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Employment Protection Legislation and Its Impact on the Elasticity of Employment in OECD Countries[1]

Abstract: This article explores the impact of employment protection legislation on the elasticity of employment with respect to GDP. We present the essence and scope of changes in employment protection and specify the theoretical mechanisms of its impact on the labor market. We also measure this impact using data for 23 OECD countries in the 2002–2014 period.
In the short term, we should expect the existence of a non-linear (U-shaped) relationship between the level of employment protection legislation (EPL) and the elasticity of employment. In the long term, however, EPL is perceived as neutral for the level of employment as flexible wages enable employers to accommodate changes in the labor market situation. The hypothesis of the long-term neutrality of EPL for labor market categories was confirmed with the use of panel cointegration tests. The hypothesis concerning the impact of EPL on short-term labor market adjustments was confirmed only for the global crisis period.

Keywords: Employment Protection Legislation, employment elasticity, U-shaped relationship, Panel ECM

JEL classification code: J23

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Introduction

Employment protection legislation (EPL) is one of the major institutional determinants of the employment relationship. It consists of different regulations concerning the proper use of labor, especially restrictions with respect to employee dismissals. It has a direct influence on the willingness of employers to hire new and dismiss current workers. As a result, it determines the level and elasticity of employment, unemployment and labor market flows.

This article focuses on the impact of EPL on employment. The aim of the analysis is to determine the essence, scope and trends of changes in employment protection legislation, and to specify the theoretical mechanisms of its impact on the situation in the labor market, especially on the elasticity of employment with respect to GDP. The article also aims to empirically verify the impact of EPL on employment elasticity in OECD countries.

The article begins with a brief presentation of the notion of employment protection legislation—its definition, functions, and purposes. These analyses are accompanied by an assessment of key trends in the level of EPL restrictiveness in selected OECD countries from 2002 to 2014. The second part of the article discusses possible theoretical underpinnings of the mechanisms for determining the impact of employment protection legislation on selected labor market variables. Next the results of the existing empirical research in this area are presented. In the following part, an attempt is made to empirically verify the hypothesis about the impact of employment protection legislation on employment elasticity with regard to GDP. The analyses are performed using data for 23 OECD countries in the 2002–2014 period. The novelty of the proposed approach lies in the fact that it uses the Panel Error Correction model (PECM) in order to discern between the long- and short-term consequences of employment protection legislation. The last part of the article contains a summary of the main conclusions of the presented analysis.

Employment protection legislation—scope, functions and indicators

Employment protection legislation is a set of mandatory norms and restrictions governing the dismissal of employees [Cahuc, Zylberberg, 2014: 734; Boeri, van Ours, 2011: 255]. Measures to protect employment are comprised of a number of instruments, such as redundancy payments, advance notices of dismissals, prior negotiations with trade unions with respect to termination, authorization from a third party to carry out the dismissals, and monetary compensation schemes for employees in cases of wrongful dismissal.

The rationale for the existence of employment protection legislation is based on the presumption that in dynamic conditions where there are economic shocks, the positions of the two parties of the employment relationship are unequal. The position of employees is weaker than the position of employers. Employees, whose only asset is their human capital, are exposed to precari-

ous employment and loss of income because of the shocks, while the position of employers is better, because they have diversified assets (they have access to capital markets) and can therefore better defend themselves against the negative effects of the shocks. Employment protection is aimed at alleviating the unequal position of the parties in the labor market.

The main aim of EPL is to increase the stability of employment. When the regulations concerning employment protection are restrictive enough, employers incur higher costs in case of employment terminations, and thus they reduce the volume of employment only when necessary. In other words, increases in the costs of employment termination discourage employers from performing quantitative adjustments in employment. As a result, restrictive employment protection regulations stabilize the fluctuations in employment.

Several indexes are elaborated and calculated to measure the restrictiveness of employment protection[2]. In the following analyses we use the Employment Protection Legislation index proposed by the OECD. This index is a weighted average of sub-indexes concerning 21 components of employment protection which are used to describe the degree of restrictiveness of legislation. The indexes take values from 0 (least restrictive) to 6 (most restrictive).

In 2013, the OECD stopped publishing its summary EPL index, restricting its data to separate indexes of employment protection for regular and temporary contracts. The decision was taken as a result of the inadequate comparative performance of that index [OECD, 2013: 75]. Despite the drawbacks of this indicator, we nonetheless use it in our analyses because our primary goal is to explain cross-country differences in the fluctuations of aggregate employment. Disaggregated analyses of temporary and regular employment will be the focus of our interest in some forthcoming publications.

Following the aforementioned considerations, the summary EPL indicator used in our analyses is obtained as the weighted average of the indicator of strictness of employment protection for individual and collective dismissals under regular contracts and an indicator of the strictness of employment protection under temporary contracts. Indicators of temporary and regular employment incidence are used as weights.

Table 1 shows the average levels of the summary EPL index (Version 1) for the selected OECD countries in four sub-periods between the years 2002 and 2013. In the sub-period of 2002–2004, the most restrictive employment protection regulations were observed in Portugal, the Czech Republic, Greece, Italy, Spain, the Netherlands, and France, while Canada, the United Kingdom, Ireland, Japan, and Switzerland had the least stringent employment protection regulations. In the last analyzed sub-period of 2011–2013, the composition of the two groups of countries was almost the same. The most liberal legal regulations were in use in Canada, the United Kingdom, Ireland, Japan, and

[2] More information about these indexes can be found in: Kwiatkowski, Włodarczyk [2012: 3–5].

Switzerland, while the most restrictive regulations were in evidence in Portugal, the Czech Republic, Italy and France.

Table 1. Summary index of restrictiveness of employment protection legislation (EPL Version 1) in selected OECD countries, 2002–2013 (0 – least strict; 6 – most strict)

Country	Average level of EPL strictness in sub-periods				Absolute change of the index between 2013 and 2003
	2002–2004	2005–2007	2008–2010	2011–2013	
Austria	2.40	2.27	2.27	2.27	–0.02
Belgium	1.93	1.93	1.99	1.99	0.0
Canada	0.84	0.83	0.83	0.83	–0.01
Czech Republic	3.04	3.04	2.89	2.82	–0.25
Denmark	2.06	2.06	2.07	2.13	+0.07
Finland	2.07	2.07	2.07	2.07	0.0
France	2.59	2.63	2.59	2.57	–0.04
Germany	2.53	2.43	2.43	2.45	–0.06
Greece	2.95	2.80	2.80	2.17	–0.89
Hungary	1.92	1.94	1.92	1.80	–0.35
Ireland	1.38	1.28	1.21	1.28	–0.05
Italy	2.69	2.66	2.66	2.63	–0.1
Japan	1.53	1.49	1.30	1.31	–0.26
Korea	2.31	2.30	2.31	2.31	0.0
Netherlands	2.60	2.55	2.49	2.45	–0.17
Norway	2.37	2.39	2.39	2.39	+0.02
Poland	1.99	2.10	2.10	2.09	+0.25
Portugal	4.16	4.03	3.78	3.25	–1.33
Slovak Republic	2.27	2.14	2.19	1.91	–0.43
Spain	2.64	2.62	2.52	2.26	–0.47
Sweden	2.43	2.41	2.32	2.30	–0.13
Switzerland	1.54	1.53	1.53	1.53	–0.01
United Kingdom	1.20	1.21	1.21	1.15	–0.16

The summary EPL indicator is obtained as a weighted average of indicators for individual and collective dismissals for regular contracts and temporary contracts.

Source: authors' own calculations based on data from the Stats. OECD Internet database.

Table 1 also indicates changes in the character of legal regulations concerning employment protection in the analyzed countries. The data show that the majority of the OECD countries liberalized their employment protection regulations during the 2003–2013 decade. This was especially the case in Portugal, Greece, Spain, and Slovakia, where the declines of the EPL indexes were the strongest. However, it must be noted that upward trends in the EPL index were also observed in several countries, including Poland, implying greater restrictiveness of employment protection regulations.

Theoretical remarks and hypotheses

Shocks in general economic activity bring about adjustment processes in the economy, including the goods and labor markets. These processes have been widely examined and discussed in economic theories, including neoclassical and Keynesian economics, as well as in the economic literature [Tsoulfidis, 2010; Cahuc, Zylberberg, 2004; Boeri, van Ours, 2011].

Shocks in general economic activity usually lead to changes in output, followed by changes in employment. Such adjustment processes are in line with the Keynesian theory emphasizing quantitative adjustments, which in the case of negative shocks are expressed in declining output and employment.

The size of the employment decline due to the decline in output (which can be measured by GDP) is not predetermined. In other words, the elasticity of employment to changes in GDP (also defined as the "output elasticity of employment") may differ. It depends to a significant extent on the role played by various types of labor market adjustments. They consist of [Cahuc, Zylberberg, 2004: 193–214]:

- a reduction of real wages (the form strongly espoused in neoclassical theories);
- a reduction of working time;
- a reduction of labor productivity (implying an increase in labor hoarding);

The greater the role played by the three alternative types of labor market adjustments, the smaller the decline in employment in reaction to a given change in GDP and the lower output elasticity of employment. One can say there is a trade-off between employment adjustments, on the one hand, and adjustments in the alternative forms, on the other.

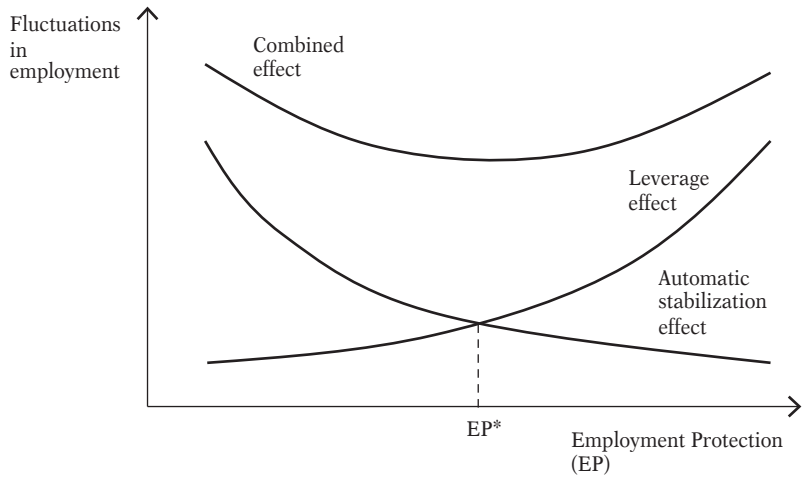
The question arises: What are the determinants influencing the dominant types of labor market adjustments? In answering this question we rely on the achievements of new institutional economics, which stresses the role of labor market institutions, which involve: minimum wages, the tax wedge, the types of employment contracts, employment protection, replacement ratios, and passive and active labor market policies. One of the institutions which should significantly influence the output elasticity of employment is employment protection legislation (EPL), the central focus of this paper.

The problem of the importance of EPL for the dominant types of labor market adjustments and for the output elasticity of employment has been widely discussed in the theoretical and empirical literature (see for example: Blanchard, Summers [1986], Lazear [1990], Greenwald, Stiglitz [1995]). We also examined this problem in an earlier paper, using OECD data [Kwiatkowski, Włodarczyk, 2012]. In this paper, we try to not only describe the influence of EPL on employment elasticity, but also indicate short-term and long-term employment elasticity effects.

In the short term, we assume rigid wages and accept the hypothesis (developed by Blanchard, Summers [1986], Greenwald, Stiglitz [1995], Malul *et al.* [2011]) about the existence of a non-linear (U-shaped) relationship between

the elasticity of employment to GDP and the restrictiveness of EPL (see also: Kwiatkowski, Włodarczyk [2012]).

Figure 1. Employment protection and fluctuations in employment



Source: Malul, Rosenboim, Tal [2011].

The hypothesis can be justified as follows. Under conditions of liberal (weak) employment protection, negative shocks produce strong quantitative adjustments, which result in declines in employment. An increased restrictiveness of such regulations causes a weakening of the employment changes. But this does not have to be the end of the story. Highly restrictive employment protection may cause a worsening of the rational allocation of the labor force, implying declines in profitability and labor demand. The two effects are underlined by Malul *et al.* [2011], who distinguished between an automatic stabilization effect (more restrictive EPL implies weaker changes in employment) and a leverage effect (increased fluctuations of employment as a result of too restrictive regulations and lower profits). The combined effect may take the shape of the letter U, as shown in Figure 1.

In the long term, we assume flexible wages. We accept the hypothesis developed by Lazear [1990] that the introduction of restrictive employment protection legislation has a neutral influence on employment and employment changes. This is because the increased costs of employment termination which result from more restrictive regulations are taken into account in wage negotiations, leading to lower wages in the employment contract. As a result, the increased costs of employment rotation do not change the economic situation of employers. In other words, the restrictiveness of EPL does not influence employer decisions concerning employment [Boeri, van Ours, 2011: 264].

Results of existing empirical research

Employment protection legislation has been the subject of a considerable number of economic publications. The results obtained from the conducted research are, however, quite ambiguous, which demonstrates a need for further research in the area.

The first group of research concerned the impact of employment protection on the basic labor market variables, i.e. on the levels of employment and unemployment. In most cases, the results were obtained from panel models using data for OECD countries. They were, however, inconclusive. Some of the studies, such as Nickell [1997] and Belot, van Ours [2001] have showed that there exists a negative relationship between the unemployment level and employment protection restrictiveness. On the other hand, Lazear [1990], Scarpetta [1996], Elmeskov *et al.* [1998], and Amable *et al.* [2011], using similar data and a similar sample, obtained contradictory results. They indicate that the aforementioned relationship is positive. The results of analyses which investigated the impact of EPL on the employment level also point in a similar direction, as the majority of them state that more protective regulations result in lower employment (see e.g.: Grubb, Wells [1993], Heckmann, Pages [2000], and Di Tella, MacCulloch [2005]). The differentiated results of the analyses support the hypothesis of the existence of a U-shaped relationship. Evidence in this vein is presented by, e.g., Belot *et al.* [2008], Malul *et al.* [2011], and Kwiatkowski, Włodarczyk [2012, 2014, 2015].

Another branch of existing research on employment protection uses search and matching models and focuses on the impact of such measures on the flow labor market variables. The results obtained by Bentolila, Bertola [1990], Bertola [1990], Bertola [1992], Bertola, Ichino [1995], Bertola, Rogerson [1997], Jackman *et al.* [1996], and Gómez-Salvador *et al.* [2004] from the models that used calibrations for OECD and EU countries show that more restrictive EPL curtails the willingness of employers to hire new workers and dispose of current employees. Even though these factors may cancel out the impact of employment protection on the levels of employment and unemployment, they do actually affect the rates of job creation and destruction in a given economy. According to Boeri [1999], Kugler, Saint-Paul [2000, 2004] and Casquel, Cunyat [2011], the rationale for such a tendency may stem from the fact that more restrictive EPL preserves the insider-outsider structure of the labor market. Due to increased costs of hiring and firing workers, employers—feeling endangered by the prospect of sustaining considerable losses if the qualifications of new workers turn out to be insufficient—focus on hiring those people who are currently employed by other enterprises. Similar results were obtained by Daniel, Siebert [2005] and Kugler, Pica [2008] on the basis of microeconomic panel data and experimental data respectively.

In line with the aforementioned results, Wolfers [2005] shows that employment protection delays workers' turnover in the case of transitory economic shocks and decreases seasonal worker rotation. This may in turn result in the

occurrence of the practice of labor hoarding in the wake of an economic crisis. At the same time, Blanchard, Wolfers [2000] and Fitoussi *et al*. [2000] show that countries with more restrictive employment protection regulations record higher unemployment levels in the case of a negative economic shock, whereas Lindbeck, Snower [2001] report that such countries also report bigger declines in employment in such conditions. Taken together, the presented results may suggest the existence of a nonlinear U-shaped relationship between the strictness of EPL and the elasticity of employment in cases of negative economic shocks. This relationship is responsible for large quantitative adjustments of employment during the crisis in countries with both relatively high and relatively weak employment protection, and moderate adjustments of employment in countries with medium levels of EPL.

Statistical data, stylized facts and model specification

The core part of our analysis is preceded by a description of the data used in econometric analyses and their introductory statistical analysis, aimed at identifying the basic stylized facts connected with the impact of EPL on employment changes. In the remainder of this part of the article, we thoroughly describe the process of econometric model specification.

In our analyses, we use LFS-based data on total employment as well as data on employment protection legislation, real GDP, and average wages obtained from the OECD Internet database (http://stats.oecd.org). All of the data are taken annually (due to the original EPL data frequency). The real GDP and average wages are expressed in constant prices—at 2010 and 2014 USD respectively—and are all PPP-adjusted. Our estimation is restricted to the 2002–2013 period due to the lack of newer data concerning EPL. However, in our statistical analysis, we also use data on GDP and employment in 2014. As such, the sample period encompasses both the times of prosperity of 2002–2007 and the financial and economic crisis of 2008–2010, concluding with the stagnation of 2011–2013. It thus gives us a proper perspective on the business cycle characteristics of our estimated relationships. Our sample is restricted to 23 OECD countries. Owing to the lack of available information concerning some categories of data and/or the lack of a sufficiently long sample, the model does not take into account Chile, Estonia, Israel, Luxembourg, Mexico, New Zealand, Slovenia, Switzerland, Turkey, and the United States.

In order to get the basic idea about the characteristics of the data in light of our tested hypotheses, we use simple statistics, such as the average levels of quasi output elasticity of employment in the analyzed sub-periods (presented in Table 2, together with data on average rates of change in employment and GDP). This provisional measure of employment elasticity was obtained as a ratio of the average rate of change of employment to the average rate of change of GDP in a given sub-period. Its analysis shows that the values of elasticities differ considerably between the prosperity and crisis periods. During the cri-

sis, the average absolute value of the quasi output elasticity of employment in the analyzed economies was nearly five times higher than its average value in the preceding period of 2002–2007, and nearly three times higher than the average in the following period of economic stagnation of 2011–2014.

Table 2. Average rates of change in total employment and GDP, average level of quasi output elasticity of employment in selected OECD countries, 2002–2014 (in sub-periods)

Country	Average rate of change of employment in sub-periods (in %)			Average rate of change of GDP in sub-periods (in %)			Average quasi output elasticity of employment in sub-periods		
	2002–2007	2008–2010	2011–2014	2002–2007	2008–2010	2011–2014	2002–2007	2008–2010	2011–2014
Austria	0.95	0.79	0.59	2.37	–0.11	1.06	0.40	–7.32	0.56
Belgium	1.30	0.82	0.30	2.36	0.39	0.83	0.55	2.13	0.37
Canada	1.95	0.40	1.21	2.61	0.61	2.33	0.75	0.65	0.52
Czech Republic	0.60	–0.24	0.45	4.84	0.05	0.63	0.12	–4.39	0.72
Denmark	0.40	–1.15	0.08	1.76	–1.39	0.52	0.23	0.83	0.14
Finland	0.84	–0.57	0.01	3.27	–1.52	–0.08	0.26	0.38	–0.07
France	1.28	0.19	0.08	1.84	–0.26	0.77	0.70	–0.72	0.10
Germany	0.68	0.66	0.65	1.35	–0.15	1.49	0.50	–4.31	0.44
Greece	1.39	–1.27	–5.19	4.05	–3.37	–4.74	0.34	0.38	1.09
Hungary	0.15	–1.46	2.40	3.64	–1.66	1.41	0.04	0.88	1.70
Ireland	3.51	–3.88	0.12	5.40	–2.47	2.34	0.65	1.57	0.05
Italy	0.95	–0.53	–0.27	1.07	–1.62	–1.08	0.89	0.33	0.25
Japan	0.00	–0.81	0.43	1.59	–0.62	0.65	0.00	1.31	0.66
Korea	1.39	0.56	1.81	4.97	3.34	3.05	0.28	0.17	0.59
Netherlands	0.77	0.43	–0.40	1.97	–0.22	0.28	0.39	–1.94	–1.43
Norway	1.17	0.89	1.27	2.38	–0.21	1.73	0.49	–4.17	0.73
Poland	1.21	0.54	0.62	4.61	3.42	2.79	0.26	0.16	0.22
Portugal	–0.11	–1.28	–2.08	1.08	–0.29	–1.52	–0.11	4.36	1.37
Slovak Republic	1.76	–0.53	0.49	6.82	1.75	2.08	0.26	–0.30	0.24
Spain	4.30	–3.06	–1.88	3.48	–0.81	–0.98	1.24	3.76	1.91
Sweden	0.86	–0.13	1.35	3.28	0.08	1.47	0.26	–1.59	0.92
Switzerland	0.77	1.27	1.45	2.37	1.03	1.65	0.32	1.23	0.88
United Kingdom	1.09	–0.14	1.27	2.76	–1.04	2.04	0.39	0.13	0.62

Source: authors' own calculations based on the data from Stats. OECD internet database.

In 2002–2007, the highest values of the quasi output elasticity of employment were observed in Spain, Italy, Canada, France, Ireland, Belgium, and Germany, whereas during the crisis of 2008–2010 such values were reported for Portugal, Spain, Belgium, Ireland, Japan, and Switzerland. Comparing these results with the data on the average EPL levels (presented in Table 1),

we can see that both of these groups consisted of countries characterized by relatively low and relatively high levels of EPL strictness. At the same time, the lowest absolute values of employment elasticity during the crisis were reported for the United Kingdom, Poland, South Korea, Italy, Greece, and Finland. It is worth noting that, apart from the United Kingdom, all of these countries are characterized by moderate levels of EPL, which are estimated to be close to or slightly higher than 2. This result clearly corresponds with the proposed hypothesis of the U-shaped relationship between EPL and the elasticity of employment.

It should also be noted that in Austria, the Czech Republic, Germany, Norway, Netherlands, Sweden, France, and Slovakia, negative values of the quasi output elasticity of employment were noted in the crisis period. Similar values were also observed in Portugal in the 2002–2007 period and in the Netherlands and Finland in 2011–2014. This result requires some comment, as it is at odds with economic theory, which expects employment to react positively to the growth of output and negatively when output falls. In most of the cases listed above, these abnormal values of quasi output elasticity of employment probably resulted from apparent lags in the adjustment of employment to changes in output, as the negative values of the average rate of change in GDP were accompanied by increases in the employment levels. In the case of the Czech Republic in 2008–2010, the changes in employment preceded the changes of output, which might suggest an elastic reaction of the labor market to an anticipated decline in economic activity, or a continuing tendency to rationalize employment in the post-communist economies.

In our previous articles, we were mainly concerned with the impact of EPL on short-term labor market adjustments to general economic fluctuations. Using the data for the OCED economies, we have shown that there exists a U-shaped relationship between the elasticity of employment (and unemployment) to changes in GDP and the level of employment protection [Kwiatkowski, Włodarczyk, 2012]. Countries with relatively weak and relatively restrictive employment protection regulations were shown to be characterized by higher employment elasticity than countries with moderate levels of EPL. According to our further results, this relationship is especially pronounced during economic downturns, while being apparently weaker in times of prosperity [Kwiatkowski, Włodarczyk, 2014, 2015]. The aforementioned results also seem relatively robust to changes in the specification of the estimated relationships.

The econometric analyses presented in this paper extend our previous results, as we embed our considerations into an error correction (ECM) framework, which enables us to make inferences about the character of both the short- and long-term influence of EPL on employment elasticity. We also further investigate the business cycle characteristics of the proposed relationships.

The econometric model used to verify the hypotheses proposed in the previous section of the paper is based on the traditional function of demand for

labor[3]. This function can be easily derived under the assumption that the production processes taking place in each of the analyzed economies can be described using the standard two-factor constant elasticity of substitution (CES) aggregate production function, with factor-augmenting technical progress, in line with Arrow *et al.* [1961] and Klump *et al.* [2012], given by:

$$Y_{it} = \left\{ \beta_i \left[A_{it}^K K_{it} \right]^{\frac{\sigma_i - 1}{\sigma_i}} + (1-\beta_i) \left[A_{it}^L L_{it} \right]^{\frac{\sigma_i - 1}{\sigma_i}} \right\}^{s_i \frac{\sigma_i}{1-\sigma_i}}, \tag{1}$$

where: Y_{it} is the level of output in i-th country in period t, K_{it} – capital level in i-th country in period t, L_{it} – employment level in i-th country in period t, A_{it}^K, A_{it}^L are, respectively, the capital and labor efficiency levels in i-th country in period, t, β_i is the capital intensity of production in i-th country, σ_i is the elasticity of substitution between capital and labor in i-th country, and s_i is the returns to scale parameter of i-th country.

Assuming further that producers maximize their profits according to the standard first-order condition, i.e. setting their marginal product of each factor equal to its price, we obtain:

$$MPL_{it} = \frac{w_{it}}{p_{it}}, \tag{2}$$

with MPL_{it} and $\frac{w_{it}}{p_{it}}$ representing, respectively, the marginal productivity of labor and real wages in i-th country in period t. Finally, we assume that technical progress takes the form:

$$A_{it}^j = A_{i0}^j e^{\gamma_i^j t}, \quad j = \{K, L\}, \tag{3}$$

where: A_{i0}^j represents j-th factor's efficiency level in i-th country at time 0, γ_i^j is j-th factor's technical progress rate at i-th country, and t stands for time.

Combining equation (1) with conditions (2) and (3) and linearizing it, we obtain the following labor demand function:

$$\ln L_{it} = \alpha_{1i} + \alpha_{2i} t + \alpha_{3i} \ln Y_{it} + \alpha_{4i} \ln \left(\frac{w_{it}}{p_{it}} \right) + \epsilon_{it}, \tag{4}$$

where: $\alpha_{1i} = \sigma_i \left[\ln s_i + \ln(1-\beta_i) + \frac{\sigma_i - 1}{\sigma_i} \ln A_{i0}^L \right]$, $\alpha_{2i} = (\sigma_i - 1)\gamma_i^L$, $\alpha_{3i} = \frac{s_i \sigma_i - \sigma_i + 1}{s_i}$, $\alpha_{4i} = -\sigma_i$, t is a deterministic trend being a representation of technical progress, and ϵ_{it} is an error term. The proposed specification is very convenient as, apart from CES, it encompasses some other well-known production function

[3] The empirical strategy proposed in this paper is an extension of the original model proposed in our previous paper: Kwiatkowski and Włodarczyk [2012].

forms, e.g. the constant returns to scale case when $s_i = 1$, resulting in $\alpha_{3i} = 1$; or the case of the unitary elasticity of substitution of production factors, given by $\sigma_i = 1$, when the limiting form of production function is the Cobb-Douglas function: $Y_{it} = \left\{ \left[A_{it}^K K_{it} \right]^{\beta_i} + \left[A_{it}^L L_{it} \right]^{(1-\beta_i)} \right\}^{s_i}$ and the labor demand function's parameters are given by $\alpha_{2i} = 0$, $\alpha_{3i} = 1$, and $\alpha_{4i} = -1$. Finally, this specification also allows for the existence of different types of factor-augmenting technical progress[4]. Apart from its relatively elastic nature, this function also has the advantage of being easily estimable using standard panel econometric methods, as it is linear in its parameters. Furthermore, parameters α_{3i}, and α_{4i} can be interpreted as elasticities of employment with regard to changes in GDP/real wage, which makes it natural to use equation (4) as a test of the hypotheses which were developed in the previous sections of this paper.

In order to assess the impact of EPL on the elasticity of employment with respect to GDP, we extend our equation by introducing appropriate interaction variables. The possible nonlinear character of this influence is also taken into account. As a result, we extend equation (4) with the quadratic interaction term: $\delta_{1i} \ln Y_{it} EPL_{it} + \delta_{2i} \ln Y_{it} EPL_{it}^2$, where EPL_{it} is the level of EPL strictness in *i*-th country at time *t*. Additionally, we introduce the lag structure into the model. This leads to the autoregressive distributive lag dynamic panel model – $ADLP(p, q_1, q_2, r_1, r_2)$ having the form:

$$\ln L_{it} = \alpha_{1i} + \alpha_{2i} t + \sum_{j=1}^{p} \lambda_{ij} \ln L_{i,t-j} + \sum_{j=1}^{q_1} \alpha_{3ij} \ln Y_{i,t-j} + \sum_{j=1}^{r_1} \delta_{1ij} \ln Y_{i,t-j} EPL_{i,t-j}$$
$$+ \sum_{j=1}^{r_2} \delta_{2ij} \ln Y_{i,t-j} EPL_{i,t-j}^2 + \sum_{j=1}^{q_2} \alpha_{4ij} \ln \left(\frac{w_{i,t-j}}{p_{i,t-j}} \right) + \epsilon_{it} \qquad (5)$$

Finally, in order to avoid the problems caused by the possible non-stationarity of the variables used in our model, which may result in the appearance of spurious regression, it was re-parametrized into the error correction form following Blackburne and Frank [2007]:

$$\Delta \ln L_{it} = \alpha_{1i} +$$
$$\phi_i \left[\ln L_{i,t-1} - \alpha_{2i}^* t - \alpha_{3i}^* \ln Y_{i,t-1} - \delta_{1i}^* \ln Y_{i,t-1} EPL_{i,t-1} - \delta_{2i}^* \ln Y_{i,t-1} EPL_{i,t-1}^2 - \alpha_{4i}^* \ln \left(\frac{w_{i,t-1}}{p_{i,t-1}} \right) \right]$$
$$+ \sum_{j=1}^{p-1} \lambda_{ij}' \Delta \ln L_{i,t-j} + \sum_{j=0}^{q_1-1} \alpha_{3ij}' \Delta \ln Y_{i,t-j} + \sum_{j=0}^{r_1-1} \delta_{1ij}' \Delta (\ln Y_{i,t-j} EPL_{i,t-j})$$

4 Due to the fact that in our research we are interested in the estimation of the labor demand function and we do not estimate the capital demand function, we cannot fully identify the character of the technical progress process. But it is apparent that in the case when $\gamma_i^L = 0$ technical progress is Solow-neutral and if $\gamma_i^L > 0$, then we have Hicks-neutral, Harrod-neutral or general factor augmenting technical progress depending on the actual characteristics of the capital efficiency growth rate.

$$+\sum_{j=0}^{r_2-1}\delta'_{1ij}\Delta(\ln Y_{i,t-j}EPL^2_{i,t-j})+\sum_{j=0}^{q_2-1}\alpha'_{4ij}\Delta\ln\left(\frac{w_{i,t-j}}{p_{i,t-j}}\right)+\varepsilon_{it} \tag{6}$$

where: $\phi_i=-(1-\sum_{j=1}^{p}\lambda_{ij})$ is the error-correction parameter,

$$\alpha^*_{2i}=\frac{\alpha_{2i}}{1-\sum_{j=1}^{p}\lambda_{ij}},\ \alpha^*_{3i}=\frac{\sum_{j=0}^{q_1}\alpha_{3ij}}{1-\sum_{j=1}^{p}\lambda_{ij}},\ \delta^*_{1i}=\frac{\sum_{j=0}^{r_1}\delta_{1ij}}{1-\sum_{j=1}^{p}\lambda_{ij}},\ \delta^*_{2i}=\frac{\sum_{j=0}^{r_2}\delta_{2ij}}{1-\sum_{j=1}^{p}\lambda_{ij}},$$

$\alpha^*_{4i}=\frac{\sum_{j=0}^{q_2}\alpha_{4ij}}{1-\sum_{j=1}^{p}\lambda_{ij}}$ are the long-term parameters of the cointegrating regression,

$\lambda'_{ij}=-\sum_{m=j+1}^{p}\lambda_{im}$ for $j=\{1,\ldots,p-1\}$, $\alpha'_{3ij}=-\sum_{m=j+1}^{q_1}\alpha_{3im}$ for $j=\{1,\ldots,q_1-1\}$,

$\delta'_{1ij}=-\sum_{m=j+1}^{r_1}\delta_{1im}$ for $j=\{1,\ldots,r_1-1\}$, $\delta'_{2ij}=-\sum_{m=j+1}^{r_2}\delta_{2im}$ for $j=\{1,\ldots,r_2-1\}$,

$\alpha'_{4ij}=-\sum_{m=j+1}^{q_1}\alpha_{4im}$ for $j=\{1,\ldots,q_2-1\}$ are the short-term parameters,

$\varepsilon_{it}\sim IID(0,\sigma^2_{\varepsilon_i})$ is an error term.

As in Kwiatkowski, Włdarczyk [2014, 2015], in our estimations, we use two additional transformations in order to obtain the first differences of interactive variables:

$$\Delta(\ln Y_{i,t-j}EPL_{i,t-j})=\Delta\ln Y_{i,t-j}\cdot EPL_{i,t-j}+\ln Y_{i,t-j}\cdot\Delta EPL_{i,t}$$

and

$$\Delta(\ln Y_{i,t-j}EPL^2_{i,t-j})=\Delta\ln Y_{i,t-j}\cdot EPL^2_{i,t-j}+\ln Y_{i,t-j}\cdot 2EPL_{i,t-j}\cdot\Delta EPL_{i,t-j}.$$

The model defined in equation (6) is well suited for testing the hypotheses, which were presented in the theoretical section of this paper, as it makes it possible to discern between the short- and long-term consequences of EPL strictness for the elasticity of employment. The model also allows for the introduction of nonlinearities implied by the theoretical considerations. As such it became our basic specification in the course of our econometric verification.

Drawing from the theoretical considerations presented above, we can formulate some expectations concerning the desired sign of the model's parameters' estimates. In accordance with the adopted CES production function given by equation (1) and the labor demand function given by equation (4), one should expect the existence of a positive relationship between employment and the size of aggregate demand and production. The value of parameters α^*_{3i} and α'_{3ij} should thus be positive. Such an expectation is additionally grounded in the Keynesian theories of the labor market [Kwiatkowski, 2006: 116–117]. The labor demand function also suggests the existence of a negative relationship between employment and real wages, which should lead to negative values

of parameters α^{*}_{4i} and $\alpha^{'}_{4ij}$. Such an expectation is also in line with the claims of the neoclassical theory of employment [Kwiatkowski, 2006: 103–104]. The hypothesis concerning the nonlinear influence of the level of stringency of employment protection legislation on the elasticity of employment with respect to GDP would be confirmed if a negative value is obtained for parameters δ^{*}_{1i} or $\delta^{'}_{1ij}$ and at the same time a positive value is obtained for parameters δ^{*}_{2i} or $\delta^{'}_{2ij}$. On the other hand, according to the hypothesis of the long-term neutrality of EPL, propagated by Lazear [1990], we should expect parameters δ^{*}_{1i} and δ^{*}_{2i} to be equal to zero. Finally, on the basis of equation (4), we expect parameter α^{*}_{2i} to be positive and, as the process generating employment is believed to be non-explosive, we expect ϕ_i to be negative and less than one.

Results of econometric analyses

In this section of the paper, we present the results of econometric verification of the proposed hypotheses relating to the effects of GDP, real wages and institutional factors on short- and long-term employment patterns, using econometric methods for panel data.

Table 3. Results of the panel unit root tests

Test type	Variable							
	ln Employment		ln GDP		ln Real wage		EPL	
	stat.	p-val.	stat.	p-val.	stat.	p-val.	stat.	p-val.
Null hypothesis: Unit root (common unit root process)								
Levin, Lin, Chu (*t**) lags = BIC	–4.48	0.00	–9.90	0.00	–5.84	0.00	5.95	1.00
Breitung (λ)	3.69	0.99	4.34	1.00	4.84	1.00	0.95	0.83
Null hypothesis: Unit root (individual unit root process)								
Im, Pesaran, Shin (*Z*)	3.67	0.99	–0.90	0.18	0.78	0.78	1.03	0.85
ADF-Fisher (*Z*) lags=2	–1.28	0.10	–1.22	0.11	1.03	0.85	5.45	1.00
PP-Fisher (*Z*) lags=2	2.69	0.99	–1.05	0.15	–0.54	0.06	–2.04	0.02
Null hypothesis: No unit root (common unit root process)								
Hadri-LM (*z*)	18.15	0.00	24.24	0.00	25.16	0.00	19.91	0.00

Source: author's own calculations.

We begin our formal econometric analyses with a brief look at the results of the unit root tests presented in Table 3. Among the tests, which assume the existence of a common unit root as a null hypothesis, the Breitung test is believed to have substantially higher power in finite samples than the alternative test proposed by Levin, Lin and Chu [Baltagi, 2005: 243]. According to the presented results, it does not let us reject the null hypothesis of the uniform unit root in any of the analyzed variables. Similar results indicating the existence of a unit root are obtained using the Im, Pesaran and Shin's test and

(in the case of most of the time series) using Fisher-type tests, in which it is assumed that the unit root processes are not uniform across countries and do not have to be present in every cross-section of the panel. It should be mentioned, however, that in this case rejection of the null hypothesis does not necessarily mean that there is no unit root in any of the analyzed cross-sections, but rather that there is some subgroup of countries which is characterized by the existence of stationary processes. In this respect, the results of these tests reinforce the findings of the Breitung test. The last of the unit root tests that were used in order to assess the data was the Hadri-LM test, which assumes the null hypothesis of stationarity against the alternative hypothesis of the existence of a common unit root process in the analyzed time series. In our study, the Hadri-LM test rejects the null hypothesis for all of the time series that were tested. Summing up the results obtained on the basis of the performed unit root and stationarity tests, we should expect that the time series used in our analyses are all integrated of order 1, i.e.: I (1).

Taking into account the results of the performed unit root test and assuming that all of the variables are actually I (1), we now test between different specifications of the cointegrating relationship. We assume that the general form of this relationship is given by the ECM part of equation (6) and gradually impose zero restrictions on subsequent parameters in order to find the most appropriate, permissible form of the long-term equation. The analyses are performed using Panel-v and Panel-rho statistics of the Pedroni test [Pedroni, 1997: 614], as well as the G_T and P_T statistics proposed by Westerlund [2007].

Table 4. Results of the cointegration tests

Cointegrating vector specification	Pedroni test		Westerlund tests			
	Panel-v	Panel-rho	G_T	p-val.	P_T	p-val.
Dependent variable: ln Employment						
t, ln GDP, ln Real wage, ln GDP EPL, ln GDP EPL^2	–1.997	4.472	lack of d.f.			
ln GDP, ln Real wage, ln GDP EPL, ln GDP EPL^2	–1.222	3.169	lack of d.f.			
t, ln GDP, ln Real wage, ln GDP EPL	–1.262	3.659	–3.860	0.000	4.193	1.000
ln GDP, ln Real wage, ln GDP EPL	–0.427	2.345	–7.549	0.000	4.470	1.000
t, ln GDP, ln Real wage	–0.193	2.112	–2.110	0.017	2.472	0.993
ln GDP, ln Real wage	**0.396**	1.029	–3.990	0.000	0.049	0.519
ln GDP, ln Real wage (lags=1)	–	–	–3.151	0.001	–0.435	0.332
t, ln GDP	**0.966**	0.9721	–1.846	0.032	**–2.100**	0.018
ln GDP	–0.138	0.9436	–6.501	0.000	**–2.572**	0.005

Source: author's own calculations.

Analysis of the results of the Pedroni test shows that none of the obtained statistics was close to their significant levels, which are located in the neighborhood of 2 for the Panel-v statistic and –2 in the case of Panel-rho statistic. The problem here, however, is connected with the low number of observa-

tions in our sample (T=12). As pointed out by Pedroni [1997: 614], the test reaches full power for T=250 in the case of Panel-v statistic and T=500 in the case of Panel-rho. We may, however, see that the only specifications in which Panel-v comes relatively close to the values mentioned above is for the specifications with: GDP and real wage, and trend and GDP. While these results do not allow us to confirm that, for these specifications, the variables are cointegrated, they might still serve as an important indicator for the assessment of Westerlund statistics.

We should start our assessment of the results of Westerlund tests with a brief remark concerning the behavior of his G_T statistic, which seems to be seriously undersized, i.e. to have the tendency to over-reject the true null hypotheses[5]. As such this test is of little use to us. On the other hand, the P_T statistic seems to behave fairly well with our data. According to the values obtained for this test statistic, we may reject the null hypothesis of no cointegration for two specifications. In the first of them, GDP cointegrates solely with GDP, and in the second this relationship is enriched with a linear deterministic trend. It should be noted that, according to the results of Westerlund tests, real wages do not influence employment in the long term. This result is quite hard to reconcile with the majority of existing economic theories. As in some cases real wages tend to react with lags to changes in labor market performance due to nominal contract rigidities, we also tested the specification in which one lag of the explanatory variables was included. It did not, however, have any impact on the result of the test.

Summing up all of the results obtained on the basis of the performed cointegration tests, there are three specifications of the long-term relationships which are permissible and may find confirmation in the data, and which will be used in our estimations. The first of them consists solely of the GDP level; the second includes both the GDP level and the linear trend approximating changes in the level of employment efficiency; and the third, which is the most disputable one, entails both the GDP and real wage levels and is thus close to the traditional version of the labor demand function. Furthermore, according to the obtained results, we find no reasons to reject the hypothesis of long-term neutrality of EPL, which was put forward in section 3 of this paper. This result is robust under both the linear and non-linear U-shaped specifications of the analyzed relationship. The impact of EPL on labor market performance is thus restricted only to the short term.

The final part of our analyses consisted of the estimation of a model in its Panel ECM (PECM) form, as proposed in equation (6). This model was estimated using methods developed for dynamic heterogeneous panel models with large T and large N. The literature on this topic suggests three strategies that might be used in order to obtain estimates of these equations. The first of

5 An extensive assessment of this problem is available, e.g., in a paper by Hlouskova and Wagner [2010].

them, subsequently called the fixed-effect (FE) estimation, consists of using methods originally developed for small T panels, which require the pooling of groups and the estimation of parameters that are homogeneous across panels. In the case of the proposed functional form of our model, it restricts not only the coefficients of the long-term cointegrating relationship, but also the short-term coefficients, together with the speed-of-correction parameter ϕ. It allows only for the country-specific intercepts. This method is very useful when the number of observations is relatively small, however as pointed by, e.g., Pesaran and Smith [1995] and Pesaran, Shin and Smith [1999], it produces inconsistent estimates when the slope coefficients actually differ between countries[6].

In order to overcome the potential pitfalls of the FE estimator, Pesaran and Smith [1995] proposed a mean-group (MG) estimation method, which uses independent estimates of equations across each group, which are later arithmetically averaged in order to obtain common coefficients. This method allows for cross-country heterogeneity of intercepts, slope coefficients and error variances, however it is very costly in terms of degrees of freedom, as each of the separate cross-country regressions has to be well fitted. As our dataset is not rich in observations (only 11 time periods), this method is of little use for our analyses.

The final strategy consists of the use of the pooled mean-group (PMG) estimator developed by Pesaran, Shin and Smith [1999]. It combines the advantages of both methods, as it allows for cross-country heterogeneity of intercepts, short-term coefficients and error variances, while restricting common long-term parameters. Country-specific parameters are later averaged over the countries. As such, this method has lower informational requirements than the MG estimator, however it produces efficient and consistent estimates only when the hypothesis of slope homogeneity cannot be rejected. Taking these considerations and the specificity of the undertaken analysis into account, we have decided to base our estimations primarily on the PMG method.

According to the results of the cointegration tests, estimations were performed using three specifications of the long-term equilibrium relationship, which were described in detail above. The most appealing estimates, which might also be easily reconciled with the mainstream economic theories, were obtained with the use of the model in which cointegration between employment, GDP, and real wages was assumed.

Table 5 summarizes the results of our estimation of the PECM model of equation (6), obtained using the PMG method. The estimations were performed for the whole analyzed sample of 2002–2013, as well as for the sub-period of 2006–2013, which was highly influenced by the global economic crisis of 2008–2010 and the following recession of 2011–2013. A full account of the

6 For further discussion of these issues, see, e.g., Baltagi [2005] and Blackburne and Frank [2007].

performed estimations is presented in Tables A.1 and A.2 of Appendix A, and may also be used in order to assess the robustness of the obtained results.

Table 5. Results of PECM estimations for the 2002–2013 and 2006–2013 periods—PMG method

Parameters		Estimation period					
		2002–2013			2006–2013		
Long-run relationship	ln GDP	**0.796** (0.000)	**0.865** (0.000)	**0.764** (0.000)	**0.735** (0.000)	**1.056** (0.000)	**0.747** (0.000)
	ln Real wage	**–0.192** (0.000)	**–0.341** (0.000)	**–0.180** (0.000)	**–0.063** (0.036)	**–0.277** (0.000)	**–0.068** (0.001)
Short-run relationship	ECM	**–0.375** (0.000)	**–0.342** (0.000)	**–0.376** (0.000)	**–0.468** (0.000)	**–0.385** (0.000)	**–0.496** (0.000)
	Δ ln Employment$_{t-1}$	**0.159** (0.014)	**0.156** (0.050)	**0.174** (0.018)	**0.207** (0.011)	0.134 (0.200)	**0.187** (0.029)
	Δ ln GDP	**0.157** (0.046)	0.085 (0.181)	0.157 (0.055)	0.140 (0.081)	0.242 (0.109)	0.141 (0.091)
	Δ ln Real wage	–	–	–	–	–	–
	Δ ln Real wage$_{t-1}$	–	–	–	–	–	–
	Δ ln GDP EPL	–	–0.084 (0.158)	0.099 (0.245)	–	–0.273 (0.089)	–0.006 (0.486)
	Δ ln GDP EPL^2	–	0.022 (0.134)	–	–	0.083 (0.073)	–
	Const	0.123	0.344	0.243	–0.088	–0.864	–0.153
Number of observations		184	184	184	230	230	230
Number of periods		8	8	8	10	10	10
Number of countries		23	23	23	23	23	23

In brackets, p-values of the significance test. Parameters in bold are significant at the 5% level. Source: author's own calculations.

Full sample estimates point towards the existence of a stable long-term relationship between employment, output, and real wages. In accordance with Keynesian theories, increases in output lead to slightly smaller increases in employment, whereas according to the hypotheses put forward by the neoclassicals, increases in the real wage result in declines of employment. The latter dependence is, however, considerably weaker. Analysis of the short-term properties of the analyzed relationship enables us to infer that, period-by-period, the ECM corrects about 35% of the existing discrepancies between the actual and equilibrium value of employment. Considering that employment is a variable characterized by a relatively high level of inertia, this result is not very surprising. The other statistically significant variables are lagged em-

ployment and GDP. There is no significant short-term impact of real wages on employment. This result confirms the hypothesis of short-term real wage rigidity.

From the point of view of the analyses undertaken in this paper, the reaction of employment to changes in the institutional variables is the most important. In the case of full sample estimations, EPL is not a significant determinant of employment. This assessment is relatively robust and does not depend on the functional form of the relationship, as both the linear and nonlinear parameters are rejected.

In order to assess the stability of the obtained estimates across the business cycle, we performed additional estimations for the 2006–2013 sub-period. This period was dominated by the global economic crisis of 2008–2010 and the post-crisis recession of 2011–2013. The analyzed subsample starts two years before the precise beginning of the crisis because the model used in empirical analyses was relatively expanded, and thus it quickly consumed the degrees of freedom of the sample.

Close inspection of the obtained results lets us infer that the model is relatively stable. GDP and real wages have a long-term relationship with employment, with the signs of reaction being consistent with general economic theory. The magnitude of reaction of employment to changes in real wages was definitely lower than in times of prosperity, which means that employment is determined at the quantitative rather than qualitative margin. According to the model, the error correction mechanism diminishes more than 40% of the existing deviation from the long-term equilibrium in each period, which is slightly higher than in the previous case. Real wages are not a significant determinant of employment in the short term. The reaction of employment to changes in the level of GDP is similar to that in the whole sample. The inertia of employment is, however, considerably higher, which might be explained by the phenomenon of labor hoarding.

The final empirical question that was answered within our analyses concerned the role of EPL in the level of output elasticity of employment. The results obtained for the period of the global economic crisis point toward a significant short-term impact of labor market regulations on this economic category. The obtained estimates were all significant at the 10% level. The existence of a U-shaped relationship was confirmed. The sign of the estimates remained in line with our earlier results [Kwiatkowski, Włodarczyk 2012, 2014, 2015] and with the theoretical hypotheses presented in this paper. During the crisis, the elasticity of employment with respect to GDP in countries with relatively high and relatively low employment protection is considerably higher than in countries with moderate levels of EPL. On the other hand, EPL does not change the performance of economies during periods of prosperity.

Conclusions

In this paper, we have investigated the role and importance of EPL on the observed levels and changes of employment. On the basis of existing economic literature, we formulated a group of empirically verifiable hypotheses. They stated that in the short term we should assume the existence of rigid wages and a non-linear (U-shaped) relationship between the elasticity of employment to GDP and the restrictiveness of EPL, whereas in the long term we may presume the existence of flexible wages and the neutrality of EPL to the changes observed in labor market categories such as employment.

The hypotheses were tested using statistical and econometrical analysis techniques, including the panel error correction model estimated using data on 23 OECD countries in 2002–2013. On the basis of the performed tests of panel cointegration, the hypothesis of the long-term neutrality of EPL for the labor market categories was confirmed. The hypothesis concerning the impact of EPL on short-term labor market adjustments was confirmed only for the global crisis sub-period. It was confirmed that there exists a U-shaped relationship between the restrictiveness of EPL regulations and the output elasticity of employment. The empirical evidence shows that in countries with both relatively high and relatively low employment protection, employment elasticity is considerably higher than in countries with moderate levels of EPL. In light of these results, Poland's employment protection regulations can be assessed as reasonably adequate as they do not evoke extensive changes in employment in response to business cycle fluctuations.

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Appendix A. Results of estimations of Panel ECM model:

Table A.1. Results of model estimations for the 2002–2013 period—PMG method

Parameters		Estimation					
		(1)	(2)	(3)	(4)	(5)	(6)
Long-run relationship	ln GDP	**0.766** (0.000)	**0.796** (0.000)	**0.782** (0.000)	**0.765** (0.000)	**0.865** (0.000)	**0.764** (0.000)
	ln Real wage	**–0.109** (0.000)	**–0.192** (0.000)	**–0.173** (0.000)	**–0.104** (0.000)	**–0.341** (0.000)	**–0.180** (0.000)
Short-run relationship	ECM	**–0.396** (0.000)	**–0.375** (0.000)	**–0.419** (0.000)	**–0.438** (0.000)	**–0.342** (0.000)	**–0.376** (0.000)
	Δ ln Employment$_{t-1}$	**0.149** (0.018)	**0.159** (0.014)	**0.150** (0.020)	0.118 (0.088)	0.156 (0.050)	**0.174** (0.018)
	Δ ln GDP	0.155 (0.096)	**0.157** (0.046)	0.091 (0.285)	0.083 (0.408)	0.085 (0.181)	0.157 (0.055)
	Δ ln Real wage	–0.119 (0.355)	–	–	–0.103 (0.438)	–	–
	Δ ln Real wage$_{t-1}$	–	–	**0.177** (0.004)	**0.176** (0.003)	–	–
	Δ ln GDP EPL	–	–	–	–	–0.084 (0.158)	0.099 (0.245)
	Δ ln GDP EPL^2	–	–	–	–	0.022 (0.134)	–
	Const	–0.062	0.123	0.132	–0.089	0.344	0.243
Number of observations		184	184	184	184	184	184
Number of periods		8	8	8	8	8	8
Number of countries		23	23	23	23	23	23

In brackets, p-values of significance test. Parameters in bold are significant at the 5% level.
Source: author's own calculations.

Table A.2. Results of model estimations for the 2006–2013 period—PMG method

Parameters		Estimation					
		(1)	(2)	(3)	(4)	(5)	(6)
Long-run relationship	ln GDP	**0.775** (0.000)	**0.735** (0.000)	**1.173** (0.000)	**0.815** (0.000)	**1.056** (0.000)	**0.747** (0.000)
	ln Real wage	**–0.096** (0.000)	**–0.063** (0.036)	**–1.874** (0.000)	**–0.116** (0.000)	**–0.277** (0.000)	**–0.068** (0.001)

Parameters		Estimation					
		(1)	(2)	(3)	(4)	(5)	(6)
Short-run relationship	ECM	**–0.466** (0.000)	**–0.468** (0.000)	**–0.217** (0.000)	**–0.475** (0.000)	**–0.385** (0.000)	**–0.496** (0.000)
	Δ ln Employment$_{t-1}$	0.153 (0.075)	**0.207** (0.011)	0.107 (0.246)	0.064 (0.504)	0.134 (0.200)	**0.187** (0.029)
	Δ ln GDP	0.139 (0.157)	0.140 (0.081)	**0.193** (0.018)	0.076 (0.496)	0.242 (0.109)	0.141 (0.091)
	Δ ln Real wage	–0.199 (0.154)	–	–	–0.164 (0.234)	–	–
	Δ ln Real wage$_{t-1}$	–	–	**0.222** (0.004)	0.131 (0.120)	–	–
	Δ ln GDP EPL	–	–	–	–	–0.273 (0.089)	–0.006 (0.486)
	Δ ln GDP EPL^2	–	–	–	–	0.083 (0.073)	–
	Const	–0.175	–0.088	2.806	–0.332	–0.864	–0.153
Number of observations		230	230	230	230	230	230
Number of periods		10	10	10	10	10	10
Number of countries		23	23	23	23	23	23

In brackets, p-values of significance test. Parameters in bold are significant at the 5% level.
Source: author's own calculations.

ZNACZENIE PRAWNEJ OCHRONY ZATRUDNIENIA DLA ELASTYCZNOŚCI ZATRUDNIENIA W KRAJACH OECD

Streszczenie

Celem artykułu jest analiza wpływu prawnej ochrony zatrudnienia (p.o.z.) na elastyczność zatrudnienia względem PKB. W artykule zaprezentowano znaczenie, zakres i tendencje zmian obserwowanych w ochronie zatrudnienia, określono mechanizmy jej wpływu na sytuację panującą na rynku pracy oraz dokonano ich weryfikacji opierając się na danych dla 23 krajów członkowskich OECD w latach 2002–2014.

W krótkim okresie należy oczekiwać istnienia nieliniowej (U-kształtnej) zależności pomiędzy poziomem ochrony zatrudnienia a jego elastycznością względem zmian PKB. W długim okresie p.o.z. staje się natomiast neutralna dla zmienności zatrudnienia w związku z tym, że elastyczne płace umożliwiają pracodawcom łatwiejsze dostosowanie się do sytuacji panującej na rynku pracy.

Przeprowadzone testy panelowej kointegracji pozwoliły na potwierdzenie hipotezy o długookresowej neutralności prawnej ochrony zatrudnienia. Hipoteza dotycząca wpływu p.o.z. na charakter krótkookresowych dostosowań kategorii rynku pracy została potwierdzona jedynie dla okresu światowego kryzysu gospodarczego.

Słowa kluczowe: prawna ochrona zatrudnienia, elastyczność zatrudnienia, U-kształtna zależność, panelowy model korekty błędem

Kod klasyfikacji JEL: J 23