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Reward effects and incentive effects on the labor market: Empirical evidence for European countries

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VOLKSWIRTSCHAFTLICHE DISKUSSIONSBEITRÄGE

WORKING PAPERS IN ECONOMICS

Friedrich L. Sell and Michael Öllinger

Reward Effects and Incentive Effects on the Labor market:
Empirical Evidence for European Countries

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**REWARD EFFECTS AND INCENTIVE EFFECTS ON THE LABOUR MARKET: EMPIRICAL
EVIDENCE FOR EUROPEAN COUNTRIES**

by

Michael Öllinger and Friedrich L. Sell

Juli 2017

ABSTRACT

In this investigation, a political economy model of the labor market is proposed, where unions offer their (old and new) affiliates the combinations between the average real wage level and the standard deviation of wages or salaries. Globalization and other forces, however, have made it recently more difficult to the unions to pursue their policy in the backdrop of a declining union density. This has been established empirically for selected European countries. In an econometric exercise, we have also tested directly the impact of changes in real wages, minimum wage rate, and the effect of 90 to 10 decile ratio on the change in the degree of affiliation, which the unions were able to achieve in the recent past.

JEL Categories: J51, D72, J31, O15

Keywords: Political Economy of the labor market, union density, wage dispersion, average and minimum wages

1. Introduction¹

Booth (1984) treated the trade unions as democratic organizations (where the union's representatives are concerned with maximizing the probability of re-election by choosing a wage rate which in turn maximizes the utility of the median voter, p. 884) and modeled how the membership decision is made: individuals join the union only "when the expected utility from joining the union exceeds the utility from not joining" (ibid., p. 889). As Ebbinghaus et al. (2008) added that union members expect unions to strive for solidarity with the group of low wage earners (Ebbinghaus et al. 2008 p. 5). In simpler words, they offer potential members a piece of equity in the distribution of wages and salaries: unions have a tendency to satisfy this strong demand of their members. A low spread in the distribution of wages signals 'solidarity', 'communitarianism', or more appropriately, 'equity'. This view is shared largely by the majority of labor market experts: "Unions ... not only increase wages but also reduce wage inequality." (Stennek 2015, p. 1). Further, it seems as if "unions nurture egalitarianism precisely because they attract individuals with egalitarian attitudes" (Pontusson 2013, p. 23). "Unions need to position themselves as agencies that can help deal with ... income inequality" (Kelly 2015, p. 526). In principle, unions can either install minimum wages or reduce directly the spread of wages and salaries or pursue a combination of both.

A study on the behavior of unions, however, must notice that the descriptive data, for example for Germany, show that "union density fell substantially in the observation period 1980 to 2000 (Schnabel/Wagner 2003, p. 11): "whereas in 1980 one in three West German employees belonged to a union, in 2004 this was true for just one in five employees" (Schnabel/Wagner 2006, p. 2). This development is also going on till now and it is, of

¹ The authors wish to thank Reinhard Neck, Thorvaldur Gylfason and the other participants of the session "Economic Policy: Institutions, Political Economy, and Quantitative Economic Policy" as part of the 83rd International Atlantic Economic Conference, held in Berlin, March 22 through 25, 2017.

course, not limited to the case of Germany but a widespread phenomenon in Europe and in many other countries of the world.

Treating unionism/union density not as an exogenous but instead as an *endogenous* variable may be of a special utility in this context: offering less real wage increase (union decline implies ... that well-paid workers ... are less likely to belong to unions” (Pontusson 2013, p. 24)) and more wage dispersion (“union decline might, in part, be a consequence of increasing earnings inequality” (Pontusson 2013, p. 16)) has made unions less attractive and has therefore caused the decline in union density.

It needs to be pointed that our approach is in contrast to a bunch of papers which tend to treat union density as an exogenous variable: prominent examples are Lemieux (1998), Asher/DeFina 1997, Card 2001, Fairris 2003, Bell/Pitt 1998). Lemieux, for instance, reports the estimates which “indicate that unions increase the wage of workers, on average, but ... also indicates that unions reduce wage inequality among workers” (Lemieux 1998, p. 287). Asher and DeFina (1997), in turn, state that "decreased earnings dispersion is a major outcome of unionism, akin to the much discussed union-induced wage premium” (ibid, p. 434). This also seems to be true if one looks at structural differences: “unions reduce ... the overall dispersion of wages among wage earners in the formal and informal sectors combined” (Fairris 2003, p. 496). If unionism declines, this will have a direct negative impact on the standard deviation of (at least) male wages (Bell/Pitt 1998, p. 527). Hence, falling union membership has reduced “the equalizing effect of unionism in the economy” (Card 2001, p. 297).

The paper is organized as follows: In the next section, our own political economy model, which explains how unions attract members, is presented. An empirical part follows, wherein the stylized facts on the development of union density, average real wages and

minimum wages in selected European countries for a recent period of observation (1990-2014) are presented. Thereafter, a multivariate regression analysis is presented to validate the insights of our theoretical approach. At the end, conclusions close the exposition.

2. The Model

Assume the initial distribution of wages is already steep at the left and skewed at the right as given by the density function shown in **Figure 1**.

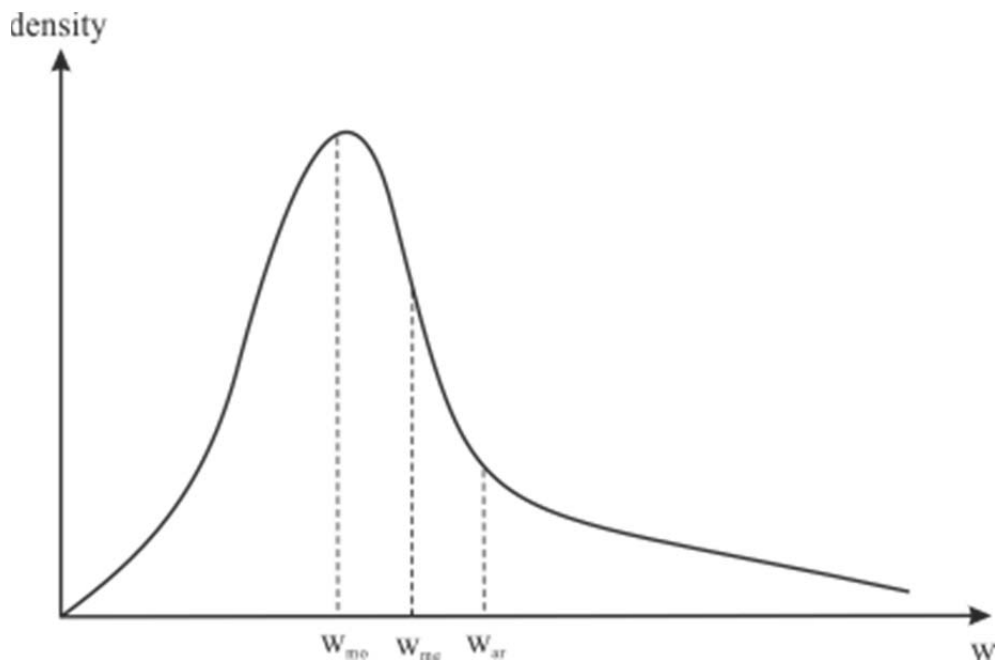


Figure 1: The stylized distribution pattern of wages. Source: authors.

It can be deduced from **Figure 1** that if the wage of the median union member is lower than the average wage, the median union member favors solidaristic wage policies (Pontusson 2013, p. 20). Hence, the median voter may have a strategic interest in increasing the lowest wages (Stennek 2015, p. 3). This goal can be achieved, among other instruments, by minimum wage legislation (see below).

The density function shown in **Figure 1** can be approximated rather accurately by a log-normal distribution of wages:

$$w = \exp(X) \text{ with } X = N(\mu, \sigma^2)$$

The expected or likewise average wage rate is then given by (see Beichelt and Montgomery 2003, pp. 46–8):

$$E(w) = w_{\text{ar}} = \exp\left(\mu + \frac{1}{2}\sigma^2\right)$$

Taking the full differential of this expression from left to right leads to:

$$dE(w) = dw_{\text{ar}} = (d\mu + \sigma d\sigma) \exp\left(\mu + \frac{1}{2}\sigma^2\right)$$

Proposition 1: *With rising σ , the expected (or average) wage rate will increase, ceteris paribus.*

It can be seen, by the way, that Maching's (2016) data support our assumption that wages tend to follow a lognormal distribution: there is a “wedge between growth in average and median wages” (ibid, p. 343).

Regarding **proposition 1**, we may state, mutatis mutandis, that lowering σ will reduce the average wage rate w_{ar} in **Figure 2** and also the average wage rate will shift to the left.

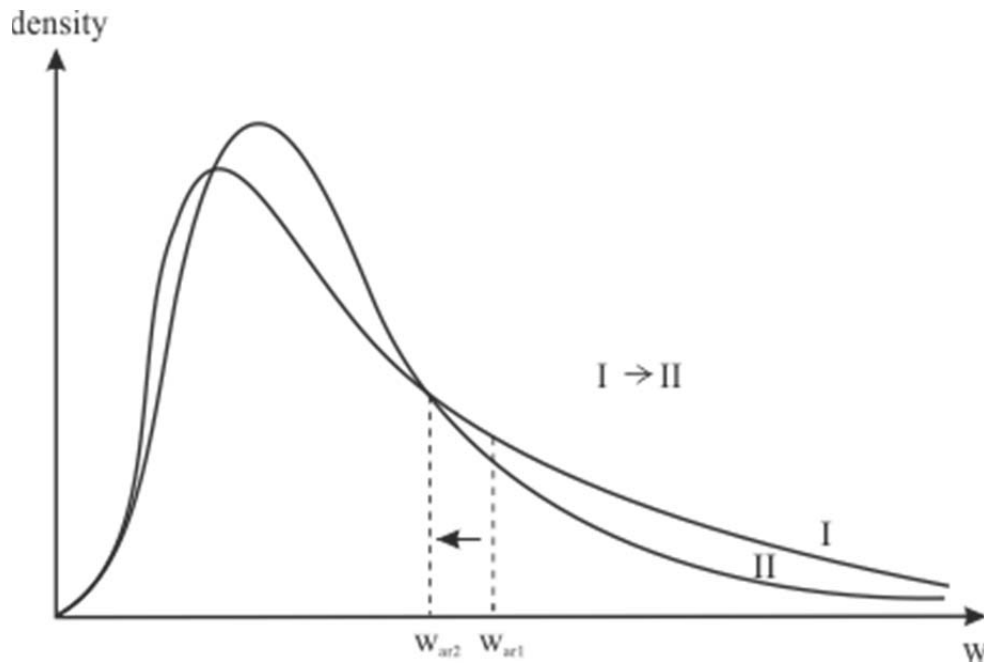


Figure 2: The dilemma of wage policy Source: authors.

Thus, there would be a trade-off between reducing wage inequality on the one hand and raising average real wages on the other hand. The log-normal distribution of wages challenges unions just as much as the Phillips curve challenges politicians in the political business cycle framework (Nordhaus 1975). There is, hence, a need for unions to pursue a strategy that optimizes the choice of w_{ar} and σ .

Assume for the simplicity that unions compete for potential members with the regularity of political elections and are confronted with the following voting function:

$$V_t = \lambda - \alpha(1/w_t^{ar}) - \beta\sigma_t; \text{ with } \alpha, \beta > 0 \text{ or } < 0$$

The parameters α and β can, in principle, have both (positive or negative) signs. In the first (positive) case, we may identify the voting function with a dominating *reward effect*, which indicates that employees join unions, when they observe that the latter have accomplished their mission in the past, i.e., they have been successful in raising average wages and/or in lowering the inequity in the distribution of wages and salaries. In the

second (negative) case, we may identify the voting function with a dominating *incentive effect*, which indicates that employees join unions when they expect the latter to improve unsatisfactory average wages and correct highly uneven wage dispersion. In the following analytical section, we limit our case to the reward effect, but we will come back to the incentive effect in the empirical section later.

Fixing $V_t = V_t^*$ and defining $\tilde{w}_t = 1/w_t^{\text{ar}}$ gives us combinations of $(\tilde{w}_t; \sigma_t)$, which lead to the same share of votes:

$$V_t^* = \lambda - \alpha \tilde{w}_t - \beta \sigma_t;$$

$$V_t^* + \beta \sigma_t - \lambda = \alpha \tilde{w}_t$$

$$(1/\alpha)(V_t^* + \beta \sigma_t - \lambda) = \tilde{w}_t$$

Total differentiation of the voting function allows us to inspect the marginal rate of substitution (MRS) between \tilde{w}_t and σ_t (omitting for a moment of the time index):

$$dV = d\tilde{w} \frac{\partial V}{\partial \tilde{w}} + d\sigma \frac{\partial V}{\partial \sigma}$$

$$dV = -\alpha d\tilde{w} - \beta d\sigma = 0$$

$$\frac{d\tilde{w}}{d\sigma} = (-\beta/\alpha) < 0; \frac{d^2 \tilde{w}}{d\sigma^2} = 0$$

Hence, an iso-voting schedule will be a linear falling curve. As the MRS demonstrates, this line will be the steeper (flatter), the preference for ‘equality’ β (for a given α) would be stronger. We can depict three different iso-voting $((I_0, I_1, I_2))$ lines in **Figure 3**. DD stands for the log-normal distribution of wages and recalls **proposition 1**, where we find a positive (negative) relationship between the expected or average wage rate (inverse wage

rate), on the one hand, and the standard deviation of wages, on the other hand. As can be seen in **Figure 3**, the closer the respective iso-voting lines are located vis-à-vis the origin, the higher the voting share a single union can expect. In P, we get equilibrium in the sense that the ‘distribution constraint’ DD is tangential to the iso-voting line I_1 . In this case, the union chooses the optimal combination of the average wage rate and the dispersion of wages over all relevant jobs/skills. The points on I_2 , such as, for example, Q and R fulfill the ‘distribution constraint’ DD, but they are associated with a much lower share of the electorate corresponding to I_2 .

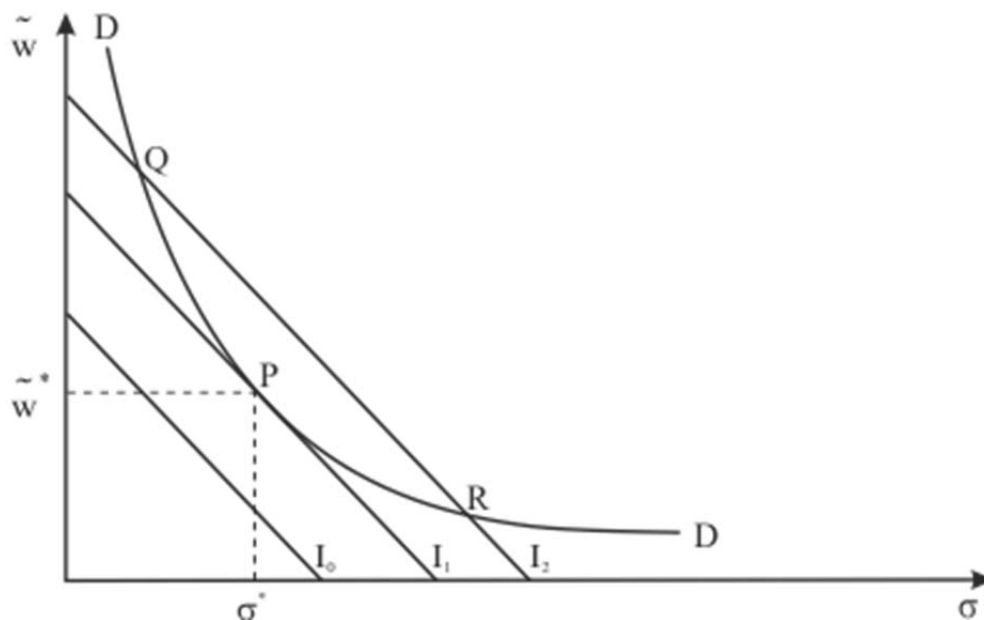


Figure 3: The political economy equilibrium of unions. Source: authors

There is a complementary thought worth to be mentioned: Unions have, in a bunch of countries and a few years ago, “discovered” some sort of the minimum wage. This, in part, comes as a surprise because in many cases minimum wages seem to undermine tariff autonomy and also appear rather as a political instrument coming from government policy vis-à-vis the labor market (see below). Further, why are minimum wages so attractive? **Figure 4** can exemplify this. If we take the example of Germany, where a statutory minimum wage of 8.50 € was installed in January 2015 (meanwhile it has been raised in

early 2017 to a level of 8.84 €), we can clearly observe how the density function of wages is affected. As depicted in Figure 4a, the trailing part of the curve at left side disappears so that the standard deviation diminishes and the average wage rate moves upward, that is toward the right. In this way, one can thus use minimum wages to achieve two goals of the unions' election function (see above) at one blow ("hitting two birds with one stone").

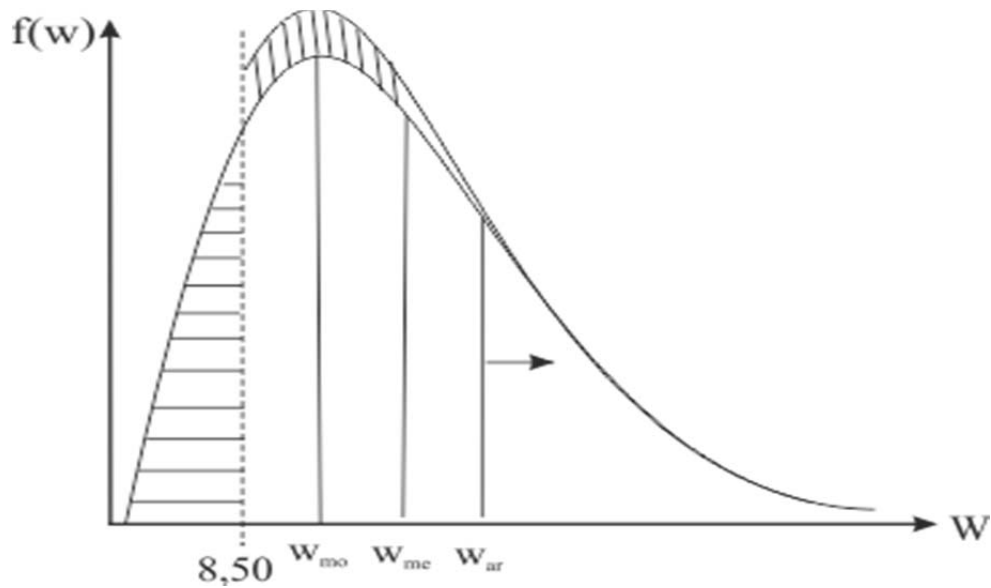


Figure 4a: The subsidiary effect of a minimum wage rate. Source: authors.

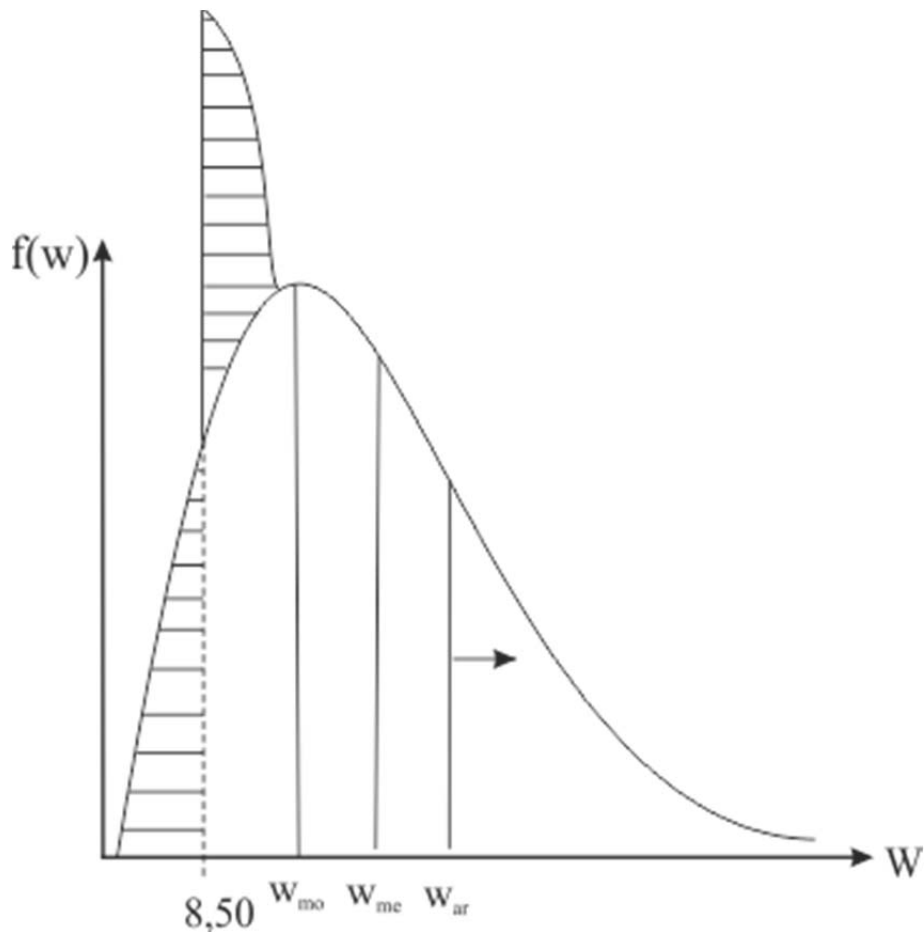


Figure 4b: The subsidiary effect of a minimum wage rate. Source: authors.

In principle, higher minimum wages can also have an opposite, thus a negative effect on union density: if potential union members and/or their current clientele assign the benefits associated with minimum wages not to the bargaining power of the unions, but to the labor market policy of the government, then it will become less attractive to become or remain a member of the union.

3. Empirical Analysis for selected European Countries

In this section, we show empirical data of wage parameters such as average wages, minimum wages, the dispersion of wages and union density for selected European countries. We try to find out how the union density in a country is influenced by wage parameters. At first, we look at the descriptive statistics represented by the time series of the already mentioned variables. Secondly, we investigate the statistical connection between wage parameters and union density.

3.1 Stylized Facts: descriptive statistics

Figure 5 shows the average wages between 1990 and 2014 for the selected European countries in the euro zone. Most of the selected time series data, except for a few countries like the United Kingdom, where the financial crisis in 2007 led to a decrease until 2013, show a trend of increasing average wages (in constant prices and PPP-\$) over the last 25 years. While countries like Spain show a rather small increase when 1990 is compared with 2015, especially the eastern European countries record a tremendously increased average wage.

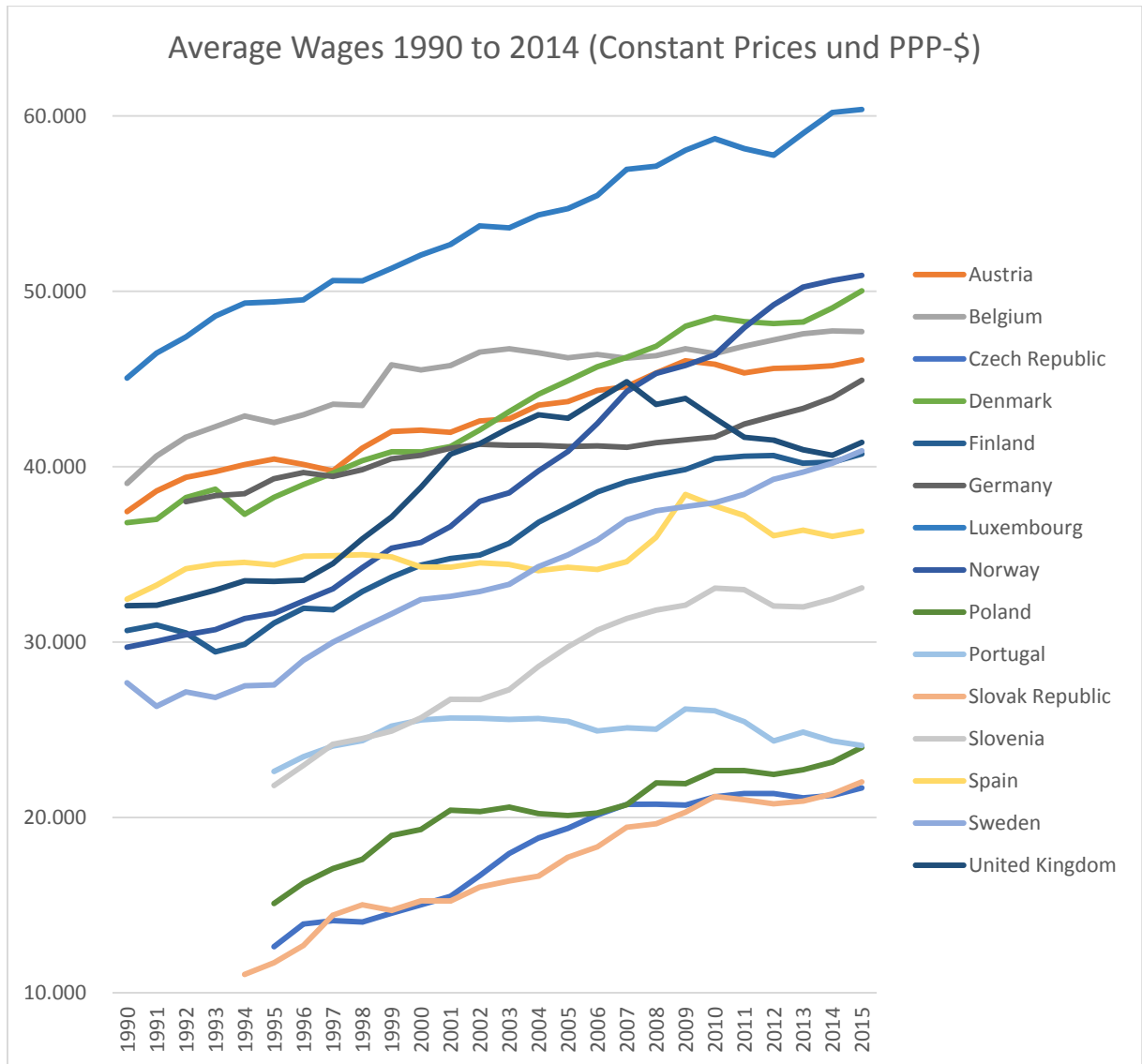


Figure 5: Average wages from 1990 to 2014 for selected countries in Europe. Source: OECD, 2016.

As shown by this trend, real minimum wages per year are also higher today as they were in 1990 (see Figure 6). While countries like the Netherlands or Belgium tend to stagnate at a relatively high level, minimum wages in France and the United Kingdom grew strongly until 2007. Since then the impact of the financial crisis led to much lower growth rates in France and even declining ones in Great Britain.

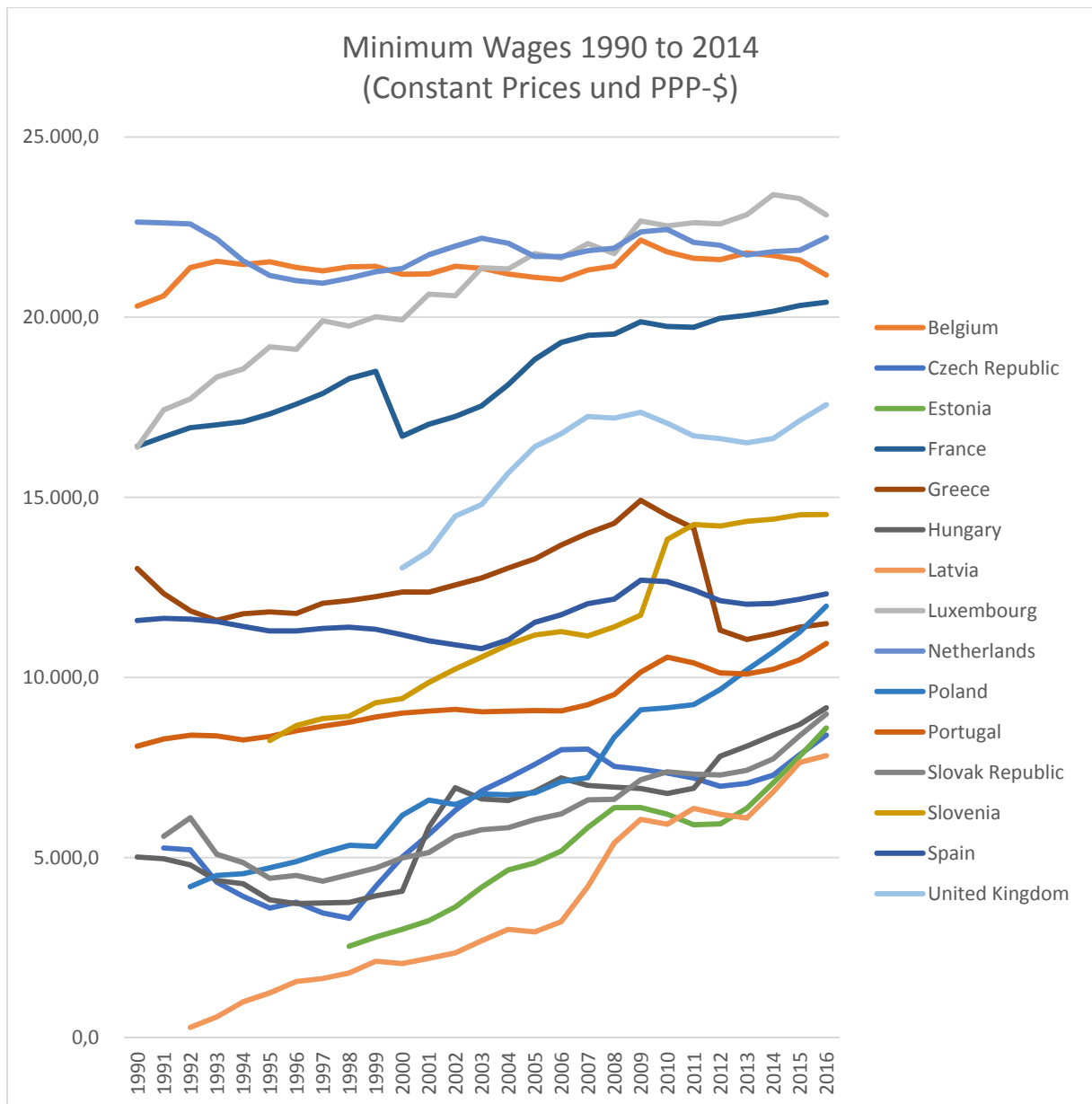


Figure 6: Minimum wages in US\$ PPP from 1990 to 2014 for selected European countries. Source: OECD, 2016.

Regarding the decile ratio between the ninth and the first decile of the income distribution as a measure of the spread of wages, **Figure 7** shows the well-known large wage spread existing in the United Kingdom with a high decile ratio around and stable in the neighborhood of 3.5 for the last fifteen years. By contrast, the figures for France are much lower and are still declining with a value of 2.98 in 2012. While the income levels rose in the last decades, the inequality performance expressed by the decile ratio is mixed. An

increasing trend for example in Germany from 1994 until now can be seen apparently but a decreasing trend in Portugal, of course, comes from a very high ratio.

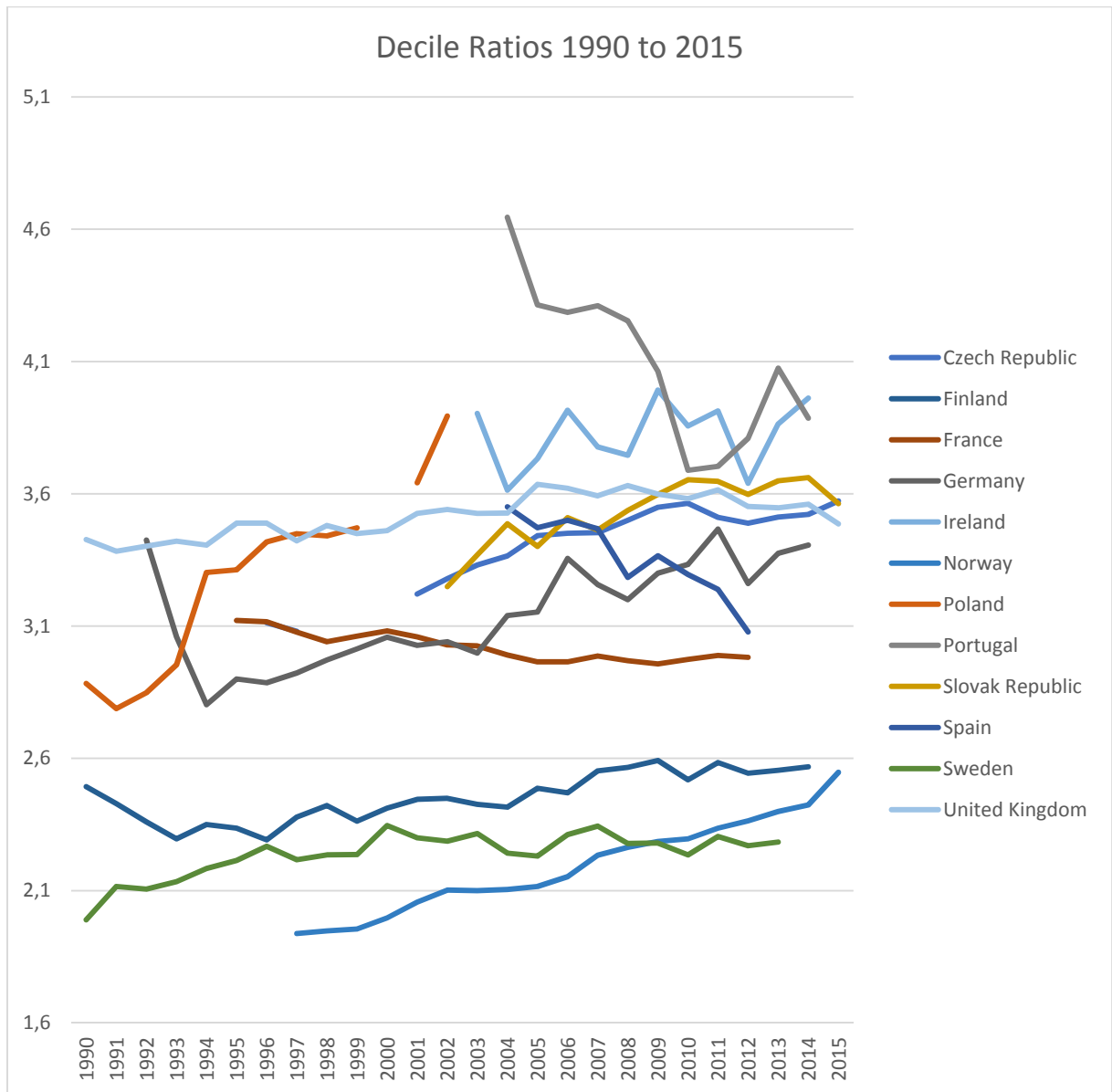


Figure 7: Decile ratios (90/10) from 1990 to 2015 for selected countries in Europe. Source: OECD, 2016.

Figure 8 shows the numbers for union density of the analyzed countries in the time period considered here. The conventional “trade union density” is calculated by the ratio of wage and salary earners that are the trade union members divided by the total number of wage and salary earners (OECD, 2016).

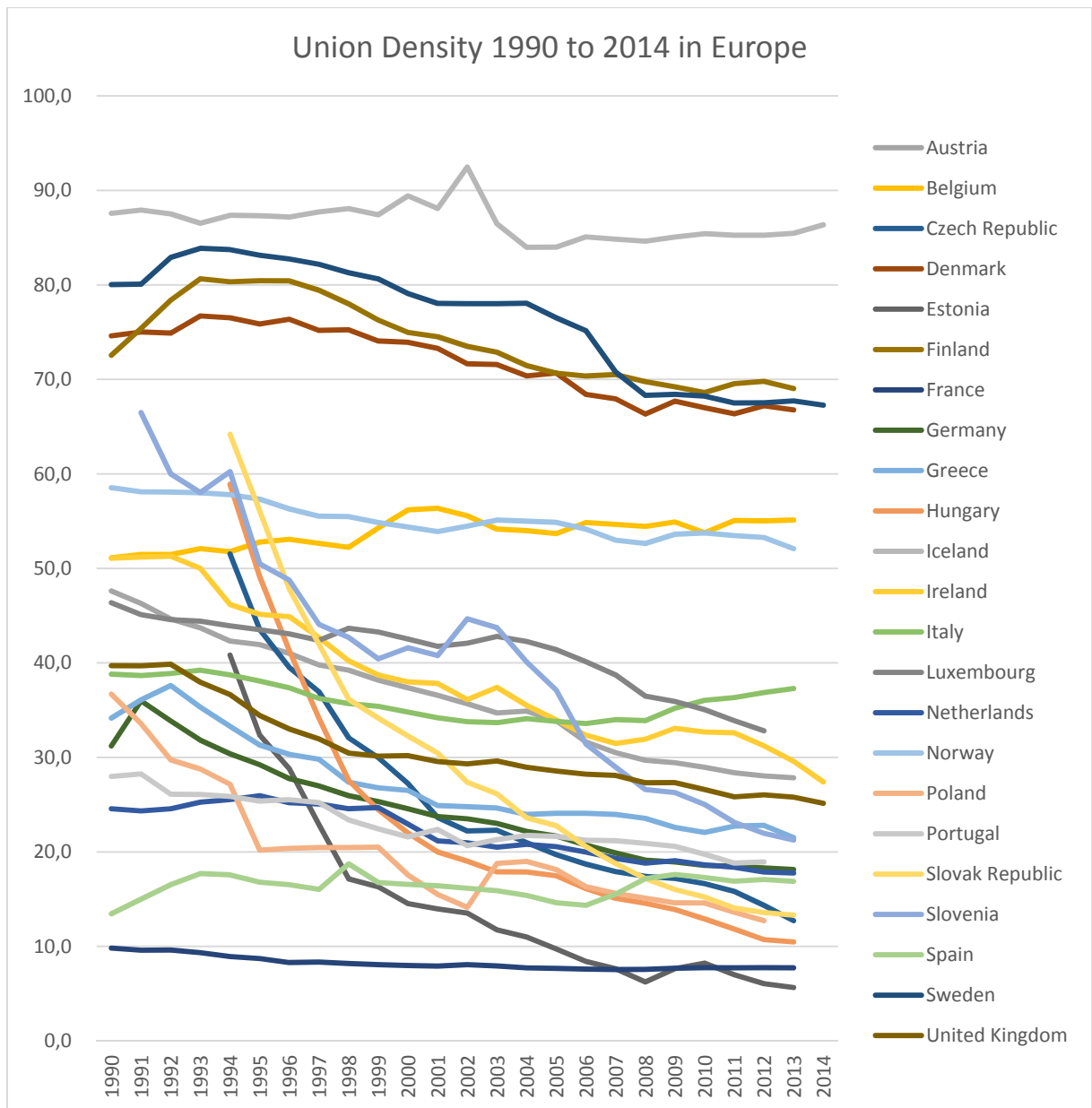


Figure 8: Union density from 1990 to 2014 for selected countries in Europe. Source: OECD, 2014.

Surprisingly, while France has traditionally very noticeable trade unions, its union density is one of the lowest in Europe. Only about 8 percent of the wage and salary earners are trade union members. The union density in the public sector or in former public companies is much higher as in the private sector. While the unions in France have lost most of the power to negotiate with the respective employers, they still manage to mobilize the society when organizing strikes.

In contrast, the trade unions in the Netherlands are well known for their dialogue conducted between the employees and employers and for their moderate demand for higher wages. Of course, this is also a result of the already existing high wage level and of earlier severe conflicts between the Dutch government and the national trade unions during the early 1980s. Both the average and the minimum wage are relatively high in comparison to other European countries.

It is a common observation that the influence of the trade unions in the United Kingdom has been fading since the period of Margaret Thatcher's administration and this is continuing for the last 15 years. Union density in Great Britain was about 30.1 in the year of 2000 and was 25.1 in 2014, with only a small tendency to stop this falling trend.

Of course, union densities between countries are hardly comparable. Therefore, we analyze the influence of wage parameters on the union density for each country separately.

3. 2 An econometric analysis of the determinants of union density

In this section, we analyze the influence of average wages, minimum wages, and that of the spread of wages, as represented by decile ratios on the union density in selected European countries, such as France, the Netherlands, and the United Kingdom. The working hypothesis is that union density is a function of the above-outlined wage parameters. The information used is the time series data has already been described in the previous section. We looked at the countries included in the time series data of the previous chapter and found several empirical connections for many countries between the wage parameters like the minimum wage, the average wage, and the ratio between the last and the first decile. The units for the minimum and the average wage in the time series data are purchasing power parity US-dollars with the reference year 2015.

While looking at the relationship between trending time series, we built the first differences to eliminate autocorrelation. In the following paragraph, all used variables are the first differences of the original times series of the average real wage, the real minimum wage, the decile ratios between the ninth and the first decile, and the union density.

In the univariate linear models, the minimum wage, especially, shows a significant influence on the union density only for a few countries.

Netherlands	
Coeff	-0,000848
p-Value	0,097856
R ²	0,119604

Table 1: Significant influence of the minimum wage on the union density in the Netherlands.

Table 1 shows a significant negative relationship between minimum wages and trade union density for the Netherlands (see above, for the rationale).

The decile ratio as a single explanatory variable has a negative sign and is significant for the three analyzed European countries: Finland, the Slovakian republic, and the United Kingdom. This finding supports the incentive effect from above.

	Finland	Slovak Republic	United Kingdom
Coeff	-10.620780	-11.129132	-7.932481
p-Value	0.038692	0.037966	0.060469
R ²	0.180186	0.363526	0.144920

Table 2: Significant influence of the decile ratio on the union density of Finland, the Slovak republic, and the United Kingdom.

Table 2, therefore, shows better results than those in Table 1, but still, only a few countries show acceptable values; however, this trend changes when we look into the relationship between the average wage and union density.

Table 3 shows highly significant results for nearly all European countries considered here. We find both positive as well as negative signs for the impact of higher average wages,

hence dominating reward or incentive effects. It should be pointed out that r-square is especially high in the case of young eastern democracies such as the Slovakian Republic and Slovenia.

Avr Wage	Austria	Belgium	Czech Republic	Estonia	Finland	Germany	Luxembourg	Norway	Slovak Republic	Slovenia	Spain	Sweden	Switzerland
Coeff	-0.000941	0.000415	-0.001814	-0.001235	-0.000958	-0.001358	-0.000642	0.000311	-0.003621	-0.002260	0.000591	-0.000808	-0.000282
p-Value	0.004483	0.096966	0.014749	0.025571	0.009699	0.006118	0.008341	0.009056	0.000212	0.001078	0.035815	0.025926	0.016161
R ²	0.312918	0.120201	0.302245	0.260472	0.267187	0.319522	0.287603	0.271337	0.542714	0.476086	0.185180	0.197756	0.226585

Table 3: The influence of the average wage on union density in selected European countries.

	Belgium	Luxembourg	Slovak.Republic	Slovenia	Spain	United.Kingdom
p-Values						
Min Wage	0.579292	0.943252	0.182755	0.565140	0.459902	0.050444
Avr Wage	0.087770	0.034812	0.000143	0.002917	0.036941	0.082745
Coeff						
Min Wage	-0.000396	0.000034	0.003394	0.000588	-0.000889	-0.000721
Avr Wage	0.000473	-0.000655	-0.004132	-0.002497	0.000739	0.000323
R²	0.133290	0.287788	0.589323	0.487145	0.206593	0.299982

Table 4: The influence of the minimum wage and the average wage on union density in selected European countries.

	Finland	Germany	Poland	Portugal	Slovak Republic	Spain	Sweden	United Kingdom
p-Values								
Decile	0.053503	0.104596	0.017260	0.093334	0.033632	0.152758	0.392602	0.058892
Avr Wage	0.014058	0.004094	0.119780	0.362868	0.013633	0.073882	0.030761	0.301139
Coeff								
Decile	-8.837042	1.997498	-4.848315	1.620922	-8.815397	-3.805818	-4.333220	-7.984156
Avr Wage	-0.000857	-0.001382	0.000295	0.000242	-0.001334	0.000453	-0.000816	-0.000200
R²	0.388967	0.409769	0.887232	0.414702	0.687774	0.509801	0.222108	0.186386

Table 5: The influence of the decile ratio and the average wage on union density in selected European countries.

When we extend the model and take two wage variables simultaneously as an influent on the union density, we find (Table 4) only a few relationships to be significant with the two wage parameters minimum and average wage. It is further noteworthy that Slovenia and the Slovakian Republic stand out prominently when it comes to compare r-square values.

In contrast, we see a much clear correlation when we combine the average wage and the decile ratio as influential variables. The results in Table 5 show a positive connection between the change in the average wage and in the decile ratio and the change in the union density. The connection, especially for Finland, Germany, Poland, and the Slovakian Republic, is way better than that in the single variable model. The altering signs in the estimation results appear. In terms of r-square, the results are especially remarkable in the case of Poland, the Slovakian Republic, and Spain. In Germany, an increase in the decile ratio leads to an increase in the union density as well as an increasing average wage leads to a decrease in the union density. Thus, we find both reward and incentive effects in the same equation. This also applies to the countries such as Poland and Spain. Some countries show only reward effects (Portugal) or only incentive effects (Slovakian Republic, Sweden, and the United Kingdom). In summary, our results demonstrate the influence of wage parameters on the union density for several European countries. Especially, the average wage and the decile ratio as a proxy for the variance of wages lead to a satisfying combined model for the relationship between wages and union density, which supports the view presented earlier in the political economy model of union density.

3. Conclusions

The insight gained by our theoretical findings can be summarized as follows. In the political economy approach, higher average wages and lower wage dispersion (reward effect) are not the outcomes of relative demand for and supply of the skilled/unskilled

workforce, but a direct consequence of the vote-maximizing behavior of unions. On the opposite (incentive effect), unions may receive support when employees find the mix of average wages and of distribution within the salary system improvable. As the limitations of this model, three points are worth of discussing:

(i) One may think of **different strategies for unions** than those presented so far: if unions let the average wage rate to increase in line with a higher variance (or likewise standard deviation) in the distribution of wages, the total wage sum will also increase. This statement hinges upon the condition of constant employment. However, when wage distribution fits better, one can expect the distribution of abilities and skills not only to be constant but even a higher rate of employment. This further elevates the wage sum. Thus in principle, such a strategy could enhance the wage quota and hence contribute to the distribution goals of unions on a macroeconomic level. Pernicka and Traxler (2004) explicitly considered the unions' interest in the wage quota, which relates the wage sum to national income. The authors found for a panel of 19 OECD countries in the years 1970 through 1995 a significant positive impact of unions' density on the (adjusted) wage quota.

(ii) **Globalization** might have played and might still be playing a double, somewhat contradictory, role in this process of de-unionization. On the one hand, it might have contributed to undermine employees' likelihood of being union members (Schnabel 2012, p. 24) as globalization tends to pressurize both firms' markups and also the unions' bargaining power via import penetration (Abraham et al. 2009, p. 25). Moreover, "for a given unemployment rate, lower profit rates translate into smaller rents that can be redistributed to union members. If globalization implies that multinational enterprises can shift employment across affiliates more easily, then the bargaining power of all workers will decline. All of this will force the union members to accept wage moderation"

(Abraham et al. 2009, p. 16). On the other hand, it may well be that unions serve to the organized employees to correct the distributional consequences of globalization and hence become more attractive in their eyes with a stronger impact of globalization.

(iii) Most of the contributions maintain that trade **union membership and wages are determined simultaneously** (Schnabel 2002, p. 25). The workers, who join a union, support the bargaining power of such a union; however, the bargaining power itself motivates the workers to join the union. The model seems to suggest that unions have to perform in the first place and then be able to attract members.

(iv) What are the insights gained by our empirical findings?

We could show that there exist at least two different relationships (reward effect and incentive effect) between the wage parameters and union density for several countries in Europe even if we only look at a short period of time, for example, not more than two and a half decades ago (1990–2014).

(v) Where do we find limitations of the empirical results?

Of course, the relatively limited time span – if one bears in mind the story of unions in modern Europe, prevailing since more than a century – makes the size of the data sets small. Besides this, the unions are very heterogeneous in European countries and can hardly be compared. The altering signs in the estimation results resemble this aspect. Therefore, more specific data for each country are perhaps needed and could provide to additional significant results in the future.

Literature

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