IS THE RULE OF LAW SIGNIFICANT FOR EXPLANATION OF DIFFERENCES IN THE GENDER PAY GAP?

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Abstract

Using data from European Union Statistics on Income and Living Conditions, the study examines the causes of variation in the unexplained gender pay gap among 25 European countries and considers the effect of the legal environment on these. We employ the Oaxaca-Blinder decomposition to estimate the unexplained part of the gender pay gap. To assess the impact of the rule of law on unexplained gender wage differences, we apply a linear regression model, where the estimated unexplained gender pay gap is used as a dependent variable and selected rule of law indicators (specifically the Worldwide Governance Indicators Rule of Law and the Legal System & Property Rights Index) as explanatory variables. Controlling for other institutions affecting gender wage differences (specifically labour market regulation, work-family reconciliation policy and male wage dispersion), we suggest that differences in the quality of legislation and law enforcement across European countries may partly account for the variation in the unexplained gender pay gap. A very progressive improvement in rule of law indices (from the worst to the best among the 25 European countries examined) leads to a decrease in the unexplained gender pay gap by 4.5–5 percentage points.

Keywords: Discrimination, gender pay gap, gender, rule of law, legislative quality, law enforcement
JEL Classification: J16, J31, J71, K30

1. Introduction

The existence of wage differences between men and women is a well-known fact. Empirical studies show that a part of the existing gender wage differences can be attributed to differences between the characteristics of men and women, especially between company-related characteristics of men and women such as the occupation and sector (Plantenga *et al.*, 2006). However, differences between the average characteristics of men and women provide an explanation for only a part of the gender pay gap. The remainder of the gender wage differences remains unexplained. Studies also show that the raw gender pay gap and its unexplained part varies among countries (for example, Christofides *et al.*, 2013; Plantenga *et al.*, 2006; Mysíková, 2012; Hedija, 2015). The causes of gender wage differences and differences among countries continue to be an economic mystery.

The role of institutions in explaining country-specific gender pay gaps is confirmed by many empirical studies. Authors of these studies have examined especially the role of the labour market policy, family policy and wage-setting institutions in explaining

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the differences among countries (Blau and Kahn, 2003; Arulampalam, 2007; Christofides *et al.*, 2013). However, the labour market and family policy and union coverage are not the only factors causing the differences in the unexplained gender pay gap. Other institutions, such as the quality of legislation and law enforcement, could also play a role due to the fact that a part of the gender pay gap may be attributed to wage discrimination against women on the labour market. Equal behaviour towards men and women and the right to receive equal compensation for the same or equivalent work belong among the basic rights in all European counties. However, the implementation and especially the enforcement of law may vary significantly in the individual countries and may be closely related to differences in the unexplained gender pay gap.

This study aims at finding out whether, and to what extent, existing differences in the unexplained gender wage gap in European countries could be explained by differences in the quality of legislation and law enforcement in these countries.

In this study, we use data from the European Statistics on Income and Living Conditions (EU-SILC) for 25 European countries for the period 2010–2012. Firstly, we estimate the unexplained part of the gender pay gap in each country using the Oaxaca-Blinder decomposition. The unexplained gender pay gaps vary significantly throughout our sample of European countries, as these range on average from 0.05 in the Netherlands to 0.30 in Estonia. To explore the causes of these differences in the unexplained gender pay gap among countries, we employ a linear regression model, where the unexplained gender pay gap is used as the dependent variable. As explanatory variables we use selected rule of law indicators, which we supplement with additional controls for institutions that may also affect gender wage differences. We conclude that the impact of the legal environment on the unexplained gender wage differences is not negligible. A very progressive improvement in rule of law indices (from the worst to the best among the 25 European countries examined) leads to a decrease in the unexplained gender pay gap by 4.5–5 percentage points. Here, the present study extends the existing literature by providing new evidence of the impact of legislative quality and law enforcement on countries' variation in the unexplained gender pay gap.

The paper is organised as follows. Section 2 provides background information on gender wage differences. Sections 3 and 4 present the data and methodology used. To estimate the unexplained part of the gender pay gap, we use the Oaxaca-Blinder type of decomposition. In Section 5, we apply the methods to EU-SILC data for 25 European countries and investigate the relationship between the estimated part of the unexplained gender pay gap and legislative quality. Section 6 contains the conclusion.

2. Gender Pay Gap and Institutions

According to statistical data, wage differences between men and women persist in European countries despite the implementation of legislation guaranteeing equal opportunities for men and women and non-discrimination by gender. The lower average wage of women in comparison with men is traditionally explained by gender-specific factors such as female shortfalls in human capital, horizontal and vertical segregation and wage discrimination.

Empirical studies show that the gender pay gap varies across countries, and it is not only overall (raw) gender wage difference that varies, but large differences can also be identified in the unexplained part of the gender pay gap. The key factor in explaining differences in the country-specific gender wage gap is formal and informal institutions. The quantification of the effect of selected institutions on the gender pay gap is the main task of some empirical studies.

The earliest studies that deal with this issue are the ones by Blau and Kahn (1992 and 1996). Here, the authors present the wage inequality as an important factor explaining differences in the gender pay gap among countries. Based on pair-wise comparisons of the United States with nine advanced industrial countries (Australia, Austria, Britain, Hungary, Italy, Norway, Sweden, Switzerland, and West Germany), they conclude that a higher level of wage inequality in the United States is the primary reason for its relatively high gender pay gap.

In a later study, Blau and Kahn (2003) use a broader sample of countries and examine the factors behind their wage inequality. They confirm the important effect of wage-setting institutions on the gender pay gap. They use micro-data from the International Social Survey Programme for 22 countries over the period 1985–1994 and find the gender wage gap to be lower in countries with more compressed male wage structures and a lower female net supply. They conclude that the extent of collective bargaining coverage in each country has a significant negative effect on the gender pay gap. Women tend to be at the bottom of the wage distribution in all the countries, and high wage floors which are associated with highly centralised, unionised wage setting raise the relative pay of women.

The role of wage-setting institutions in explaining the variation in the gender pay gap by country is also confirmed by Arulampalam *et al.* (2007). In this study, the authors analyse gender pay gaps across the wage distribution in 11 countries using micro-data from the European Community Household Panel over the period 1995–2001. The glass ceiling and the sticky floor effects are identified. The unexplained gender pay gap widened towards the top of the wage distribution and, in a few cases, also at the bottom. The unexplained gender pay gap varies among countries and also between the public and private sectors. To explain the differences in gender pay gaps among countries (especially the glass ceiling effects), the authors use a simple correlation between the unexplained gender pay gap and the work-family reconciliation index, wage dispersion and union coverage. They conclude that differences in childcare provision and wage-setting institutions across EU countries may partly account for the variation in the unexplained gender pay gap.

Similar conclusions are also shown by Christofides *et al.* (2013). They use a broader dataset covering data for 26 European countries from the European Union Statistics on Income and Living Conditions 2007. Similarly to Arulampalam *et al.* (2007), they find the unexplained gender pay gaps to vary across countries, and in a number of countries they identify the glass ceiling and sticky floor effects. They use the linear regression model to explore the influence of country-specific policies which reconcile the work and family life and a country's wage-setting institutions, and confirm a quantitatively important relationship between the unexplained gender pay gap and country-specific policies and institutions.

Contrary to both studies mentioned above, Mandel and Semyonov (2005) came to different conclusions. They used hierarchical linear models and data for 20 European countries for the period 1991–2000 to examine the relationship of family-friendly policy and gender wage inequality. They found out that a lower gender wage gap is identified in countries having more family-friendly policies. However, if they controlled for cross-country differences in the wage structure, the effect of family policy disappeared. Hence, they concluded that the variation in gender wage differences among countries might be explained by an egalitarian wage structure rather than the work-family reconciling policy.

Recent studies are primarily focused on assessing the impact of labour market regulations and family policy on the gender pay gap. There is no study examining the impact of legislative quality, and that is the aim of this paper.

The quality of legislation and law enforcement might affect the unexplained gender wage gap through more channels. The unexplained gender pay gap reflects potential wage discrimination against women. Better quality of anti-discrimination legislation and its higher enforceability may lead directly to a reduction in wage discrimination against women and a decrease in the unexplained gender pay gap. It may also mitigate the glass ceiling and sticky floor effects that women are exposed to on the labour market, allowing women with the same education and skills as men to achieve better jobs and corresponding higher wages. Legislative quality and law enforcement might also act indirectly on gender wage differences through better enforcement of work-family reconciliation policy measures and labour market regulations, which could reduce the gender wage differences and their unexplained part.

3. Data

We use data from the European Union Statistics on Income and Living Conditions (EU-SILC). The EU-SILC covers multidimensional micro-data on income, poverty, social exclusion and living conditions. The data are based on a rotational design with 4 sub-samples. It means that one quarter of the sample is changed every year. One household stays in the sample for four years. It provides two types of data: cross-sectional and longitudinal. The former include data pertaining to a given time or a certain time period, and a person's identification number is not stable in time; the latter contains individual-level data observed periodically over a four-year period, and unfortunately, it contains only selected information which is not sufficient for our purpose.

The study is based on cross-sectional data for 2010–2012, which can be found in EU-SILC 2011, 2012 and 2013. We selected the data for 25 European countries which contain all the necessary information for our analysis.[1] The EU-SILC data do not contain information on hourly wages; therefore, it was necessary to narrow the sample to be able to calculate these using available data. We narrowed the reference population sample to persons who were employed during the reference period, had an all-twelve-month full-time

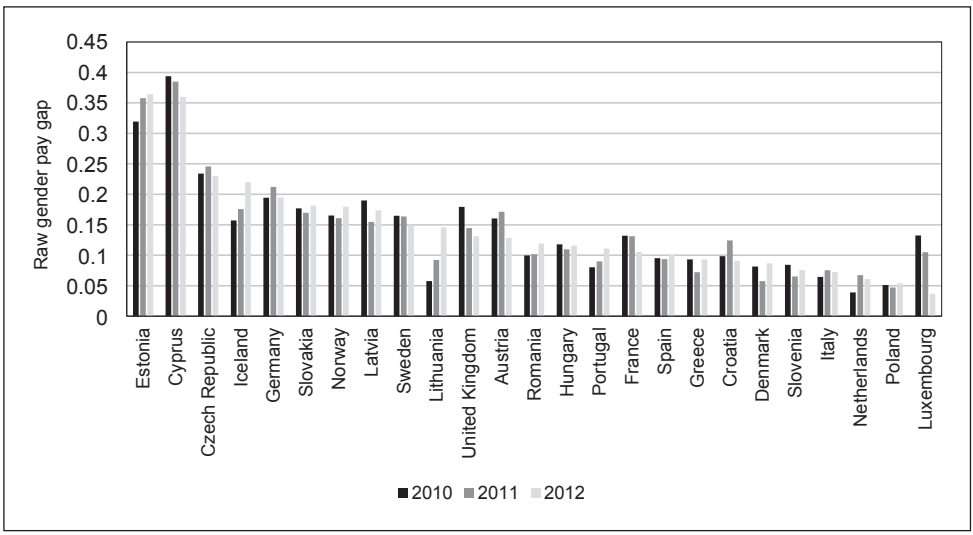
1 Austria, Cyprus, the Czech Republic, Denmark, Germany, Estonia, Greece, Spain, France, Croatia, Hungary, Iceland, Italy, Luxembourg, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Slovakia, Sweden and the United Kingdom.

job, had no other jobs, and earned an income. We excluded the self-employed, as the wage differences among self-employed men and women give no indication of the potential wage discrimination against women. The earnings of the self-employed are closely linked to realised or declared profits and are not dependent on the decision of another person.

The cross-sectional data used are not panel data because of the rotational design. Due to personal identification numbers changing in time, it is not possible to create a panel. Nevertheless, if we use the sample for three years, one half of the households in the sample remain unchanged. Every subsample is also representative of the whole population. It should be sufficient to accurately reflect the actual wage differences and their changes over time.

Figure 1 shows the raw gender pay gap, which is calculated as the difference between the means of the logarithms of the male and female gross hourly wages. The countries are ordered by the gender pay gap in 2012. We can see that Estonia, Cyprus and the Czech Republic belong to countries having the largest raw gender wage differences. On the other hand, the smallest differences between men's and women's wages are observed in Italy, the Netherlands and Poland during the whole study period.

Figure 1 | Raw Gender Pay Gap in European Countries

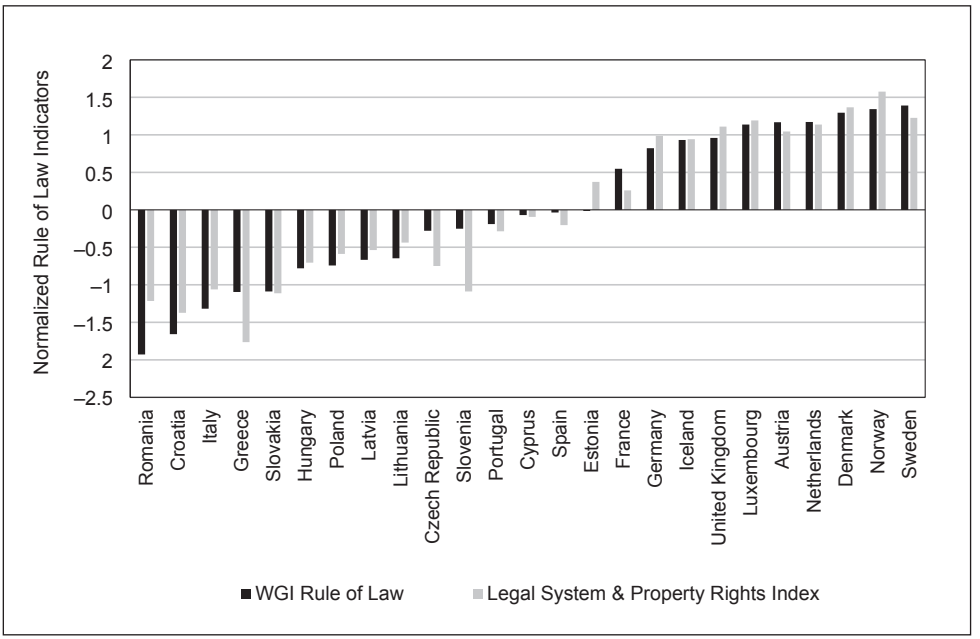


Source: EU-SILC 2011, 2012 and 2013 micro-data, author's computations

When taking the relationship between the unexplained gender pay gap and the legal environment into consideration, we choose selected indicators which allow us to quantify the quality of legislation and law enforcement in individual countries. For our purpose, the most useful ones are: the World Governance Indicators Rule of Law (WGI Rule of Law) and the Legal System & Property Rights Index. The WGI Rule of Law is published by the World Bank as a part of the Worldwide Governance Indicators "capturing perceptions of the extent to which agents have confidence in and abide by the rules of society,

and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence" (Kaufmann, Kraay, and Mastruzzi, 2010, p. 4). It is an aggregate indicator which is based on many data sources such as the World Economic Forum Global Competitiveness Report, Economic Intelligence Unit, Freedom House, Heritage Foundation, *etc.* The indicator originally ranges from −2.5 to 2.5, where a higher value means a better rule of law (for more details, see Kaufmann, Kraay and Mastruzzi, 2010). To get a more objective picture of the legal environment in individual countries, we also use the Legal System & Property Rights Index. This index is published by the Fraser Institute as a part of the Index of Economic Freedom, and offers a picture of the extent to which the countries abide by the rule of law. The Index is composed of nine components: Judicial Independence, Impartial Courts, Protection of Property Rights, Military Interference in Rule of Law and Politics, Integrity of the Legal System, Legal Enforcement of Contracts, Regulatory Costs of the Sale of Real Property, Reliability of Police, and Business Costs of Crime. The index ranges from 0 to 10, where a higher value corresponds to a better rule of law. As in the case of the first indicator, data for the index calculation are drawn from more sources, namely the World Economic Forum Global Competitiveness Report, World Bank Doing Business and the PRS Group International Country Risk Guide (for more details, see Gwartney *et al.*, 2016). The main advantage of these indicators is that yearly data have been available for all the European countries since 1996 (WGI Rule of Law) and 2000 (Legal System & Property Rights Index). We use 2010, 2011 and 2012 data.

Figure 2 | Legislative Quality and Law Enforcement in European Countries (2010–2012)



Source: Gwartney *et al.* (2016), Kaufmann, Kraay and Mastruzzi (2010), author's computations

Figure 2 illustrates the situation of legislative quality and law enforcement in European countries in the period 2010–2012 evaluated by means of the rule of law indicators. For better interpretation and clarity, we normalise both rule of law indicators, whose means equal zero and whose standard deviations equal unity. The zero value implies that the country concerned is at the average value for the examined countries. The countries are ordered by their values of WGI Rule of Law. As the figure shows, the best quality of legislation was observed in the Scandinavian countries, the lowest in Romania, Croatia, Italy and Greece. However, the ranking of countries varies slightly according to individual indicators. The highest differences among the indicators were for Slovenia, Romania, Greece and the Czech Republic.

4. Methods

To establish the unexplained part of the gender pay gap in European countries, we use the Oaxaca-Blinder decomposition. This method belongs among the most frequently used methods of decomposing wage differences. It allows us to divide the gender pay gap into the part which can be explained by different characteristics of men and women and the part that remains unexplained and is often attributed to wage discrimination against women (Oaxaca, 1973; Blinder, 1973).

The Oaxaca-Blinder decomposition is given by

$$\ln(\bar{W}_m) - \ln(\bar{W}_f) = (\bar{X}_m - \bar{X}_f) \cdot \beta^* + (\hat{\beta}_m - \beta^*) \cdot \bar{X}_m + (\beta^* - \hat{\beta}_f) \cdot \bar{X}_f . \quad (1)$$

Where $\bar{W}_m$ and $\bar{W}_f$ are the values of average hourly earnings for men of women, $\bar{X}_m$ and $\bar{X}_f$ are vectors of average characteristics for both genders, $\hat{\beta}_m$ and $\hat{\beta}_f$ are the vectors of the wage function coefficients, β^* is the vector of wage function coefficients in the absence of discrimination (equilibrium wage). The term $\ln(\bar{W}_m) - \ln(\bar{W}_f)$ expresses the raw gender pay gap, which is defined as the difference between logarithmic mean wages of men and women. The term $(\bar{X}_m - \bar{X}_f) \cdot \beta^*$ represents the part of the gender pay gap which is explained by different characteristics of men and women in the sample. This part of the pay difference is known as the endowment effect. Finally, the term $(\hat{\beta}_m - \beta^*) \cdot \bar{X}_m + (\beta^* - \hat{\beta}_f) \cdot \bar{X}_f$ is the unexplained part of the gender pay gap, where the first part is the male advantage and the other is the female disadvantage. This is known as the remuneration effect or the effect of discrimination.

The decomposition is based on an estimate of the wage functions for men and women. The wage equations for men and women are defined as follows:

$$\ln(W_i)_m = \beta_m \cdot (X'_i)_m + (u_i)_m , \quad (2)$$

$$\ln(W_i)_f = \beta_f \cdot (X'_i)_f + (u_i)_f . \quad (3)$$

Where $(W_i)_m$ and $(W_i)_f$ are the gross hourly earnings of the *i*-th man and the *i*-th woman, $(X'_i)_m$ and $(X'_i)_f$ are the vectors of the chosen characteristics of the *i*-th man and the *i*-th woman, β_m and β_f are the vectors of coefficients of male and female wage function, and u_i is a disturbance term.

The next step in the decomposition is setting the non-discriminatory wage structure. In empirical studies working with the Oaxaca-Blinder decomposition, we can find various concepts of the equilibrium wage (β^*). We set the non-discriminatory wage structure using the pooled sample as proposed by Neumark (1988) and Oaxaca and Ransom (1994). We estimate the coefficients of the wage function for the whole sample as follows:

$$\ln(W_i) = \beta^* \cdot X'_i + u_i . \quad (4)$$

Where W_i is the gross hourly earnings of the i-th employee, X'_i is the vector of the chosen characteristics of the i-th employee, β^* is the vector of wage function coefficients, and u_i is a disturbance term.

As a response variable to the wage functions (Equations 2, 3 and 4), we use the logarithm of the gross hourly earnings. It is calculated as the employee's cash, near-cash and non-cash incomes per year divided by the number of hours usually worked per year (including overtime).[2] We use selected personal characteristics (age, age squared, education, sickness and partnership) and company characteristics (occupation, sector, company size, contract and managerial position) as explanatory variables.[3] Age and education are the proxies for human capital: age indicates the age in years, and education is a set of dummy variables which denotes the highest level of education that a person has successfully completed using the ISCED 1997 educational classification. Sickness is a dummy variable which denotes whether the employee was temporarily unable to work due to a sickness during the income reference period. Partnership is a dummy variable which indicates whether the person has a partner living in the same household. Occupation is a set of dummy variables which indicates the person's occupation according to ISCO-88 (two digits). Sector is a set of dummy variables which denotes the branch in accordance with NACE Rev. 2. Company size is a dummy variable showing the number of persons in their main job. There are two categories: the size from 1 to 10 employees, and the size of more than 11 employees. Contract is a dummy variable which denotes the type of contract – whether permanent or temporary. Managerial position is a dummy variable reflecting a supervisory function, where the supervisory function means formal responsibility for supervising a group of other employees. We use the Ordinary Least Square (OLS) to estimate the coefficients of male, female and pooled wage functions (Equations 2, 3 and 4). Then, we calculate the unexplained part of the gender pay gap using Equation 1.

To estimate the impact of the quality of legislation and law enforcement on the gender pay gap, we apply a linear regression model. As the dependent variable, we use an estimate of the unexplained gender pay gap and as the explanatory variable, we use selected indicators of the rule of law, specifically the WGI Rule of Law and the Legal System & Property Rights Index. For better interpretation of results, we normalise both rule of law indicators to have the mean equal to zero and the standard deviation equal to unity.

2 A detailed description of cash and near-cash and non-cash incomes and their items is available in Eurostat (2017).

3 We employ age as an indicator of work experience. Data that indicate the number of years spent in a paid occupation are not available for all countries.

As we discussed earlier in the text, the differences in the unexplained gender pay gap among countries may be partially attributed to differences in the governance policy, wage-setting institutions and overall wage disparity. To take these factors into consideration and to be able to estimate the impact of the quality of legislation and law enforcement in the context of other factors, we control for the work-family reconciliation, labour market regulation level and male wage dispersion.

There is some evidence showing that countries with stronger wage-setting institutions manifest lower wage inequality and a lower level of gender wage differences. Stronger labour market regulation and a higher level of unionisation with well-organised and more centralised collective bargaining could reduce the unexplained wage differences between men and women (Blau and Khan, 2006; Arulampalam *et al.*, 2007; Christofides *et al.*, 2013). However, the effect of these institutions is not unambiguous. Female wages are in many cases lower than male ones, and women are more often at the low end of the wage distribution. Stronger labour market regulation settings and a higher amount of the minimum wage could primarily increase the female wages and decrease the gender pay gap. Blau and Kahn (1992 and 1996) showed that countries having higher unionisation rates tend to have lower wage disparity. On the contrary, unions may be less likely to represent the interests of women effectively if women are underrepresented and perceived as less dependent on the labour market (Booth and Francesconi, 2003). To reflect the impact of the level of unionisation and labour market regulation, we use the Labour Market Regulation Index published by the Fraser Institute as a part of the Index of Economic Freedom. The index consists of six components: Hiring Regulations and Minimum Wage, Hiring and Firing Regulations, Centralised Collective Bargaining, Hours Regulations, Mandated Costs of Worker Dismissal, and Conscription. It ranges from 0 to 10, where a higher value corresponds to a weaker labour market regulation (for more details, see Gwartney *et al.*, 2016). The advantage of this index is that yearly data are available.

Mandel and Semyonov (2005) concluded that a more egalitarian wage structure leads to lower gender wage differences. As we mentioned above, stronger labour market regulation could narrow the wage differences in the society. However, not only the importance of a wage-setting institution but also the solidarity and egalitarianism within the country may play a role, as low wage inequality cannot be merely a reflection of a higher level of unionisation and of strong labour market regulation. Solidarity and egalitarianism might be other factors leading to a lower unexplained gender pay gap. These factors might be historically determined and based on informal institutions rather than formal ones. Finally, we choose the male wage dispersion as another explanatory variable. We prefer male wage inequality to overall wage inequality because the latter might partly reflect the impact of antidiscrimination legislation on wage inequality, and we aim to consider these factors as independently as possible. On the other hand, there might also be some dependency between the rule of law and the male wage dispersion. A better quality of legislation and law enforcement implies better compliance and enforcement of a provision negotiated in the field of wages. However, our sample shows no correlation between the rule of law indicators and the male wage dispersion.

According to Arulampalam *et al.* (2007) and Christofides (2013), the government family policy is another factor affecting the size of the unexplained gender pay gap. However, the impact of a family-friendly policy on the unexplained gender pay gap is unclear as well. Some family-policy provisions, such as support to part-time jobs and good public childcare for young children, can shorten the duration of temporary job absence and motivate employers to invest in women employees. This might narrow gender wage differences and the unexplained part (Blau and Khan, 2003; Datta Gupta *et al.*, 2008). On the other hand, a higher maternity allowance and longer maternity leave may lead to lower motivation for a quick return to work and decrease the wage due to the loss of human capital (Ruhm, 1999). This results in a higher unexplained gender pay gap. To control for work-family reconciliation policy, we used the Index of Conditions for Work and Family Reconciliation (ICWFR) published in the study by Matysiak and Weziak-Białowolska (2016). This index consists of three main components: family policies containing provisions such as public childcare and parental leave mandates for women and men; labour market structures, including the flexibility of working hours and employment protection legislation that affect the costs of firing and hiring; and gender norms containing social norms regarding men's and women's roles. A higher value indicates a better condition for work-family reconciliation. This indicator refers to the period between 2008 and 2010, and the data came from several sources, *e.g.*, from Eurostat EU-SILC data, the European Labour Force Survey, OECD Family Policy Database, and Council of Europe Family Policy Database. The composite index ranges from 1 to 100, where a higher value corresponds to better conditions for reconciling the work and family lives (for more details, see Matysiak and Weziak-Białowolska, 2016). We converted the indicator into a scale from 1 to 10 to correspond with the range of the Labour Market Regulation Index. The main advantage of this index is the fact that its time corresponds to our needs and mainly, it takes into account not only formal institutions but also informal ones in the form of social norms defining men's and women's roles. Egalitarian gender norms and acceptance of mothers' employment can significantly affect gender wage differentials (Budig *et al.*, 2012).

5. Results and Discussion

To assess the effect of the quality of legislation and law enforcement on gender wage differences, we have to estimate the unexplained gender pay gap. Using the Oaxaca-Blinder decomposition, we calculate the unexplained part of the gender pay gap for 25 European countries separately for individual years and also for the whole period 2010–2012 using time-fixed effects. The results are shown in Table 1.

The estimated unexplained gender pay gap represents the gender pay gap which could not be explained by different observed characteristics of employed men and women in the sample, specifically differences in the average age, education level, sickness, partnership, occupation, job sector, company size, contract and managerial position. The highest unexplained gender pay gap is identified in Estonia and the Czech Republic, where it amounts to over 20 percent. It means that women earn 20 percent lower wages than men, and this difference could not be explained by any variation in observed characteristics of men and women. On the other

hand, the unexplained gender pay gap is at its lowest in the Netherlands, Denmark, Norway and France. In these countries less than 10 percent of the gender pay differences stay unexplained. We have to admit that the estimated unexplained wage differences that reflect potential wage discrimination against women might be somewhat biased. We take into account only observed differences between men and women, applying the wage difference decomposition.

Table 1 | Unexplained Part of Gender Pay Gap – Oaxaca-Blinder Decomposition

Country	2010	2011	2012	2010–2012[a]
Austria	0.125***	0.128***	0.109***	0.122***
Croatia	0.110***	0.123***	0.135***	0.134***
Cyprus	0.223***	0.180***	0.138***	0.184***
Czech Republic	0.220***	0.220***	0.219***	0.223***
Denmark	0.080***	0.056***	0.088***	0.074***
Estonia	0.284***	0.307***	0.303***	0.301***
France	0.100***	0.097***	0.080***	0.093***
Germany	0.097***	0.132***	0.119***	0.116***
Greece	0.112***	0.095***	0.100***	0.108***
Hungary	0.149***	0.143***	0.129***	0.144***
Iceland	0.195***	0.136***	0.197***	0.183***
Italy	0.125***	0.095***	0.092***	0.109***
Latvia	0.175***	0.146***	0.184***	0.172***
Lithuania	0.154***	0.176***	0.194***	0.178***
Luxembourg	0.105***	0.109***	0.080***	0.100***
Netherlands	0.039***	0.064***	0.042***	0.048***
Norway	0.085***	0.094***	0.088***	0.092***
Poland	0.132***	0.144***	0.147***	0.147***
Portugal	0.190***	0.151***	0.156***	0.175***
Romania	0.121***	0.118***	0.127***	0.124***
Slovakia	0.184***	0.175***	0.201***	0.185***
Slovenia	0.164***	0.164***	0.159***	0.164***
Spain	0.125***	0.119***	0.129***	0.126***
Sweden	0.142***	0.135***	0.134***	0.137***
United Kingdom	0.148***	0.130***	0.091***	0.123***

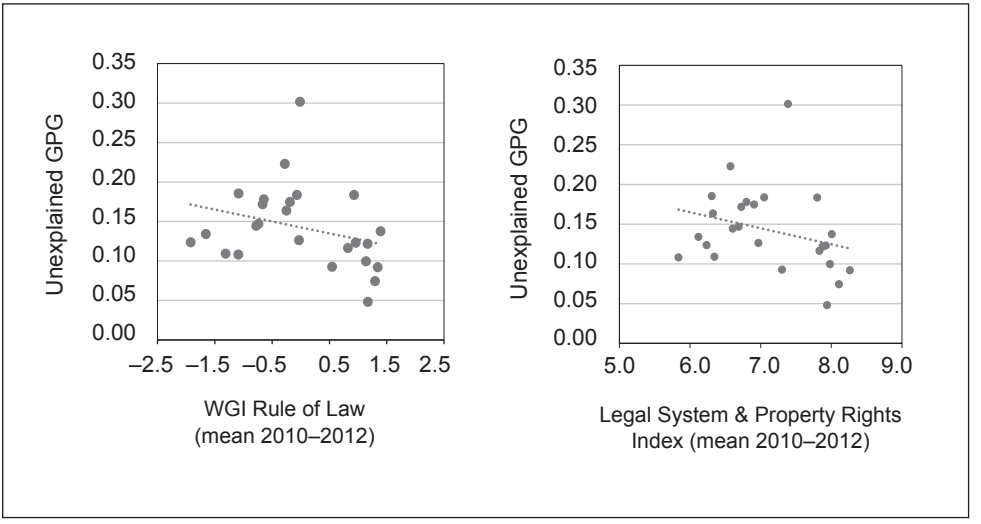
Notes: a. decomposition with time-fixed effects, ***significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level.

Source: EU-SILC 2011, 2012 and 2013 micro-data, author's computation

Unobserved knowledge and skills of individuals and different preferences and work deployment of men and women may play a very important role. Hedija (2015) shows that unexplained wage differences between men and women are lower if taking intra-household specialisation into account, and Filipová *et al.* (2012) identify very narrow unexplained gender wage differences using a very rich data set including cognitive and non-cognitive skills. Another problem is the selection bias that affects coefficients in the wage regression. Olivetti and Petrongolo (2008) show that selection into employment affects the gender wage gaps. Using alternative imputation techniques to recover the wages for the non-employed, they conclude that gender wage gaps observed in southern EU countries are underestimated due to a substantial portion of low-skilled women who are not employed.

Now, we focus on the relationship between the quality of legislation and the unexplained gender pay gap in the selected European countries. The examined relationship is shown in Figure 1 using scatter plots. We apply two indicators to evaluate the quality of legislation and law enforcement (the WGI Rule of Law and the Legal System & Property Rights Index). Higher indicator values indicate a better quality of legislation and law enforcement. Potential wage discrimination against women is represented by estimates of the unexplained gender pay gap. The figures presented show the relationship using data for the period 2010–2012. Rule of law indices are computed as a mean, and the unexplained gender pay gaps for individual countries are estimated using time-fixed effects. Both scatter plots indicate the existence of a possible inversely proportional relationship between the rule of law indices and the unexplained gender pay gap. Countries having better legislation and law enforcement also report a lower unexplained gender pay gap.

Figure 3 | Relationship Between Rule of Law and Unexplained Gender Pay Gap (2010–2012 data)



Source: EU-SILC 2011, 2012 and 2013 micro-data, Kaufmann, Kraay, and Mastruzzi (2010), Gwartney *et al.* (2016), author's computation

To explore this relationship in more detail, we apply a linear regression model and for higher robustness of results also a pooled regression model. We use data for the period 2010–2012 and employ the unexplained part of the gender pay gap as a dependant variable and both rule of law indices (WGI Rule of Law index and Legal System & Property Rights Index) as explanatory variables. For better interpretation of results, both rule of law indicators are normalised. Unfortunately, the rule of law is a variable which does not display sufficient variation over time in order to be distinguished from the fixed effect. Because of this, we do not use fixed country effects to capture the effect of any time-stationary differences across countries.

The estimates of regression models are presented in Tables 2, 3 and 4 (models 1 and 2). As may be expected and is demonstrated in Figure 2, the relationship between the rule of law indicators and the unexplained gender pay gap is inversely proportional and the conclusions are very similar for both rule of law indicators. It indicates that gender wage differences are smaller with better quality of legislation and law enforcement. The estimated regression coefficients are very similar for both rule of law indices. The results show that the legislative quality explains approximately 8 percent of the variability in unexplained wage differences between men and women in the surveyed European countries. Using the pooled regression, the explanatory power of rule of law indices is slightly weaker: they explained about 7 percent of the variability in potential wage discrimination against women.

Table 2 | Coefficients of Regression Models: Dependent Variable – Unexplained GPG

	(1)	(2)
WGI Rule of Law (2010–2012 mean)	−0.015* (0.008)	–
Legal System & Property Rights Index (2010–2012 mean)	–	−0.015 (0.009)
Constant	0.143*** (0.010)	0.143*** (0.010)
N	25	25
R squared	0.0864	0.0820

Note: Robust standard errors in brackets, ***significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level.

Source: Author's computation

As is shown, both rule of law indices indicate very similar quantitative effects on the unexplained gender pay gap. This is not surprising due to their high correlation. However, the ranking of countries by quality of legislation is slightly different according to individual indices, as we discussed in the data section. Hence, we run a regression and present the results applying both indicators. Unfortunately, the results of the cross-sectional regression show poor statistical significance. Using the pooled regression, the statistical

significance of the rule of law indicators increases significantly. The results of the pooled regressions (Tables 3 and 4, models 1 and 2) suggest that a very progressive improvement in the quality of legislation and law enforcement (from the worst to the best score of a rule of law index within the European countries examined) causes a decrease in the unexplained gap by more than 4.5 percentage points. The results are very similar for both tested indicators (4.71 percentage points using the WGI Rule of Law Index and a move from the Romanian to Swedish rule of law scores; and 4.57 percentage points applying the Legal System & Property Rights Index and an improvement from the Greek to Norwegian rule of law scores).

Table 3 | Coefficients of Pooled Regression Models: Dependent Variable – Unexplained GPG; Explanatory Variable – WGI Rule of Law

	(1)	(2)	(3)	(4)	(5)	(6)
WGI Rule of Law	−0.014*** (0.005)	−0.014*** (0.005)	−0.013** (0.005)	−0.016* (0.009)	−0.012** (0.005)	−0.019** (0.008)
Labour Market Regulation Index	–	–	0.009* (0.004)	0.008* (0.005)	–	–
Index of Conditions for Work and Family Reconciliation	–	–	–	0.0004 (0.006)	–	0.004 (0.007)
Male wage dispersion	–	–	–	–	0.061* (0.031)	0.060 (0.039)
Time-fixed effects	no	yes	yes	yes	yes	yes
Constant	0.139*** (0.006)	0.144*** (0.010)	0.089*** (0.030)	0.092** (0.035)	0.106*** (0.022)	0.092* (0.048)
N	75	75	75	72	75	72
R squared	0.0656	0.0687	0.0965	0.1171	0.0930	0.1139

Note: Robust standard errors in brackets, ***significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level.

Source: Author's computation

Apart from the quality of legislation and law enforcement, there are other institutions that may have a significant impact on the unexplained gender pay gaps in the European countries. Arulampalam *et al.* (2007) and Christofides *et al.* (2013) confirm the relationship between the unexplained gender pay gap and country work-family policy, and wage-setting institutions. Following these studies, we include the Labour Market Regulation Index and the Index of Conditions for Work and Family Reconciliation (and its components) as explanatory variables in the linear regression model to control for these factors. As may be expected, the quality of models increases with the inclusion of other explanatory variables and now they explain 10–12 percent of the variability in the unexplained gender pay gaps. The rule of law indices and the Labour Market Regulation Index are proven to be statistically

significant factors influencing wage differences between men and women. Countries having a higher quality of legislation and higher labour market regulation (lower Labour Market Regulation Index) also have a lower unexplained gender wage gap. The effect of rule of law indices remains almost unchanged and slightly increases for models 4 and 6, which may be due to a smaller number of observations (the Index of Conditions for Work and Family Reconciliation was not available for Croatia).

Table 4 | Coefficients of Pooled Regression Models: Dependent Variable – Unexplained GPG; Explanatory Variable – Legal System & Property Rights Index

	(1)	(2)	(3)	(4)	(5)	(6)
Legal System & Property Rights Index	−0.014*** (0.005)	−0.014*** (0.005)	−0.014*** (0.005)	−0.018** (0.007)	−0.013** (0.005)	−0.021*** (0.006)
Labour Market Regulation Index	–	–	0.009** (0.004)	0.009** (0.004)	–	–
Index of Conditions for Work and Family Reconciliation	–	–	–	0.002 (0.005)	–	0.006 (0.006)
Male wage dispersion	–	–	–	–	0.062** (0.030)	0.070* (0.037)
Time-fixed effects	no	yes	yes	yes	yes	yes
Constant	0.139*** (0.006)	0.144*** (0.010)	0.085*** (0.030)	0.081** (0.037)	0.106*** (0.022)	0.075*** (0.044)
N	75	75	75	72	75	72
R squared	0.0721	0.0762	0.1082	0.1250	0.1017	0.1235

Note: Robust standard errors in brackets, ***significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level.

Source: Author's computation

On the other hand, the overall work-family reconciliation policy is not a statistically significant explanatory variable. This may be due to different effects of individual instruments of this policy and informal institutions on women's wages, as is discussed above. To take this into account, we control separately for individual components of the Index of Conditions for Work and Family Reconciliation, specifically for Family Policies containing provisions such as public childcare and parental leave mandates for women and men; Labour Market Structures, including the flexibility of working hours and employment protection legislation that affect the costs ofcosts of redundancy and hiring, and Gender Norms containing social norms regarding men's and women's roles. The results are presented in Tables A1 and A2 in the Appendix. Only Family Policy proves to be a statistically significant factor explaining the differences in unexplained gender wage gaps among the examined countries.

Finally, we also choose a more general indicator for wage inequality in a country to take into account the objection of Mandel and Semyonov (2005) that a more egalitarian

wage structure is behind lower gender wage differences. Lower wage differences may be the result of differences not only in formal institutions (which can be captured by the Labour Market Regulation Index) but also in informal ones. Reflecting this, we use the male wage dispersion as another explanatory variable. The results are shown in Tables 3 and 4, models 5 and 6. The effect of rule of law indices decreases only very slightly. Now, a very progressive improvement in the legislative quality and law enforcement (from the worst to the best among the European countries examined) decreases the unexplained gender pay gap by approximately 4 percentage points (4.03 percentage points using the WGI Rule of Law and 4.25 percentage points applying the Legal System & Property Rights Index).

However, the conclusions must be interpreted carefully with regard to the effect of the selection into employment. A higher labour market regulation, some kind of family policy measures and higher enforceability of these provisions may lead to lower employment of less qualified women and underestimation of the unexplained wage gap between men and women. The lower gender wage gap does not have to reflect lower discrimination against women or lower losses of their working capital related to childcare but may be partly associated with lower employment of women as pointed out by Olivetti and Petrongolo (2008).

6. Conclusion

This study aims at analysing whether, and to what extent, existing differences in the unexplained gender wage gap in European countries may be explained by differences in the quality of legislation and law enforcement in these countries.

In European counties, equal behaviour towards men and women and the right to receive equal compensation for the same or equivalent work belong among the basic rights. In the absence of gender discrimination, the unexplained gender wage gap should reflect only differences between unobserved characteristics of men and women in terms of differences in human capital. Empirical studies show that there is an unexplained gender pay gap in European countries; and based on the conclusions of empirical studies, we cannot exclude that there is wage discrimination against women on the labour market (for example, Christofides *et al.*, 2013; Hedija, 2015). For this reason, the legal environment and law implementation and enforcement may play an important role in trying to explain the differences in the unexplained gender pay gap among the European countries. Firstly, a lower unexplained wage gap may be due to a better anti-discrimination legislation and its better enforcement. The other possible channel leading to the decline in unexplained gender wage differences is provided by better enforcement of provisions on labour market regulation and work-family life reconciliation.

We test this hypothesis on a sample of 25 European countries using data from European Statistics on Income and Living Conditions. First, we estimate the unexplained part of the gender pay gap for every country in the sample, applying the Oaxaca-Blinder decomposition and using the approach of Neumark (1988) and Oaxaca and Ransom (1994), where the non-discriminatory wage structure is obtained from the pooled regression of males and females. We find that the unexplained gender pay gap varies significantly among European countries and it ranges from 0.30 in Estonia to 0.05 in the Netherlands. To consider the possible

impact of the legal environment on these differences, we use a linear regression model with the estimated unexplained gender pay gap as a dependent variable and selected rule of law indicators as explanatory variables, specifically the Worldwide Governance Indicators Rule of Law and the Legal System & Property Rights Index. To consider the explanatory power of these variables in the context of other factors, we controlled for family-friendly policies, wage-setting institutions and a more egalitarian overall wage structure. We find out that differences in the legal environment may play a role in explaining the variability in the unexplained gender pay gap among countries. It was found that a better rule of law led to a decline in gender wage differences. A very progressive improvement in rule of law indices (from the worst to the best among the 25 European countries examined) led to a decrease in the unexplained gender pay gap by 4.5–5 percentage points.

Our study has extended the knowledge in the field of possible causes of gender wage differences and has informed on the way in which to reduce these. We confirm that the legislative quality and law enforcement may play a role in the explanation of differences in the unexplained gender pay gap among countries.

Appendix

Table A1 | Coefficients of Pooled Regression Models: Dependent Variable – Unexplained GPG

	(1)	(2)	(3)	(4)	(5)	(6)
WGI Rule of Law	−0.019*** (0.006)	−0.011 (0.009)	−0.013* (0.007)	−0.018*** (0.006)	−0.014** (0.007)	−0.015** (0.007)
Labour Market Regulation Index	0.010** (0.004)	0.011* (0.006)	0.008* (0.004)	–	–	–
Index of Conditions for Work and Family Reconciliation						
Family Policies	0.006* (0.003)	–	–	0.005 (0.004)	–	–
Labour Market Structures	–	−0.005 (0.005)	–	–	−0.001 (0.004)	–
Gender Norms	–	–	−0.002 (0.003)	–	–	−0.000 (0.004)
Male wage dispersion	–	–	–	0.057* (0.033)	0.050 (0.032)	0.051 (0.035)
Time-fixed effects	yes	yes	yes	yes	yes	yes
Constant	0.064** (0.031)	0.103*** (0.026)	0.102*** (0.037)	0.091*** (0.031)	0.121*** (0.035)	0.116*** (0.038)
N	72	72	72	72	72	72
R squared	0.1393	0.1307	0.1203	0.1269	0.1098	0.1090

Note: Robust standard errors in brackets, ***significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level.

Source: Author's computation

Table A2 | Coefficients of Pooled Regression Models: Dependent Variable – Unexplained GPG

	(1)	(2)	(3)	(4)	(5)	(6)
Legal System & Property Rights Index	−0.021*** (0.005)	−0.012 (0.007)	−0.013* (0.007)	−0.019*** (0.005)	−0.015** (0.007)	−0.015** (0.007)
Labour Market Regulation Index	0.012** (0.004)	0.011** (0.005)	0.009** (0.004)	–	–	–
Index of Conditions for Work and Family Reconciliation						
Family Policies	0.007** (0.003)	–	–	0.006** (0.003)	–	–
Labour Market Structures	–	-0.004 (0.005)	–	–	0.000 (0.004)	–
Gender Norms	–	–	−0.002 (0.003)	–	–	−0.000 (0.004)
Male wage dispersion	–	–	–	0.062* (0.032)	0.055* (0.032)	0.054 (0.034)
Time-fixed effects	yes	yes	yes	yes	yes	yes
Constant	0.051 (0.032)	0.098*** (0.026)	0.097** (0.039)	0.085*** (0.030)	0.112*** (0.034)	0.114*** (0.037)
N	72	72	72	72	72	72
R squared	0.1539	0.1324	0.1267	0.1363	0.1128	0.1129

Note: Robust standard errors in brackets, ***significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level.

Source: Author's computation

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