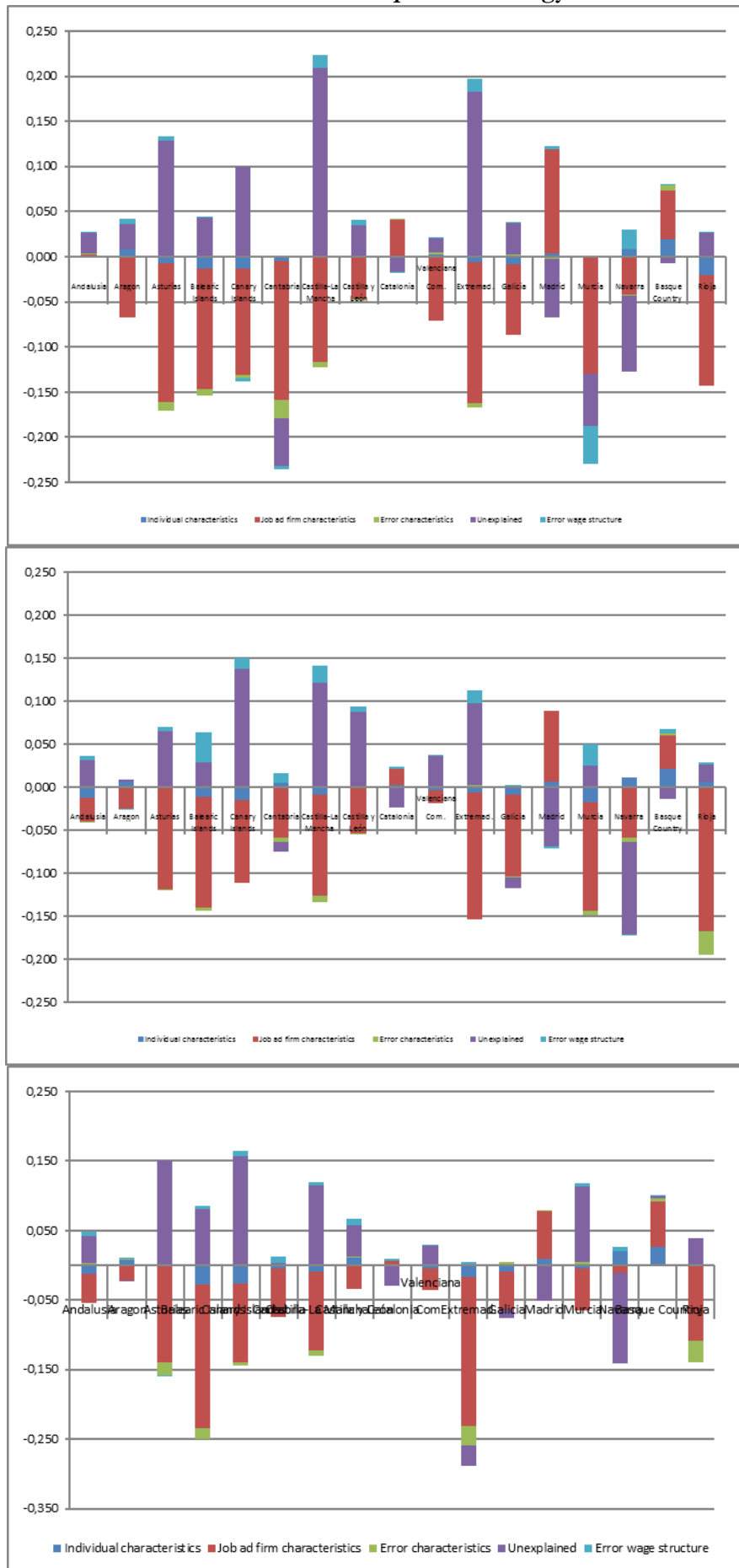


Figure 5. Inter-regional wage differences along the wage distribution in Spain.
 2006 (upper figure), 2010 (intermediate figure) and 2014 (lower figure).
 Haisken-DeNew and Schmidt methodology.

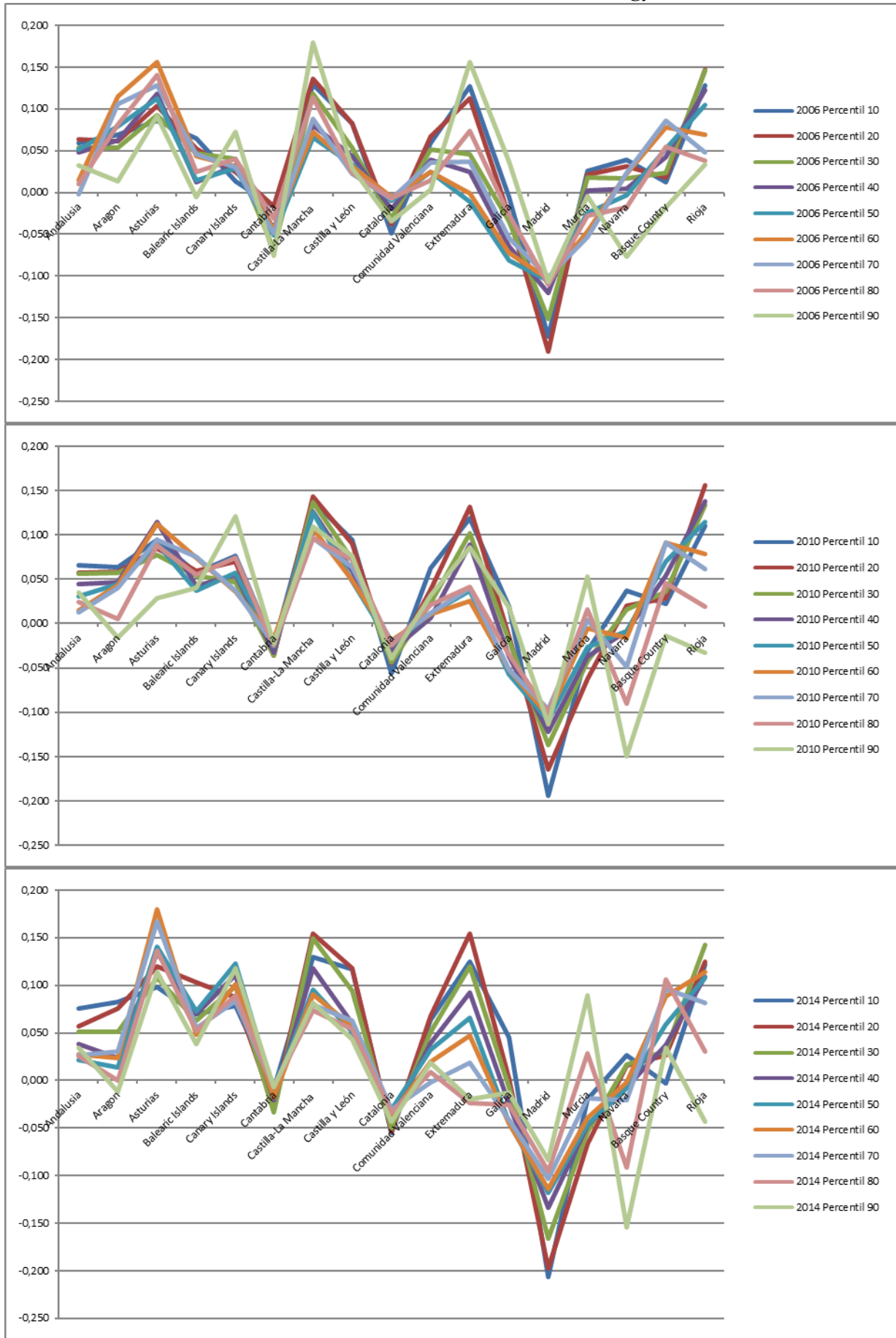


Table 1. Average hourly wages in Spanish regions.

	Without purchasing power parities			With purchasing power parities		
	2006	2010	2014	2006	2010	2014
Spain	9.36	10.62	10.95	9.36	10.62	10.95
Andalusia	8.66	9.85	10.26	9.29	10.60	11.09
Aragon	9.23	10.54	10.76	9.60	10.92	11.19
Asturias	8.26	9.47	9.99	9.41	10.79	11.39
Balearic Islands	8.74	10.12	9.99	8.78	10.20	10.06
Canary Islands	7.78	9.08	9.29	9.12	10.82	11.28
Cantabria	7.73	10.01	10.27	7.85	10.14	10.30
Castilla-La Mancha	8.44	9.35	9.48	9.99	11.09	11.17
Castilla y León	8.34	9.67	10.23	9.45	11.04	11.68
Catalonia	10.14	11.49	11.70	9.48	10.65	10.72
Comunidad Valenciana	8.61	10.06	10.28	9.23	10.81	11.08
Extremadura	7.41	8.40	7.87	9.19	10.45	9.85
Galicia	7.99	9.20	9.59	8.62	9.97	10.36
Madrid	10.91	11.86	12.23	9.52	10.34	10.70
Murcia	7.86	9.34	10.10	8.26	9.83	10.64
Navarra	10.19	11.10	11.85	9.13	10.05	10.77
Basque Country	11.08	12.72	13.52	10.32	11.79	12.50
Rioja	8.02	9.30	9.83	8.88	10.32	10.89
Coefficient of variation	0.129	0.112	0.125	0.065	0.047	0.058
Gini Index	0.067	0.058	0.063	0.034	0.025	0.031
Minimum	7.41	8.40	7.87	7.85	9.83	9.85
Maximum	11.08	12.72	13.52	10.32	11.79	12.50

Notes: Hourly wages are measured in euros with and without considering regional purchasing power parities.

Table 2. Hourly wages in Spanish regions along the wage distribution.

	2006			2010			2014		
	P10	P50	P90	P10	P50	P90	P10	P50	P90
Spain	4.87	7.53	15.95	5.60	8.64	17.78	5.86	9.02	18.27
Andalusia	5.16	7.68	15.32	5.95	8.66	17.71	6.23	8.99	18.18
Aragon	5.20	8.06	15.56	6.09	9.08	17.49	6.55	9.28	18.02
Asturias	5.34	7.97	15.36	6.34	9.03	16.90	6.65	9.71	18.10
Balearic Islands	5.05	7.19	14.30	5.80	8.27	16.41	6.22	8.60	15.51
Canary Islands	4.95	7.39	15.34	6.09	8.57	18.49	6.31	9.27	18.63
Cantabria	4.76	6.86	12.58	5.57	8.44	16.76	5.83	8.73	17.13
Castilla-La Mancha	5.69	7.64	17.66	6.54	8.97	17.91	6.75	9.29	18.05
Castilla y León	5.31	7.62	15.84	6.19	8.84	18.52	6.83	9.47	18.85
Catalonia	4.70	7.68	16.34	5.42	8.64	17.81	5.65	8.95	17.92
Comunidad Valenciana	5.23	7.55	15.12	5.95	8.71	18.14	6.30	9.11	18.16
Extremadura	5.46	7.18	16.41	6.43	8.46	17.06	6.42	8.72	13.65
Galicia	4.77	6.87	15.18	5.69	7.99	15.87	6.10	8.59	16.99
Madrid	4.38	7.29	16.87	4.97	8.25	18.09	5.21	8.52	18.77
Murcia	4.90	7.13	12.68	5.51	7.88	16.11	5.66	8.31	19.26
Navarra	5.24	7.52	14.48	5.98	8.75	15.15	6.17	9.46	16.30
Basque Country	5.25	8.76	17.18	6.18	10.13	18.78	6.46	10.87	20.20
Rioja	5.62	7.73	14.09	6.53	8.90	15.06	6.61	9.43	16.51
Coefficient of variation	0.067	0.062	0.092	0.071	0.059	0.067	0.070	0.066	0.088
Gini Index	0.036	0.032	0.050	0.039	0.030	0.037	0.037	0.033	0.045
Minimum	4.38	6.86	12.58	4.97	7.88	15.06	5.21	8.31	13.65
Maximum	5.69	8.76	17.66	6.54	10.13	18.78	6.83	10.87	20.20

Notes: Hourly wages are measured in euros controlling for regional purchasing power parities.

Table 3. Decomposition of inter-regional wage differences in average wages in Spain. Fortin-Lemieux-Firpo methodology.

	Andalusia	Aragon	Asturias	Balearic Isl	Canary Isl.	Cantabria	C-La Man.	C. y León	Catalonia	Com.Val.	Extremad.	Galicia	Madrid	Murcia	Navarra	Basque C.	Rioja
2006																	
Overall difference	0.040 (0.009)***	0.046 (0.006)***	0.031 (0.006)***	-0.039 (0.007)***	-0.019 (0.008)**	-0.128 (0.006)***	0.065 (0.006)***	0.022 (0.006)***	0.008 (0.006)	0.007 (0.007)	-0.007 (0.007)	-0.076 (0.006)***	-0.024 (0.007)***	-0.089 (0.005)***	-0.003 (0.006)	0.108 (0.006)***	0.003 (0.006)
Composition	0.000 (0.000)	-0.029 (0.001)***	-0.080 (0.002)***	-0.075 (0.002)***	-0.064 (0.001)***	-0.083 (0.002)***	-0.053 (0.001)***	-0.024 (0.001)***	0.017 (0.001)***	-0.031 (0.001)***	-0.070 (0.002)***	-0.044 (0.002)***	0.071 (0.002)***	0.000 (0.001)	-0.008 (0.002)***	0.072 (0.002)***	-0.077 (0.006)***
Individual characteristics	0.000 (0.000)	0.003 (0.000)***	-0.001 (0.001)**	-0.008 (0.001)***	-0.005 (0.001)***	-0.001 (0.001)***	0.001 (0.000)*	-0.000 (0.000)	-0.002 (0.000)***	0.001 (0.000)*	0.001 (0.001)	-0.003 (0.000)***	0.002 (0.001)***	0.000 (0.000)	0.003 (0.000)***	0.010 (0.001)***	-0.072 (0.006)***
Job and firm characteristics	0.002 (0.002)	-0.031 (0.001)***	-0.078 (0.002)***	-0.067 (0.002)***	-0.059 (0.001)***	-0.082 (0.002)***	-0.054 (0.001)***	-0.024 (0.001)***	0.019 (0.001)***	-0.031 (0.001)***	-0.071 (0.002)***	-0.041 (0.002)***	0.069 (0.002)***	0.000 (0.001)	-0.011 (0.002)***	0.062 (0.002)***	-0.004 (0.004)
Error characteristics	0.002 (0.002)	0.000 (0.003)	-0.000 (0.003)	-0.000 (0.003)	-0.000 (0.003)	-0.000 (0.003)	-0.000 (0.003)	0.000 (0.003)	0.000 (0.003)	0.000 (0.003)	0.001 (0.003)	0.000 (0.003)	0.001 (0.003)	0.000 (0.003)	0.001 (0.003)	0.002 (0.003)	0.001 (0.004)
Wage structure	0.039 (0.009)***	0.070 (0.004)***	0.109 (0.004)***	0.031 (0.006)***	0.041 (0.006)***	-0.042 (0.004)***	0.108 (0.005)***	0.043 (0.004)***	-0.009 (0.005)*	0.037 (0.006)***	0.056 (0.004)***	-0.033 (0.005)***	-0.098 (0.006)***	-0.077 (0.004)*	-0.012 (0.004)***	0.028 (0.004)***	0.078 (0.007)***
Error wage structure	0.001 (0.002)	0.005 (0.004)	0.002 (0.004)	0.005 (0.005)	0.004 (0.004)	-0.002 (0.005)	0.010 (0.004)**	0.003 (0.004)	-0.000 (0.003)	0.001 (0.003)	0.007 (0.005)	0.001 (0.004)	0.002 (0.003)	-0.012 (0.004)***	0.016 (0.006)***	0.007 (0.004)*	0.001 (0.003)
2010																	
Overall difference	0.011 (0.007)	0.040 (0.006)***	0.038 (0.006)***	-0.027 (0.007)***	0.015 (0.008)**	-0.034 (0.007)***	0.061 (0.006)***	0.049 (0.006)***	-0.005 (0.005)	0.023 (0.006)***	0.008 (0.007)	-0.058 (0.006)***	-0.047 (0.004)***	-0.079 (0.008)***	-0.019 (0.005)***	0.113 (0.006)***	0.008 (0.006)
Composition	-0.023 (0.002)***	-0.004 (0.001)***	-0.050 (0.002)***	-0.087 (0.002)***	-0.068 (0.001)***	-0.013 (0.001)***	-0.064 (0.001)***	-0.024 (0.001)***	0.009 (0.001)***	-0.011 (0.001)***	-0.066 (0.002)***	-0.043 (0.001)***	0.050 (0.001)***	-0.072 (0.001)***	0.002 (0.001)	0.063 (0.001)***	-0.083 (0.002)***
Individual characteristics	-0.004 (0.000)***	0.002 (0.000)***	0.003 (0.000)***	-0.009 (0.001)***	-0.007 (0.000)***	0.004 (0.000)***	-0.005 (0.000)***	0.001 (0.000)*	-0.000 (0.000)	-0.001 (0.000)***	0.001 (0.001)	-0.002 (0.000)***	0.003 (0.000)***	-0.008 (0.000)***	0.007 (0.000)***	0.014 (0.001)***	0.001 (0.001)
Job and firm characteristics	-0.019 (0.002)***	-0.006 (0.001)***	-0.053 (0.002)***	-0.077 (0.003)***	-0.060 (0.001)***	-0.017 (0.001)***	-0.059 (0.001)***	-0.025 (0.001)***	0.009 (0.001)***	-0.010 (0.001)***	-0.067 (0.002)***	-0.040 (0.001)***	0.047 (0.001)***	-0.063 (0.001)***	-0.006 (0.001)***	0.049 (0.001)***	-0.083 (0.002)***
Error characteristics	-0.000 (0.002)	0.000 (0.002)	-0.000 (0.002)	0.000 (0.003)	0.000 (0.002)	-0.000 (0.002)	-0.001 (0.002)	0.000 (0.002)	-0.000 (0.002)	0.000 (0.002)	0.000 (0.003)	0.000 (0.002)	0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.001 (0.003)
Wage structure	0.030 (0.006)***	0.043 (0.005)***	0.089 (0.005)***	0.042 (0.007)***	0.078 (0.007)***	-0.027 (0.004)***	0.116 (0.005)***	0.068 (0.005)***	-0.015 (0.004)***	0.033 (0.006)***	0.069 (0.005)***	-0.015 (0.005)***	-0.098 (0.004)***	-0.017 (0.006)***	-0.023 (0.004)***	0.044 (0.005)***	0.089 (0.004)***
Error wage structure	0.004 (0.003)	0.001 (0.004)	-0.000 (0.005)	0.018 (0.004)***	0.005 (0.004)	0.006 (0.006)	0.009 (0.004)**	0.004 (0.004)	0.001 (0.002)	0.002 (0.003)	0.006 (0.005)	-0.000 (0.003)	-0.000 (0.002)	-0.000 (0.005)**	0.002 (0.005)	0.005 (0.004)	0.003 (0.005)
2014																	
Overall difference	0.019 (0.007)***	0.039 (0.006)***	0.060 (0.007)***	-0.056 (0.008)***	0.033 (0.009)***	-0.049 (0.008)***	0.045 (0.006)***	0.075 (0.006)***	-0.021 (0.005)***	0.020 (0.007)***	-0.058 (0.007)***	-0.037 (0.006)***	-0.052 (0.005)***	-0.043 (0.008)***	0.009 (0.006)	0.140 (0.006)***	0.031 (0.006)***
Composition	-0.035 (0.001)***	-0.000 (0.001)	-0.063 (0.002)***	-0.117 (0.003)***	-0.083 (0.002)***	-0.032 (0.002)***	-0.065 (0.001)***	-0.006 (0.001)***	0.004 (0.001)***	-0.025 (0.001)***	-0.117 (0.002)***	-0.028 (0.001)***	0.051 (0.001)***	-0.041 (0.001)***	0.032 (0.002)***	0.089 (0.002)***	-0.060 (0.002)***
Individual characteristics	-0.003 (0.000)***	0.002 (0.000)***	-0.000 (0.001)	-0.020 (0.001)***	-0.015 (0.001)***	-0.002 (0.000)***	-0.007 (0.001)***	0.003 (0.000)***	-0.001 (0.000)***	-0.004 (0.000)***	-0.008 (0.001)***	-0.003 (0.000)***	0.007 (0.001)***	-0.005 (0.000)***	0.011 (0.000)***	0.018 (0.001)***	-0.004 (0.001)***
Job and firm characteristics	-0.032 (0.001)***	-0.003 (0.001)**	-0.063 (0.002)***	-0.097 (0.003)***	-0.068 (0.002)***	-0.031 (0.002)***	-0.059 (0.001)***	-0.010 (0.001)***	0.006 (0.001)***	-0.021 (0.001)***	-0.108 (0.002)***	-0.025 (0.001)***	0.044 (0.001)***	-0.036 (0.001)***	0.021 (0.001)***	0.072 (0.001)***	-0.056 (0.002)***
Error characteristics	0.000 (0.002)	0.001 (0.002)	0.000 (0.003)	-0.001 (0.003)	0.000 (0.003)	-0.000 (0.003)	-0.001 (0.002)	0.000 (0.002)	-0.000 (0.002)	0.000 (0.002)	-0.006 (0.004)	0.001 (0.002)	-0.000 (0.002)	0.000 (0.003)	-0.001 (0.002)	-0.000 (0.002)	-0.002 (0.003)
Wage structure	0.049 (0.007)***	0.037 (0.005)***	0.123 (0.005)***	0.059 (0.008)***	0.110 (0.008)***	-0.021 (0.005)***	0.110 (0.005)***	0.077 (0.005)***	-0.027 (0.004)***	0.043 (0.006)***	0.064 (0.004)***	-0.009 (0.005)*	-0.104 (0.004)***	-0.004 (0.006)	-0.028 (0.004)***	0.046 (0.005)***	0.092 (0.003)***
Error wage structure	0.004 (0.003)	0.001 (0.004)	-0.001 (0.004)	0.003 (0.004)	0.006 (0.004)	0.004 (0.006)	0.002 (0.004)	0.005 (0.004)	0.001 (0.002)	0.001 (0.003)	0.001 (0.005)	-0.000 (0.003)	0.001 (0.002)	0.002 (0.005)	0.006 (0.005)	0.005 (0.004)	0.001 (0.006)

Notes: Hourly wages are measured in euros considering regional purchasing power parities. The estimates corresponds to a specification of the wage equation that includes as control variables both individual characteristics (gender, age, education and nationality) and attributes of the job and the firm (tenure, type of contract, full- or part-time, supervisory tasks, occupation, sector, size, type of collective agreement, type of control, type of market, the proportion of females and immigrants in the firm, the proportion of workers with fixed-term contracts and with part-time in the firm, the proportion of workers working in unskilled and skilled occupations in the firm and the proportion of workers with primary and tertiary studies in the firm). ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 4. Decomposition of inter-regional wage differences along the wage distribution in Spain. 2006. Fortin-Lemieux-Firpo methodology.

	Andalusia	Aragon	Asturias	Balearic Isl	Canary Isl.	Cantabria	C-La Man.	C. y León	Catalonia	Com.Val.	Extremad.	Galicia	Madrid	Murcia	Navarra	Basque C.	Rioja
P 10																	
Overall difference	0.057 (0.015)***	0.067 (0.007)***	0.094 (0.007)***	0.057 (0.010)***	0.017 (0.011)	-0.019 (0.007)***	0.158 (0.006)***	0.087 (0.007)***	-0.034 (0.010)***	0.073 (0.010)***	0.117 (0.006)***	-0.019 (0.010)**	-0.105 (0.008)***	0.006 (0.007)	0.074 (0.006)***	0.076 (0.008)***	0.144 (0.006)***
Composition	0.001 (0.001)***	-0.007 (0.001)***	-0.019 (0.002)***	-0.014 (0.003)***	-0.006 (0.002)***	-0.015 (0.002)***	0.003 (0.001)**	0.003 (0.002)*	-0.012 (0.002)***	0.001 (0.001)	0.006 (0.003)**	-0.011 (0.002)***	0.000 (0.002)	0.000 (0.001)	0.014 (0.002)***	0.037 (0.003)***	0.001 (0.001)
Individual characteristics	0.000 (0.000)	-0.001 (0.000)**	0.002 (0.001)**	-0.005 (0.002)***	-0.000 (0.001)	0.001 (0.001)	0.002 (0.001)***	-0.001 (0.000)	-0.003 (0.001)***	0.000 (0.001)	0.005 (0.001)***	-0.000 (0.001)	-0.000 (0.001)	0.000 (0.000)	-0.001 (0.001)*	0.002 (0.001)	0.000 (0.000)
Job and firm characteristics	0.001 (0.001)	-0.006 (0.001)***	-0.021 (0.003)***	-0.009 (0.003)***	-0.006 (0.002)***	-0.016 (0.002)***	0.002 (0.002)	0.003 (0.002)**	-0.009 (0.002)***	0.001 (0.001)	0.002 (0.003)	-0.011 (0.002)***	0.001 (0.002)	0.000 (0.001)	0.015 (0.002)***	0.035 (0.003)***	0.002 (0.002)
Error characteristics	0.001 (0.004)	0.000 (0.004)	0.001 (0.005)	-0.001 (0.005)	-0.000 (0.005)	0.000 (0.005)	0.001 (0.004)	0.001 (0.004)	0.002 (0.004)	0.000 (0.004)	0.002 (0.005)	0.002 (0.005)	-0.000 (0.004)	0.000 (0.004)	0.001 (0.005)	0.003 (0.005)	0.001 (0.004)
Wage structure	0.054 (0.007)***	0.071 (0.007)***	0.112 (0.007)***	0.067 (0.010)***	0.021 (0.011)*	-0.002 (0.006)	0.149 (0.006)***	0.083 (0.007)***	-0.025 (0.010)**	0.071 (0.010)***	0.105 (0.007)***	-0.009 (0.010)	-0.107 (0.008)***	0.022 (0.008)***	0.048 (0.006)***	0.031 (0.008)***	0.140 (0.007)***
Error wage structure	0.001 (0.003)	0.002 (0.003)	-0.001 (0.003)	0.005 (0.003)	0.003 (0.003)	-0.002 (0.004)	0.006 (0.002)**	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.004 (0.003)	-0.001 (0.002)	0.002 (0.002)	-0.015 (0.003)***	0.010 (0.004)***	0.006 (0.003)**	0.001 (0.003)
P 50																	
Overall difference	0.043 (0.009)***	0.068 (0.007)***	0.057 (0.007)***	-0.043 (0.008)***	-0.019 (0.008)**	-0.093 (0.007)***	0.014 (0.006)**	0.012 (0.006)*	0.019 (0.008)**	0.002 (0.008)	-0.047 (0.005)***	-0.092 (0.006)***	-0.033 (0.010)***	-0.055 (0.005)***	-0.001 (0.007)	0.151 (0.007)***	0.026 (0.005)***
Composition	0.000 (0.000)	-0.024 (0.001)***	-0.060 (0.002)***	-0.067 (0.002)***	-0.053 (0.001)***	-0.068 (0.002)***	-0.042 (0.001)***	-0.021 (0.001)***	0.016 (0.001)***	-0.024 (0.001)***	-0.052 (0.002)***	-0.034 (0.002)***	0.073 (0.002)***	0.000 (0.001)	-0.004 (0.002)**	0.085 (0.003)***	-0.069 (0.006)***
Individual characteristics	0.000 (0.000)	0.001 (0.000)***	0.000 (0.001)***	-0.006 (0.001)***	-0.002 (0.001)***	-0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	-0.002 (0.000)***	0.000 (0.001)	0.002 (0.001)**	-0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.001 (0.001)*	0.008 (0.001)***	-0.000 (0.001)
Job and firm characteristics	0.002 (0.002)	-0.025 (0.001)***	-0.060 (0.002)***	-0.061 (0.003)***	-0.051 (0.002)***	-0.068 (0.002)***	-0.043 (0.001)***	-0.021 (0.001)***	0.018 (0.001)***	-0.025 (0.001)***	-0.054 (0.003)***	-0.033 (0.002)***	0.072 (0.002)***	0.000 (0.001)	-0.005 (0.002)***	0.077 (0.002)***	-0.069 (0.003)***
Error characteristics	0.002 (0.002)	0.001 (0.003)	0.005 (0.003)	0.005 (0.004)	0.003 (0.003)	0.008 (0.004)**	0.003 (0.003)	0.002 (0.003)	0.001 (0.004)	0.001 (0.003)	0.005 (0.004)	0.002 (0.003)	-0.001 (0.004)	0.000 (0.003)	0.001 (0.004)	-0.005 (0.004)	0.001 (0.004)
Wage structure	0.040 (0.009)***	0.087 (0.006)***	0.112 (0.005)***	0.011 (0.008)	0.025 (0.007)***	-0.031 (0.005)***	0.047 (0.006)***	0.029 (0.005)***	0.003 (0.008)	0.025 (0.008)***	-0.005 (0.005)	-0.060 (0.005)***	-0.107 (0.010)***	-0.035 (0.005)***	-0.012 (0.005)**	0.061 (0.006)***	0.092 (0.007)***
Error wage structure	0.001 (0.002)	0.004 (0.003)	0.000 (0.003)	0.007 (0.003)**	0.006 (0.003)**	-0.003 (0.004)	0.007 (0.003)**	0.001 (0.003)	-0.000 (0.002)	0.001 (0.002)	0.004 (0.003)	0.000 (0.003)	0.002 (0.003)	-0.020 (0.004)***	0.014 (0.005)***	0.010 (0.004)**	0.001 (0.003)
P 90																	
Overall difference	0.025 (0.022)	-0.025 (0.011)**	-0.037 (0.012)***	-0.110 (0.017)***	-0.038 (0.020)*	-0.235 (0.014)***	0.102 (0.018)***	-0.007 (0.014)	0.024 (0.013)*	-0.050 (0.016)***	0.030 (0.022)	-0.049 (0.019)***	0.056 (0.016)***	-0.229 (0.016)***	-0.097 (0.013)***	0.074 (0.010)***	-0.116 (0.015)***
Composition	0.000 (0.000)	-0.059 (0.003)***	-0.161 (0.004)***	-0.146 (0.004)***	-0.131 (0.003)***	-0.158 (0.004)***	-0.116 (0.003)***	-0.047 (0.003)***	0.042 (0.003)***	-0.069 (0.003)***	-0.162 (0.004)***	-0.087 (0.003)***	0.120 (0.004)***	0.000 (0.002)	-0.033 (0.004)***	0.073 (0.004)***	-0.143 (0.011)***
Individual characteristics	0.000 (0.000)	0.008 (0.001)***	-0.007 (0.002)***	-0.013 (0.002)***	-0.013 (0.001)***	-0.005 (0.001)***	0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	0.002 (0.001)	-0.006 (0.002)***	-0.008 (0.001)***	0.004 (0.001)***	0.000 (0.001)	0.009 (0.001)***	0.019 (0.002)***	-0.120 (0.007)***
Job and firm characteristics	0.002 (0.002)	-0.067 (0.003)***	-0.154 (0.005)***	-0.134 (0.005)***	-0.118 (0.003)***	-0.154 (0.004)***	-0.117 (0.003)***	-0.046 (0.003)***	0.041 (0.002)***	-0.071 (0.003)***	-0.156 (0.004)***	-0.079 (0.003)***	0.115 (0.004)***	0.000 (0.002)	-0.042 (0.004)***	0.054 (0.004)***	-0.023 (0.023)
Error characteristics	0.002 (0.002)	0.001 (0.006)	-0.009 (0.007)	-0.007 (0.007)	-0.004 (0.007)	-0.020 (0.008)***	-0.006 (0.006)	-0.001 (0.006)	0.001 (0.006)	0.003 (0.006)	-0.005 (0.007)	0.002 (0.006)	-0.002 (0.007)	0.000 (0.006)	-0.001 (0.006)	0.006 (0.007)	0.001 (0.004)
Wage structure	0.022 (0.009)***	0.027 (0.009)***	0.128 (0.010)***	0.043 (0.014)***	0.100 (0.016)***	-0.053 (0.010)***	0.208 (0.014)***	0.035 (0.011)***	-0.017 (0.012)	0.015 (0.015)	0.183 (0.014)***	0.035 (0.015)**	-0.065 (0.016)***	-0.187 (0.013)***	-0.084 (0.010)***	-0.007 (0.009)	0.025 (0.007)***
Error wage structure	0.001 (0.002)	0.006 (0.008)	0.005 (0.010)	0.002 (0.012)	-0.003 (0.010)	-0.004 (0.013)	0.015 (0.009)*	0.006 (0.008)	-0.001 (0.004)	0.001 (0.006)	0.014 (0.012)	0.001 (0.008)	0.003 (0.004)	-0.042 (0.007)***	0.021 (0.011)*	0.002 (0.005)	0.001 (0.003)

Notes: Hourly wages are measured in euros considering regional purchasing power parities. The estimates corresponds to a specification of the wage equation that includes as control variables both individual characteristics (gender, age, education and nationality) and attributes of the job and the firm (tenure, type of contract, full- or part-time, supervisory tasks, occupation, sector, size, type of collective agreement, type of control, type of market, the proportion of females and immigrants in the firm, the proportion of workers with fixed-term contracts and with part-time in the firm, the proportion of workers working in unskilled and skilled occupations in the firm and the proportion of workers with primary and tertiary studies in the firm). ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 5. Decomposition of inter-regional wage differences along the wage distribution in Spain. 2010. Fortin-Lemieux-Firpo methodology.

	Andalusia	Aragon	Asturias	Balearic Islands	Canary Islands	Cantabria	Castilla-La Mancha	Castilla y León	Catalonia	Com. Valenciana	Extremad.	Galicia	Madrid	Murcia	Navarra	Basque Country	Rioja
P 10																	
Overall difference	0.061 (0.009)***	0.084 (0.008)***	0.125 (0.006)***	0.037 (0.012)***	0.085 (0.009)***	-0.002 (0.008)	0.156 (0.008)***	0.100 (0.010)***	-0.032 (0.007)***	0.061 (0.009)***	0.139 (0.007)***	0.017 (0.008)**	-0.118 (0.007)***	-0.015 (0.009)	0.070 (0.007)***	0.104 (0.009)***	0.153 (0.006)***
Composition	-0.004 (0.002)**	0.006 (0.001)***	-0.002 (0.002)	-0.027 (0.004)***	-0.021 (0.002)***	0.019 (0.002)***	-0.003 (0.001)**	0.005 (0.001)***	-0.007 (0.001)***	-0.000 (0.001)	0.004 (0.003)	0.006 (0.002)***	-0.004 (0.001)***	-0.010 (0.001)***	0.023 (0.002)***	0.045 (0.001)***	-0.008 (0.002)***
Individual characteristics	0.001 (0.001)	-0.001 (0.001)*	0.003 (0.001)***	-0.008 (0.002)***	-0.003 (0.001)***	0.001 (0.001)***	-0.002 (0.001)***	-0.000 (0.001)	-0.002 (0.000)***	-0.000 (0.000)	0.002 (0.001)*	0.000 (0.001)	-0.000 (0.001)	-0.003 (0.001)***	0.003 (0.000)***	0.007 (0.001)***	-0.002 (0.001)
Job and firm characteristics	-0.005 (0.002)***	0.007 (0.001)***	-0.005 (0.002)*	-0.019 (0.004)***	-0.018 (0.002)***	0.018 (0.002)***	-0.001 (0.002)	0.006 (0.001)***	-0.006 (0.001)***	0.000 (0.001)	0.003 (0.003)	0.006 (0.002)***	-0.004 (0.002)***	-0.007 (0.002)***	0.020 (0.002)***	0.038 (0.002)***	-0.006 (0.003)**
Error characteristics	0.000 (0.004)	0.001 (0.004)	-0.000 (0.004)	-0.000 (0.005)	-0.000 (0.004)	0.003 (0.004)	-0.000 (0.004)	0.000 (0.004)	-0.000 (0.004)	-0.000 (0.004)	0.000 (0.005)	0.000 (0.004)	-0.001 (0.004)	-0.000 (0.004)	0.001 (0.004)	0.003 (0.004)	0.002 (0.005)
Wage structure	0.062 (0.009)***	0.076 (0.008)***	0.130 (0.007)***	0.055 (0.013)***	0.105 (0.010)***	-0.027 (0.008)***	0.155 (0.008)***	0.093 (0.010)***	-0.025 (0.007)***	0.060 (0.009)***	0.132 (0.008)***	0.012 (0.009)	-0.114 (0.007)***	-0.008 (0.009)	0.046 (0.006)***	0.054 (0.009)***	0.157 (0.006)***
Error wage structure	0.003 (0.001)*	0.001 (0.002)	-0.003 (0.003)	0.009 (0.003)***	0.001 (0.003)	0.003 (0.004)	0.005 (0.002)**	0.002 (0.002)	0.001 (0.001)	0.001 (0.002)	0.003 (0.003)	-0.002 (0.002)	0.002 (0.001)	0.004 (0.003)	0.004 (0.003)	0.003 (0.002)	0.002 (0.003)
P 50																	
Overall difference	0.003 (0.007)	0.052 (0.007)***	0.045 (0.007)***	-0.044 (0.008)***	-0.007 (0.008)	-0.023 (0.008)***	0.039 (0.007)***	0.024 (0.007)***	0.000 (0.006)	0.009 (0.009)	-0.018 (0.006)***	-0.077 (0.006)***	-0.046 (0.007)***	-0.091 (0.009)***	0.013 (0.007)**	0.160 (0.008)***	0.030 (0.006)***
Composition	-0.025 (0.002)***	-0.001 (0.001)	-0.042 (0.002)***	-0.087 (0.013)***	-0.067 (0.002)***	-0.009 (0.001)***	-0.058 (0.001)***	-0.023 (0.001)***	0.010 (0.001)***	-0.011 (0.001)***	-0.054 (0.002)***	-0.034 (0.001)***	0.059 (0.002)***	-0.064 (0.001)***	0.014 (0.001)***	0.073 (0.002)***	-0.077 (0.002)***
Individual characteristics	-0.002 (0.000)***	0.001 (0.000)	0.003 (0.000)***	-0.008 (0.001)***	-0.005 (0.001)***	0.003 (0.000)***	-0.004 (0.001)***	0.001 (0.000)	-0.001 (0.000)*	-0.001 (0.000)**	0.002 (0.001)***	-0.001 (0.000)**	0.003 (0.001)***	-0.006 (0.001)***	0.006 (0.000)***	0.013 (0.001)***	0.001 (0.001)
Job and firm characteristics	-0.023 (0.002)***	-0.001 (0.001)	-0.045 (0.001)***	-0.079 (0.003)***	-0.062 (0.002)***	-0.012 (0.001)***	-0.054 (0.001)***	-0.024 (0.001)***	0.011 (0.001)***	-0.010 (0.001)***	-0.057 (0.002)***	-0.033 (0.001)***	0.056 (0.002)***	-0.057 (0.001)***	0.007 (0.001)***	0.060 (0.002)***	-0.078 (0.002)***
Error characteristics	0.000 (0.003)	0.000 (0.003)	0.003 (0.003)	0.002 (0.003)	-0.000 (0.003)	0.001 (0.003)	0.004 (0.003)	0.001 (0.003)	-0.001 (0.003)	0.000 (0.003)	0.002 (0.003)	0.001 (0.003)	0.000 (0.003)	0.004 (0.003)	-0.001 (0.003)	-0.002 (0.003)	0.013 (0.004)***
Wage structure	0.025 (0.007)***	0.051 (0.006)***	0.084 (0.006)***	0.027 (0.008)***	0.057 (0.008)***	-0.021 (0.006)***	0.088 (0.006)***	0.043 (0.007)***	-0.011 (0.006)*	0.018 (0.008)**	0.032 (0.006)***	-0.043 (0.006)***	-0.106 (0.006)***	-0.037 (0.008)***	-0.004 (0.005)	0.082 (0.007)***	0.093 (0.004)***
Error wage structure	0.003 (0.002)	0.001 (0.004)	-0.001 (0.004)	0.014 (0.004)***	0.004 (0.003)	0.005 (0.005)	0.005 (0.003)*	0.004 (0.003)	0.001 (0.002)	0.002 (0.003)	0.003 (0.004)	-0.001 (0.003)	0.001 (0.003)	0.006 (0.004)	0.004 (0.005)	0.006 (0.004)	0.002 (0.005)
P 90																	
Overall difference	-0.004 (0.017)	-0.016 (0.014)	-0.051 (0.011)***	-0.080 (0.016)***	0.039 (0.020)*	-0.059 (0.013)***	0.007 (0.016)	0.041 (0.015)***	0.001 (0.011)	0.020 (0.017)	-0.042 (0.020)**	-0.114 (0.017)***	0.017 (0.009)*	-0.098 (0.020)***	-0.159 (0.010)***	0.054 (0.013)***	-0.166 (0.013)***
Composition	-0.040 (0.003)***	-0.020 (0.002)***	-0.118 (0.003)***	-0.140 (0.004)***	-0.111 (0.003)***	-0.053 (0.003)***	-0.126 (0.003)***	-0.052 (0.002)***	0.023 (0.002)***	-0.018 (0.002)***	-0.154 (0.003)***	-0.104 (0.003)***	0.089 (0.003)***	-0.144 (0.003)***	-0.046 (0.003)***	0.060 (0.003)***	-0.162 (0.004)***
Individual characteristics	-0.012 (0.001)***	0.006 (0.001)***	-0.000 (0.001)	-0.011 (0.002)***	-0.015 (0.001)***	0.005 (0.001)***	-0.009 (0.001)***	0.000 (0.001)	0.003 (0.001)***	-0.003 (0.001)***	-0.006 (0.001)***	-0.009 (0.001)***	0.007 (0.001)***	-0.017 (0.001)***	0.012 (0.001)***	0.021 (0.001)***	0.006 (0.002)***
Job and firm characteristics	-0.028 (0.003)***	-0.025 (0.002)***	-0.118 (0.003)***	-0.129 (0.005)***	-0.096 (0.003)***	-0.058 (0.003)***	-0.117 (0.003)***	-0.053 (0.002)***	0.019 (0.002)***	-0.015 (0.002)***	-0.148 (0.004)***	-0.095 (0.002)***	0.082 (0.003)***	-0.127 (0.003)***	-0.059 (0.003)***	0.039 (0.003)***	-0.167 (0.004)***
Error characteristics	-0.001 (0.005)	0.000 (0.005)	-0.002 (0.005)	-0.003 (0.006)	0.000 (0.006)	-0.006 (0.005)	-0.007 (0.005)	-0.001 (0.005)	-0.001 (0.005)	-0.000 (0.005)	0.003 (0.006)	-0.001 (0.005)	0.000 (0.005)	-0.004 (0.006)	-0.004 (0.005)	0.002 (0.005)	-0.028 (0.007)***
Wage structure	0.031 (0.016)**	0.003 (0.012)	0.065 (0.010)***	0.029 (0.015)*	0.138 (0.018)***	-0.011 (0.009)	0.121 (0.013)***	0.087 (0.013)***	-0.022 (0.010)**	0.037 (0.016)**	0.095 (0.015)***	-0.012 (0.015)	-0.068 (0.008)***	0.025 (0.017)	-0.108 (0.008)***	-0.013 (0.012)	0.020 (0.008)**
Error wage structure	0.006 (0.005)	-0.001 (0.008)	0.005 (0.008)	0.035 (0.010)***	0.012 (0.008)	0.012 (0.010)	0.020 (0.009)**	0.007 (0.007)	0.002 (0.004)	0.001 (0.005)	0.014 (0.011)	0.003 (0.007)	-0.003 (0.003)	0.025 (0.009)***	-0.001 (0.008)	0.005 (0.006)	0.003 (0.011)

Notes: Hourly wages are measured in euros considering regional purchasing power parities. The estimates corresponds to a specification of the wage equation that includes as control variables both individual characteristics (gender, age, education and nationality) and attributes of the job and the firm (tenure, type of contract, full- or part-time, supervisory tasks, occupation, sector, size, type of collective agreement, type of control, type of market, the proportion of females and immigrants in the firm, the proportion of workers with fixed-term contracts and with part-time in the firm, the proportion of workers working in unskilled and skilled occupations in the firm and the proportion of workers with primary and tertiary studies in the firm). ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 6. Decomposition of inter-regional wage differences along the wage distribution in Spain. 2014. Fortin-Lemieux-Firpo methodology.

	Andalusia	Aragon	Asturias	Balearic Islands	Canary Islands	Cantabria	Castilla-La Mancha	Castilla y León	Catalonia	Com. Valenciana	Extremad.	Galicia	Madrid	Murcia	Navarra	Basque Country	Rioja
P 10																	
Overall difference	0.061 (0.011)***	0.112 (0.008)***	0.127 (0.008)***	0.060 (0.012)***	0.075 (0.013)***	-0.001 (0.008)	0.142 (0.009)***	0.153 (0.009)***	-0.037 (0.008)***	0.073 (0.011)***	0.091 (0.009)***	0.041 (0.009)***	-0.117 (0.007)***	-0.028 (0.010)***	0.052 (0.008)***	0.097 (0.012)***	0.123 (0.007)***
Composition	-0.016 (0.001)***	0.010 (0.001)***	0.008 (0.002)***	-0.022 (0.003)***	-0.032 (0.002)***	0.006 (0.002)***	-0.015 (0.002)***	0.005 (0.001)***	-0.003 (0.001)***	-0.009 (0.001)***	-0.030 (0.003)***	0.003 (0.002)*	0.006 (0.001)***	-0.013 (0.001)***	0.032 (0.002)***	0.051 (0.002)***	-0.005 (0.002)***
Individual characteristics	0.003 (0.001)***	-0.000 (0.000)	0.002 (0.001)*	-0.012 (0.002)***	-0.007 (0.001)***	-0.000 (0.001)	-0.004 (0.001)***	-0.000 (0.001)	-0.002 (0.000)***	-0.002 (0.000)***	-0.001 (0.002)	0.001 (0.001)*	0.002 (0.001)***	-0.005 (0.001)***	0.004 (0.001)***	0.008 (0.001)***	-0.005 (0.001)***
Job and firm characteristics	-0.019 (0.001)***	0.010 (0.001)***	0.007 (0.002)***	-0.010 (0.003)***	-0.025 (0.003)***	0.006 (0.002)***	-0.011 (0.002)***	0.005 (0.001)***	-0.001 (0.001)	-0.007 (0.001)***	-0.029 (0.004)***	0.002 (0.002)	0.004 (0.001)***	-0.008 (0.002)***	0.028 (0.002)***	0.043 (0.002)***	-0.001 (0.002)
Error characteristics	-0.003 (0.004)	-0.001 (0.004)	-0.001 (0.005)	-0.004 (0.005)	-0.003 (0.005)	-0.002 (0.005)	-0.003 (0.005)	-0.001 (0.004)	-0.002 (0.004)	-0.002 (0.004)	-0.009 (0.007)	-0.001 (0.004)	-0.001 (0.004)	-0.004 (0.005)	-0.004 (0.005)	-0.004 (0.004)	0.000 (0.005)
Wage structure	0.077 (0.011)***	0.103 (0.008)***	0.120 (0.007)***	0.084 (0.012)***	0.106 (0.013)***	-0.007 (0.008)	0.160 (0.009)***	0.147 (0.009)***	-0.033 (0.008)***	0.083 (0.011)***	0.130 (0.008)***	0.038 (0.009)***	-0.123 (0.007)***	-0.012 (0.010)	0.022 (0.007)***	0.046 (0.011)***	0.127 (0.006)***
Error wage structure	0.003 (0.001)**	0.001 (0.003)	-0.000 (0.003)	0.002 (0.003)	0.003 (0.002)	0.001 (0.003)	0.001 (0.002)	0.002 (0.002)	0.001 (0.001)	0.000 (0.001)	-0.000 (0.003)	0.001 (0.002)	0.001 (0.001)	0.001 (0.003)	0.003 (0.003)	0.004 (0.002)*	0.001 (0.003)
P 50																	
Overall difference	-0.004 (0.008)	0.028 (0.007)***	0.074 (0.008)***	-0.047 (0.010)***	0.028 (0.010)***	-0.033 (0.008)***	0.029 (0.007)***	0.049 (0.008)***	-0.008 (0.006)	0.011 (0.008)	-0.034 (0.006)***	-0.049 (0.007)***	-0.057 (0.007)***	-0.081 (0.007)***	0.048 (0.007)***	0.186 (0.008)***	0.044 (0.006)***
Composition	-0.033 (0.001)***	0.003 (0.001)***	-0.056 (0.002)***	-0.106 (0.003)***	-0.076 (0.002)***	-0.029 (0.002)***	-0.057 (0.001)***	-0.003 (0.001)*	0.007 (0.001)***	-0.026 (0.001)***	-0.110 (0.002)***	-0.022 (0.001)***	0.059 (0.002)***	-0.040 (0.001)***	0.046 (0.002)***	0.102 (0.002)***	-0.057 (0.002)***
Individual characteristics	-0.000 (0.000)	0.001 (0.000)***	0.001 (0.001)	-0.016 (0.001)***	-0.011 (0.001)***	-0.000 (0.000)	-0.006 (0.001)***	0.002 (0.000)***	-0.002 (0.000)***	-0.003 (0.000)***	-0.006 (0.001)***	-0.001 (0.000)**	0.006 (0.001)***	-0.005 (0.001)***	0.009 (0.000)***	0.016 (0.001)***	-0.004 (0.001)***
Job and firm characteristics	-0.033 (0.001)***	0.002 (0.001)*	-0.057 (0.002)***	-0.089 (0.003)***	-0.065 (0.002)***	-0.029 (0.002)***	-0.051 (0.001)***	-0.005 (0.001)***	0.009 (0.001)***	-0.023 (0.001)***	-0.104 (0.002)***	-0.021 (0.001)***	0.053 (0.002)***	-0.034 (0.001)***	0.037 (0.002)***	0.086 (0.002)***	-0.052 (0.002)***
Error characteristics	0.000 (0.003)	0.001 (0.003)	0.012 (0.004)***	0.014 (0.004)***	0.006 (0.003)*	0.000 (0.003)	0.004 (0.003)	0.000 (0.003)	0.001 (0.003)	-0.000 (0.003)	0.015 (0.005)***	0.001 (0.003)	-0.001 (0.003)	0.001 (0.003)	-0.003 (0.003)	-0.001 (0.003)	0.010 (0.004)***
Wage structure	0.025 (0.007)***	0.023 (0.006)***	0.119 (0.006)***	0.042 (0.010)***	0.093 (0.010)***	-0.007 (0.006)	0.081 (0.006)***	0.048 (0.007)***	-0.017 (0.006)***	0.035 (0.008)***	0.061 (0.005)***	-0.028 (0.006)***	-0.117 (0.006)***	-0.044 (0.006)***	-0.002 (0.005)	0.078 (0.007)***	0.090 (0.004)***
Error wage structure	0.004 (0.002)*	0.001 (0.004)	-0.001 (0.003)	0.003 (0.003)	0.005 (0.003)*	0.003 (0.005)	0.001 (0.003)	0.004 (0.003)	0.001 (0.002)	0.001 (0.002)	-0.000 (0.003)	-0.000 (0.003)	0.002 (0.003)	0.001 (0.004)	0.006 (0.005)	0.007 (0.004)*	0.001 (0.004)
P 90																	
Overall difference	-0.005 (0.018)	-0.012 (0.014)	-0.009 (0.015)	-0.164 (0.022)***	0.020 (0.025)	-0.061 (0.016)***	-0.011 (0.016)	0.032 (0.016)*	-0.019 (0.010)*	-0.006 (0.019)	-0.284 (0.015)***	-0.072 (0.015)***	0.027 (0.009)***	0.053 (0.021)**	-0.114 (0.010)***	0.101 (0.011)***	-0.100 (0.011)***
Composition	-0.053 (0.002)***	-0.013 (0.002)***	-0.139 (0.003)***	-0.235 (0.005)***	-0.139 (0.003)***	-0.074 (0.003)***	-0.122 (0.003)***	-0.023 (0.002)***	0.006 (0.002)***	-0.036 (0.002)***	-0.201 (0.004)***	-0.065 (0.002)***	0.076 (0.003)***	-0.065 (0.003)***	0.009 (0.003)***	0.091 (0.003)***	-0.108 (0.004)***
Individual characteristics	-0.013 (0.001)***	0.008 (0.001)***	-0.002 (0.001)*	-0.028 (0.003)***	-0.026 (0.002)***	-0.004 (0.001)***	-0.009 (0.001)***	0.011 (0.001)***	-0.001 (0.001)	-0.005 (0.001)***	-0.017 (0.003)***	-0.009 (0.001)***	0.010 (0.001)***	-0.004 (0.001)***	0.020 (0.001)***	0.027 (0.001)***	0.001 (0.002)
Job and firm characteristics	-0.041 (0.002)***	-0.021 (0.002)***	-0.137 (0.004)***	-0.207 (0.006)***	-0.113 (0.003)***	-0.070 (0.003)***	-0.113 (0.003)***	-0.034 (0.002)***	0.007 (0.002)***	-0.031 (0.002)***	-0.184 (0.005)***	-0.055 (0.002)***	0.067 (0.003)***	-0.061 (0.003)***	-0.011 (0.003)***	0.064 (0.003)***	-0.109 (0.004)***
Error characteristics	0.003 (0.006)	0.002 (0.005)	-0.020 (0.007)***	-0.015 (0.006)**	-0.006 (0.006)	0.001 (0.006)	-0.009 (0.005)	0.002 (0.005)	0.000 (0.005)	0.002 (0.005)	-0.058 (0.009)***	0.005 (0.005)	0.002 (0.006)	0.004 (0.006)	-0.000 (0.005)	0.005 (0.006)	-0.031 (0.007)***
Wage structure	0.039 (0.017)**	-0.002 (0.012)	0.151 (0.011)***	0.081 (0.020)***	0.156 (0.023)***	0.002 (0.012)	0.115 (0.014)***	0.045 (0.015)***	-0.028 (0.010)***	0.026 (0.018)	-0.029 (0.011)***	-0.012 (0.014)	-0.051 (0.009)***	0.110 (0.018)***	-0.130 (0.008)***	0.003 (0.011)	0.038 (0.009)***
Error wage structure	0.006 (0.005)	0.001 (0.007)	-0.001 (0.009)	0.005 (0.010)	0.009 (0.009)	0.009 (0.011)	0.004 (0.008)	0.008 (0.007)	0.002 (0.003)	0.002 (0.005)	0.004 (0.011)	-0.000 (0.006)	-0.000 (0.003)	-0.000 (0.010)	0.007 (0.007)	0.001 (0.004)	-0.000 (0.012)

Notes: Hourly wages are measured in euros considering regional purchasing power parities. The estimates corresponds to a specification of the wage equation that includes as control variables both individual characteristics (gender, age, education and nationality) and attributes of the job and the firm (tenure, type of contract, full- or part-time, supervisory tasks, occupation, sector, size, type of collective agreement, type of control, type of market, the proportion of females and immigrants in the firm, the proportion of workers with fixed-term contracts and with part-time in the firm, the proportion of workers working in unskilled and skilled occupations in the firm and the proportion of workers with primary and tertiary studies in the firm). ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 7. Inter-regional wage differences in Spain. Haisken-DeNew and Schmidt methodology.

	2006				2010				2014			
	Average	P10	P50	P90	Average	P10	P50	P90	Average	P10	P50	P90
Andalusia	0.042 (0.002)***	0.059 (0.003)***	0.051 (0.003)***	0.032 (0.006)***	0.034 (0.002)***	0.066 (0.003)***	0.031 (0.003)***	0.035 (0.006)***	0.046 (0.002)***	0.076 (0.003)***	0.022 (0.003)***	0.034 (0.006)***
Aragon	0.064 (0.006)***	0.069 (0.008)***	0.079 (0.007)***	0.013 (0.015)	0.036 (0.005)***	0.064 (0.007)***	0.045 (0.006)***	-0.016 (0.014)	0.031 (0.005)***	0.082 (0.008)***	0.014 (0.006)**	-0.012 (0.014)
Asturias	0.112 (0.008)***	0.086 (0.011)***	0.113 (0.009)***	0.091 (0.021)***	0.089 (0.006)***	0.094 (0.009)***	0.090 (0.008)***	0.029 (0.017)*	0.128 (0.007)***	0.098 (0.011)***	0.140 (0.009)***	0.114 (0.019)***
Balearic Islands	0.031 (0.006)***	0.065 (0.010)***	0.014 (0.007)*	-0.005 (0.018)	0.041 (0.005)***	0.057 (0.008)***	0.037 (0.007)***	0.040 (0.015)***	0.060 (0.006)***	0.070 (0.009)***	0.073 (0.007)***	0.038 (0.015)**
Canary Islands	0.040 (0.005)***	0.013 (0.007)**	0.029 (0.005)***	0.072 (0.013)***	0.073 (0.004)***	0.076 (0.006)***	0.057 (0.005)***	0.121 (0.012)***	0.104 (0.004)***	0.079 (0.006)***	0.123 (0.005)***	0.118 (0.011)***
Cantabria	-0.041 (0.010)***	-0.017 (0.015)	-0.051 (0.012)***	-0.076 (0.028)***	-0.027 (0.008)***	-0.024 (0.012)**	-0.026 (0.010)***	-0.022 (0.023)	-0.020 (0.009)**	-0.009 (0.013)	-0.012 (0.011)	-0.007 (0.024)
Castilla-La Mancha	0.109 (0.005)***	0.129 (0.007)***	0.066 (0.006)***	0.179 (0.014)***	0.119 (0.004)***	0.138 (0.007)***	0.125 (0.005)***	0.109 (0.012)***	0.107 (0.005)***	0.130 (0.007)***	0.095 (0.006)***	0.081 (0.013)***
Castilla y León	0.043 (0.004)***	0.083 (0.007)***	0.033 (0.005)***	0.029 (0.012)**	0.069 (0.003)***	0.094 (0.005)***	0.048 (0.005)***	0.076 (0.010)***	0.075 (0.004)***	0.117 (0.006)***	0.051 (0.005)***	0.043 (0.010)***
Catalonia	-0.023 (0.002)***	-0.049 (0.003)***	-0.010 (0.002)***	-0.034 (0.005)***	-0.029 (0.002)***	-0.056 (0.003)***	-0.024 (0.002)***	-0.039 (0.005)***	-0.045 (0.002)***	-0.055 (0.003)***	-0.031 (0.002)***	-0.043 (0.005)***
Comunidad Valenciana	0.032 (0.003)***	0.059 (0.004)***	0.024 (0.003)***	0.003 (0.007)	0.025 (0.002)***	0.063 (0.004)***	0.012 (0.003)***	0.032 (0.007)***	0.035 (0.002)***	0.064 (0.004)***	0.032 (0.003)***	0.019 (0.007)***
Extremadura	0.069 (0.008)***	0.127 (0.012)***	-0.011 (0.009)	0.156 (0.022)***	0.074 (0.007)***	0.119 (0.011)***	0.037 (0.009)***	0.086 (0.020)***	0.070 (0.008)***	0.125 (0.013)***	0.066 (0.010)***	-0.020 (0.022)
Galicia	-0.031 (0.004)***	-0.005 (0.006)	-0.081 (0.005)***	0.037 (0.011)***	-0.015 (0.003)***	0.019 (0.005)***	-0.057 (0.004)***	0.018 (0.010)*	-0.012 (0.004)***	0.045 (0.006)***	-0.044 (0.004)***	-0.013 (0.010)
Madrid	-0.128 (0.002)***	-0.173 (0.003)***	-0.106 (0.002)***	-0.107 (0.006)***	-0.128 (0.002)***	-0.194 (0.003)***	-0.109 (0.002)***	-0.114 (0.005)***	-0.138 (0.002)***	-0.207 (0.003)***	-0.118 (0.002)***	-0.084 (0.005)***
Murcia	-0.009 (0.006)	0.026 (0.008)***	-0.024 (0.007)***	-0.004 (0.015)	-0.015 (0.005)***	-0.031 (0.008)***	-0.027 (0.007)***	0.053 (0.015)***	-0.010 (0.006)*	-0.020 (0.009)**	-0.046 (0.007)***	0.089 (0.015)***
Navarra	-0.011 (0.009)	0.039 (0.014)***	-0.003 (0.011)	-0.077 (0.025)***	-0.029 (0.007)***	0.037 (0.011)***	-0.008 (0.009)	-0.150 (0.020)***	-0.032 (0.007)***	0.026 (0.012)**	-0.008 (0.009)	-0.154 (0.020)***
Basque Country	0.029 (0.004)***	0.012 (0.006)*	0.052 (0.005)***	-0.018 (0.012)	0.042 (0.003)***	0.022 (0.005)***	0.070 (0.004)***	-0.014 (0.010)	0.043 (0.003)***	-0.003 (0.005)	0.059 (0.004)***	0.034 (0.010)***
Rioja	0.081 (0.014)***	0.128 (0.021)***	0.105 (0.016)***	0.033 (0.038)	0.083 (0.011)***	0.110 (0.017)***	0.115 (0.014)***	-0.033 (0.031)	0.080 (0.011)***	0.122 (0.017)***	0.108 (0.014)***	-0.043 (0.031)
Adjusted standard deviation	0.060+	0.075+	0.060+	0.076+	0.061+	0.080+	0.061+	0.072+	0.067+	0.085+	0.069+	0.070+
Minimum	-0.128	-0.173	-0.106	-0.107	-0.128	-0.194	-0.109	-0.150	-0.138	-0.207	-0.118	-0.154
Maximum	0.112	0.129	0.113	0.179	0.119	0.138	0.125	0.121	0.128	0.130	0.140	0.118

Notes: Hourly wages are measured in euros considering regional purchasing power parities. Regional dummy coefficients measure differences relative to the national wage in the correspondent decile of the unconditional wage distribution and were estimated using restricted least squares. The estimates corresponds to a specification of the wage equation that includes as control variables both individual characteristics (gender, age, education and nationality) and attributes of the job and the firm (tenure, type of contract, full- or part-time, supervisory tasks, occupation, sector, size, type of collective agreement, type of control, type of market, the proportion of females and immigrants in the firm, the proportion of workers with fixed-term contracts and with part-time in the firm, the proportion of workers working in unskilled and skilled occupations in the firm and the proportion of workers with primary and tertiary studies in the firm). ***, ** and * indicate that the regional dummy is statistically significant at the 1%, 5% and 10% levels, respectively, and + indicates that regional wage differences are jointly statistically different from zero with a significance level lower than 1%

Annex

Figure A.1. Regional average hourly wages of Spanish regions with and without considering purchasing power parities.

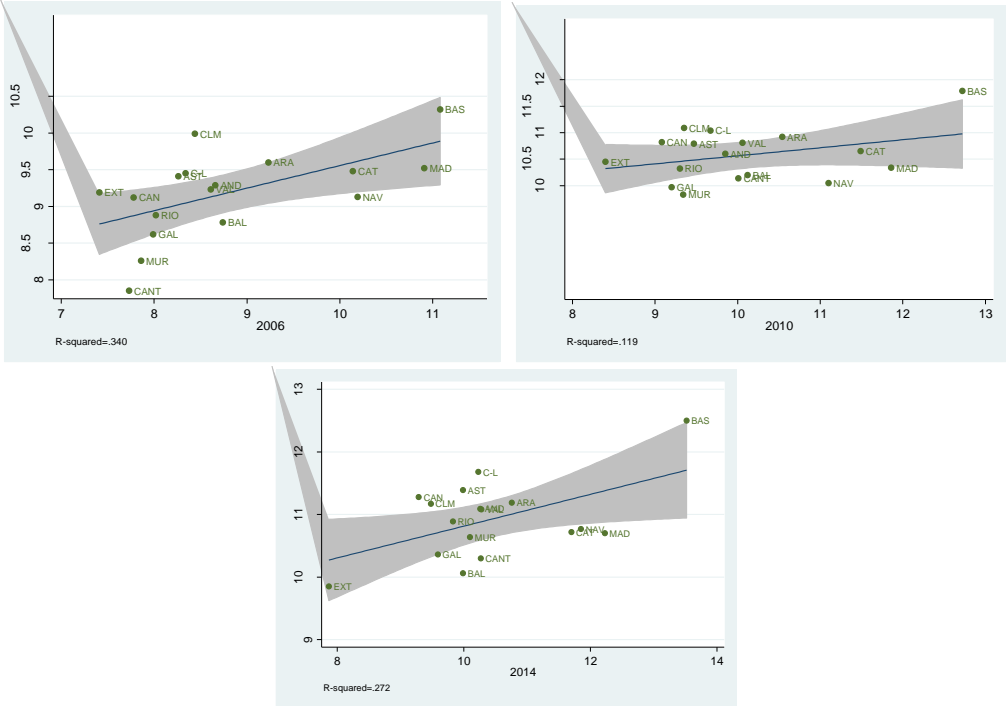


Table A.1. Descriptive evidence (average) of explanatory variables, 2006.

	Spain	Andalusia	Aragon	Asturias	Bal. Isl.	Canary Isl.	Cantabria	C-La Man.	C. y León	Catalonia	Com.Val.	Extremad.	Galicia	Madrid	Murcia	Navarra	Basque C.	Rioja
Male	0.585	0.631	0.601	0.584	0.560	0.590	0.605	0.637	0.591	0.550	0.631	0.635	0.571	0.546	0.636	0.572	0.582	0.625
Inmigrant	0.093	0.054	0.127	0.041	0.165	0.092	0.061	0.106	0.065	0.112	0.112	0.024	0.035	0.115	0.142	0.118	0.034	0.135
Age<30	0.260	0.295	0.240	0.258	0.265	0.256	0.264	0.299	0.254	0.249	0.287	0.287	0.253	0.243	0.273	0.242	0.205	0.258
Age>45	0.258	0.205	0.294	0.252	0.270	0.239	0.267	0.240	0.282	0.285	0.258	0.234	0.269	0.255	0.224	0.262	0.310	0.259
Age 30-45	0.482	0.500	0.466	0.489	0.465	0.506	0.469	0.461	0.464	0.466	0.456	0.479	0.478	0.503	0.503	0.497	0.485	0.483
Education: primary	0.276	0.301	0.295	0.196	0.370	0.352	0.288	0.289	0.315	0.241	0.347	0.271	0.289	0.221	0.337	0.283	0.211	0.517
Education: secondary	0.439	0.448	0.454	0.567	0.448	0.443	0.501	0.501	0.403	0.459	0.420	0.512	0.436	0.417	0.472	0.366	0.380	0.242
Education: tertiary	0.285	0.250	0.251	0.237	0.182	0.205	0.211	0.210	0.282	0.299	0.233	0.217	0.275	0.362	0.190	0.351	0.409	0.241
Tenure	6.016	4.422	6.491	5.064	5.782	4.881	5.071	5.209	6.326	6.884	5.926	5.168	5.862	6.387	4.618	6.555	8.350	5.907
Fixed-term contract	0.308	0.431	0.301	0.398	0.311	0.343	0.326	0.386	0.345	0.218	0.318	0.381	0.326	0.259	0.374	0.278	0.283	0.264
Part-time	0.168	0.188	0.178	0.171	0.134	0.126	0.165	0.125	0.172	0.185	0.155	0.147	0.141	0.164	0.170	0.165	0.170	0.162
Supervisory tasks	0.180	0.180	0.161	0.169	0.202	0.167	0.164	0.160	0.167	0.184	0.181	0.136	0.154	0.199	0.162	0.172	0.181	0.188
Directors and managers	0.021	0.014	0.019	0.012	0.013	0.018	0.017	0.012	0.019	0.022	0.017	0.004	0.016	0.035	0.008	0.018	0.020	0.015
Techn. and scient. prof.	0.107	0.097	0.078	0.076	0.069	0.066	0.062	0.095	0.098	0.112	0.083	0.099	0.090	0.146	0.076	0.139	0.150	0.063
Technicians and assoc. prof.	0.135	0.103	0.123	0.102	0.092	0.090	0.114	0.078	0.101	0.176	0.117	0.068	0.092	0.191	0.088	0.083	0.118	0.086
Office and admin. staff	0.135	0.145	0.107	0.104	0.156	0.142	0.093	0.105	0.122	0.136	0.137	0.116	0.132	0.153	0.120	0.086	0.112	0.093
Caterers and vendors	0.152	0.157	0.164	0.207	0.186	0.189	0.203	0.125	0.150	0.150	0.134	0.166	0.176	0.143	0.138	0.133	0.148	0.150
Workers skilled in agriculture	0.003	0.003	0.002	0.001	0.005	0.008	0.004	0.001	0.002	0.001	0.002	0.001	0.001	0.004	0.003	0.000	0.003	0.002
Skilled in manuf. and constr.	0.180	0.193	0.224	0.213	0.186	0.161	0.240	0.250	0.214	0.154	0.220	0.191	0.207	0.130	0.240	0.209	0.184	0.252
Oper. of plant and machinery	0.102	0.102	0.100	0.092	0.063	0.084	0.083	0.133	0.110	0.109	0.129	0.133	0.122	0.058	0.126	0.157	0.138	0.153
Elementary occupations	0.165	0.185	0.183	0.193	0.231	0.242	0.184	0.200	0.185	0.141	0.161	0.222	0.164	0.140	0.200	0.173	0.127	0.186
Mining and quarrying	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.003	0.006	0.001	0.001	0.007	0.008	0.000	0.003	0.000	0.002	0.000
Manufacturing	0.139	0.095	0.220	0.107	0.039	0.035	0.098	0.175	0.134	0.193	0.195	0.094	0.142	0.074	0.138	0.208	0.243	0.270
Prod. of electr.gas and water	0.002	0.003	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.004	0.000	0.000	0.000	0.000
Construction	0.187	0.233	0.190	0.253	0.240	0.225	0.287	0.280	0.234	0.128	0.218	0.267	0.204	0.138	0.274	0.231	0.135	0.261
Trade	0.188	0.187	0.152	0.203	0.197	0.222	0.205	0.142	0.141	0.204	0.212	0.195	0.184	0.182	0.200	0.142	0.156	0.159
Hospitality	0.072	0.090	0.066	0.094	0.231	0.176	0.095	0.053	0.073	0.056	0.057	0.074	0.073	0.057	0.051	0.074	0.050	0.074
Transport and commun.	0.050	0.044	0.064	0.041	0.039	0.064	0.039	0.054	0.041	0.045	0.044	0.045	0.049	0.075	0.042	0.035	0.038	0.033
Financial intermediation	0.032	0.030	0.027	0.006	0.025	0.025	0.000	0.035	0.040	0.033	0.027	0.025	0.036	0.050	0.012	0.002	0.011	0.004
Real estate and rental	0.169	0.146	0.143	0.175	0.086	0.139	0.160	0.114	0.157	0.167	0.121	0.134	0.145	0.263	0.151	0.140	0.155	0.119
Education	0.045	0.051	0.024	0.030	0.036	0.017	0.035	0.044	0.042	0.056	0.039	0.024	0.024	0.048	0.021	0.032	0.079	0.042
Health	0.084	0.090	0.091	0.055	0.065	0.090	0.043	0.102	0.113	0.085	0.061	0.126	0.099	0.072	0.086	0.116	0.104	0.013
Other social and services act.	0.029	0.029	0.022	0.036	0.044	0.028	0.023	0.013	0.019	0.031	0.022	0.012	0.037	0.037	0.021	0.019	0.027	0.026
Size<20	0.383	0.431	0.431	0.485	0.499	0.384	0.515	0.461	0.443	0.355	0.438	0.551	0.466	0.243	0.480	0.405	0.358	0.517
Size 20-49	0.204	0.197	0.225	0.247	0.235	0.216	0.272	0.242	0.235	0.207	0.212	0.217	0.219	0.149	0.248	0.297	0.225	0.400
Size 50-99	0.097	0.093	0.102	0.094	0.097	0.117	0.099	0.092	0.083	0.100	0.107	0.078	0.098	0.088	0.106	0.114	0.101	0.070
Size 100-199	0.064	0.066	0.053	0.035	0.051	0.091	0.047	0.045	0.069	0.062	0.061	0.028	0.049	0.076	0.050	0.076	0.080	0.012
Size 200-499	0.086	0.060	0.075	0.099	0.051	0.071	0.068	0.079	0.079	0.101	0.060	0.068	0.073	0.122	0.038	0.026	0.122	0.000
Size>499	0.166	0.153	0.114	0.040	0.067	0.121	0.000	0.081	0.091	0.176	0.122	0.058	0.095	0.322	0.078	0.083	0.113	0.000
Coll. agr.: sectoral national	0.370	0.292	0.354	0.361	0.310	0.286	0.350	0.370	0.347	0.405	0.394	0.240	0.308	0.495	0.423	0.226	0.125	0.383
Coll. agr.: sectoral subnational	0.563	0.593	0.583	0.632	0.690	0.688	0.636	0.620	0.636	0.536	0.569	0.752	0.672	0.409	0.577	0.756	0.671	0.600
Coll. agr.: firm	0.067	0.115	0.062	0.008	0.000	0.026	0.014	0.011	0.017	0.059	0.036	0.007	0.021	0.096	0.000	0.018	0.204	0.018
Proportion unskilled in firm	0.165	0.185	0.183	0.193	0.231	0.242	0.184	0.200	0.185	0.141	0.161	0.222	0.164	0.140	0.200	0.173	0.127	0.186
Proportion skilled in firm	0.263	0.214	0.220	0.190	0.173	0.174	0.194	0.186	0.217	0.310	0.217	0.172	0.198	0.372	0.173	0.240	0.289	0.164
Proportion prim. stud. in firm	0.276	0.301	0.295	0.196	0.370	0.352	0.288	0.289	0.315	0.241	0.347	0.271	0.289	0.221	0.337	0.283	0.211	0.517
Proportion tert. stud. in firm	0.285	0.250	0.251	0.237	0.182	0.205	0.211	0.210	0.282	0.299	0.233	0.217	0.275	0.362	0.190	0.351	0.409	0.241
Proportion females in firm	0.414	0.368	0.399	0.416	0.440	0.410	0.395	0.363	0.409	0.450	0.369	0.365	0.429	0.454	0.364	0.428	0.418	0.375
Proportion immigr. in firm	0.093	0.054	0.127	0.041	0.165	0.092	0.061	0.106	0.065	0.112	0.112	0.024	0.035	0.115	0.142	0.118	0.034	0.135
Proportion fixed-term in firm	0.308	0.431	0.301	0.398	0.311	0.343	0.326	0.386	0.345	0.218	0.318	0.381	0.326	0.259	0.374	0.278	0.283	0.264
Proportion part-time in firm	0.168	0.187	0.178	0.171	0.134	0.126	0.165	0.125	0.172	0.185	0.155	0.147	0.141	0.165	0.170	0.165	0.170	0.162

Table A.2. Descriptive evidence (average) of explanatory variables. 2010.

	Spain	Andalusia	Aragon	Asturias	Bal. Isl.	Canary Isl.	Cantabria	C-La Man. C. y León	Catalonia	Com.Val.	Extremad.	Galicia	Madrid	Murcia	Navarra	Basque C.	Rioja	
Male	0.543	0.552	0.574	0.601	0.550	0.519	0.590	0.590	0.565	0.519	0.540	0.609	0.545	0.520	0.544	0.615	0.590	0.603
Inmigrant	0.090	0.045	0.112	0.053	0.167	0.115	0.062	0.090	0.060	0.118	0.091	0.025	0.035	0.114	0.080	0.094	0.046	0.134
Age<30	0.186	0.205	0.186	0.198	0.211	0.166	0.182	0.217	0.176	0.185	0.165	0.203	0.189	0.190	0.211	0.194	0.139	0.182
Age>45	0.302	0.274	0.313	0.290	0.310	0.297	0.342	0.281	0.350	0.303	0.317	0.310	0.315	0.290	0.270	0.298	0.353	0.312
Age 30-45	0.512	0.521	0.501	0.512	0.479	0.537	0.477	0.501	0.474	0.512	0.519	0.487	0.496	0.520	0.520	0.508	0.509	0.507
Education: primary	0.188	0.204	0.242	0.167	0.208	0.226	0.207	0.245	0.227	0.170	0.211	0.202	0.203	0.142	0.241	0.218	0.167	0.326
Education: secondary	0.500	0.518	0.461	0.566	0.602	0.538	0.517	0.527	0.503	0.492	0.509	0.571	0.527	0.469	0.512	0.466	0.453	0.413
Education: tertiary	0.312	0.278	0.298	0.268	0.190	0.236	0.277	0.228	0.270	0.338	0.281	0.227	0.270	0.389	0.247	0.316	0.380	0.261
Tenure	7.623	6.788	8.257	7.647	6.644	6.776	8.641	6.566	8.336	7.831	7.952	6.646	7.404	7.521	6.623	8.680	9.711	7.888
Fixed-term contract	0.217	0.309	0.215	0.274	0.253	0.244	0.236	0.264	0.236	0.167	0.190	0.286	0.242	0.179	0.252	0.211	0.230	0.169
Part-time	0.208	0.257	0.190	0.194	0.327	0.196	0.175	0.171	0.218	0.214	0.219	0.165	0.172	0.176	0.246	0.197	0.187	0.230
Supervisory tasks	0.174	0.173	0.191	0.171	0.187	0.163	0.192	0.166	0.139	0.188	0.169	0.153	0.160	0.176	0.164	0.187	0.171	0.183
Directors and managers	0.024	0.020	0.021	0.013	0.017	0.015	0.014	0.014	0.016	0.029	0.021	0.011	0.016	0.034	0.010	0.017	0.027	0.017
Techn. and scient. prof.	0.137	0.122	0.113	0.081	0.078	0.105	0.094	0.105	0.109	0.146	0.133	0.117	0.103	0.192	0.118	0.098	0.126	0.076
Technicians and assoc. prof.	0.147	0.119	0.158	0.134	0.127	0.096	0.138	0.113	0.122	0.166	0.138	0.121	0.127	0.173	0.134	0.157	0.170	0.135
Office and admin. staff	0.123	0.119	0.109	0.095	0.140	0.130	0.095	0.095	0.101	0.137	0.137	0.087	0.102	0.135	0.105	0.085	0.104	0.105
Caterers and vendors	0.214	0.266	0.166	0.250	0.300	0.290	0.200	0.207	0.209	0.196	0.194	0.220	0.204	0.209	0.227	0.134	0.177	0.174
Workers skilled in agriculture	0.003	0.003	0.002	0.006	0.009	0.002	0.004	0.001	0.005	0.004	0.002	0.001	0.004	0.001	0.000	0.000	0.004	0.002
Skilled in manuf. and constr.	0.136	0.126	0.185	0.222	0.126	0.114	0.206	0.189	0.157	0.115	0.132	0.202	0.195	0.096	0.180	0.212	0.177	0.214
Oper. of plant and machinery	0.095	0.094	0.128	0.103	0.068	0.073	0.129	0.137	0.142	0.089	0.107	0.105	0.137	0.054	0.096	0.194	0.113	0.156
Elementary occupations	0.121	0.129	0.118	0.098	0.134	0.176	0.119	0.138	0.139	0.118	0.136	0.137	0.115	0.102	0.130	0.103	0.103	0.121
Mining and quarrying	0.001	0.001	0.002	0.003	0.000	0.000	0.001	0.003	0.005	0.000	0.001	0.005	0.003	0.000	0.002	0.001	0.001	0.001
Manufacturing	0.178	0.127	0.294	0.266	0.064	0.062	0.271	0.237	0.236	0.193	0.205	0.155	0.232	0.094	0.199	0.445	0.303	0.387
Prod. of electr.gas and water	0.009	0.015	0.004	0.002	0.011	0.007	0.003	0.004	0.004	0.010	0.014	0.005	0.006	0.007	0.008	0.003	0.006	0.003
Construction	0.098	0.113	0.112	0.148	0.125	0.086	0.141	0.145	0.126	0.078	0.084	0.188	0.137	0.074	0.129	0.115	0.088	0.141
Trade	0.253	0.266	0.231	0.266	0.249	0.318	0.222	0.247	0.223	0.248	0.275	0.262	0.257	0.248	0.320	0.167	0.201	0.202
Hospitality	0.081	0.090	0.057	0.095	0.262	0.210	0.097	0.062	0.065	0.070	0.082	0.055	0.063	0.068	0.063	0.049	0.053	0.087
Transport and commun.	0.030	0.016	0.019	0.012	0.012	0.013	0.009	0.010	0.012	0.028	0.017	0.015	0.013	0.074	0.010	0.009	0.025	0.007
Financial intermediation	0.030	0.030	0.022	0.009	0.016	0.016	0.007	0.030	0.024	0.032	0.030	0.013	0.017	0.050	0.007	0.007	0.021	0.014
Real estate and rental	0.151	0.146	0.116	0.126	0.114	0.145	0.097	0.100	0.120	0.152	0.125	0.092	0.126	0.223	0.097	0.100	0.135	0.089
Education	0.035	0.031	0.026	0.011	0.012	0.017	0.000	0.008	0.024	0.052	0.044	0.016	0.011	0.044	0.014	0.012	0.037	0.018
Health	0.097	0.120	0.088	0.020	0.096	0.089	0.114	0.126	0.132	0.093	0.089	0.158	0.100	0.080	0.120	0.061	0.098	0.017
Other social and services act.	0.037	0.045	0.029	0.042	0.039	0.037	0.038	0.028	0.029	0.042	0.033	0.035	0.037	0.036	0.031	0.030	0.031	0.033
Size<20	0.418	0.470	0.481	0.532	0.568	0.469	0.536	0.558	0.498	0.361	0.445	0.653	0.512	0.276	0.565	0.461	0.403	0.629
Size 20-49	0.145	0.140	0.157	0.154	0.138	0.134	0.142	0.156	0.138	0.161	0.154	0.144	0.147	0.119	0.145	0.161	0.160	0.216
Size 50-99	0.087	0.081	0.077	0.084	0.063	0.087	0.067	0.066	0.067	0.104	0.089	0.052	0.081	0.085	0.088	0.094	0.093	0.100
Size 100-199	0.073	0.066	0.051	0.055	0.061	0.084	0.044	0.060	0.058	0.081	0.072	0.044	0.070	0.083	0.063	0.084	0.086	0.027
Size 200-499	0.094	0.076	0.093	0.046	0.069	0.069	0.078	0.092	0.106	0.105	0.081	0.034	0.092	0.119	0.054	0.128	0.101	0.029
Size>499	0.183	0.167	0.141	0.129	0.101	0.156	0.114	0.068	0.133	0.189	0.159	0.073	0.098	0.317	0.085	0.073	0.157	0.000
Coll. agr.: sectoral national	0.271	0.243	0.303	0.179	0.204	0.213	0.211	0.233	0.245	0.280	0.263	0.309	0.230	0.360	0.287	0.227	0.145	0.325
Coll. agr.: sectoral subnational	0.522	0.512	0.469	0.653	0.631	0.571	0.502	0.598	0.544	0.566	0.551	0.525	0.600	0.398	0.570	0.513	0.527	0.634
Coll. agr.: firm	0.207	0.245	0.228	0.168	0.165	0.216	0.287	0.169	0.211	0.154	0.185	0.166	0.170	0.242	0.143	0.260	0.328	0.042
Proportion unskilled in firm	0.121	0.129	0.115	0.097	0.134	0.173	0.124	0.137	0.142	0.117	0.135	0.139	0.114	0.102	0.130	0.100	0.102	0.123
Proportion skilled in firm	0.309	0.266	0.291	0.238	0.225	0.220	0.251	0.235	0.249	0.342	0.295	0.251	0.251	0.399	0.263	0.283	0.324	0.233
Proportion prim. stud. in firm	0.189	0.206	0.238	0.165	0.209	0.222	0.203	0.244	0.224	0.171	0.208	0.208	0.205	0.143	0.245	0.205	0.168	0.324
Proportion tert. stud. in firm	0.312	0.282	0.294	0.275	0.193	0.237	0.279	0.229	0.270	0.335	0.284	0.228	0.272	0.388	0.247	0.314	0.374	0.268
Proportion females in firm	0.452	0.447	0.422	0.417	0.447	0.477	0.406	0.407	0.430	0.472	0.457	0.390	0.451	0.471	0.452	0.389	0.411	0.404
Proportion immigr. in firm	0.089	0.046	0.113	0.054	0.164	0.111	0.065	0.091	0.061	0.117	0.092	0.028	0.035	0.112	0.080	0.092	0.047	0.134
Proportion fixed-term in firm	0.217	0.313	0.216	0.272	0.253	0.240	0.234	0.264	0.239	0.166	0.197	0.288	0.240	0.178	0.243	0.207	0.224	0.177
Proportion part-time in firm	0.210	0.257	0.193	0.193	0.326	0.195	0.178	0.176	0.219	0.216	0.225	0.165	0.174	0.175	0.251	0.200	0.189	0.231

Table A.4. Purchasing power parities of Spanish regions.

	2012	2006	2010	2014
Andalusia	92.70	93.18	92.94	92.46
Aragon	96.40	96.16	96.50	96.16
Asturias	87.90	87.75	87.75	87.71
Balearic Islands	98.90	99.50	99.17	99.39
Canary Islands	83.10	85.33	83.92	82.29
Cantabria	99.10	98.51	98.75	99.70
Castilla-La Mancha	84.80	84.44	84.30	84.87
Castilla y León	88.00	88.23	87.65	87.66
Catalonia	108.50	107.04	107.98	109.15
Comunidad Valenciana	93.00	93.23	93.09	92.78
Extremadura	80.30	80.61	80.35	79.89
Galicia	92.40	92.70	92.30	92.62
Madrid	114.50	114.60	114.69	114.34
Murcia	94.80	95.21	94.99	94.86
Navarra	110.60	111.60	110.48	110.05
Basque Country	107.70	107.37	107.94	108.21
Rioja	90.40	90.30	90.08	90.27
Spain	100.00	100.00	100.00	100.00

Notes: Original regional purchasing power parities correspond to 2012 and are drawn from Costa et al. (2015). In order to calculate the values corresponding to 2006, 2010 and 2014, respectively, the change in the value of the consumer price index between each year and 2012 (measured from the average of all the months of the year) of each region has been applied (normalized with respect to the national average).

Table A.5. Correlation between observed regional wages along percentiles of the wage distribution.

	2006	2010	2014
10-50	0.427*	0.541**	0.583**
50-90	0.499**	0.406	0.390
10-90	0.187	0.064	0.052

***, ** and * indicate significance at the 1% , 5% and 10% levels, respectively.

Table A.6. Correlation between estimated pure (net of composition effects) regional wages along percentiles of the wage distribution.

	2006	2010	2014
10-50	0.735***	0.854***	0.803***
50-90	0.489**	0.491**	0.556**
10-90	0.729***	0.598**	0.452**

***, ** and * indicate significance at the 1% , 5% and 10% levels, respectively.