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AMBIGUOUS EFFECTS OF MINIMUM WAGE TOOL OF LABOUR MARKETS REGULATION – KEY STUDY OF V4 COUNTRIES

EMILIE JASOVA, BOZENA KADERABKOVA

Abstract:

In this paper we analyze the effect of minimum wage change on selected labour market indicators such as duration of employment, hours worked, unemployment by education or profession or long-term unemployment. Our research is based on Eurostat and OECD data for V4 countries. The hypothesis discussed is whether the effect of minimum wage increase is positive or negative and we discuss the issue of economic regulation more generally. The output values of the regressions coefficients of all the V4 countries showed that the effects are more positive than negative. Mapping the overall intensity of effects of the minimum wage on selected indicator of the labour market in the Czech Republic and Hungary indicated a low sensitivity. The effects were very weak in Slovakia and Poland. The results of the analysis complied with the results of the domestic and international research in 13 cases and the results were different in 6 cases. Slightly more often they confirmed more positive effects of the minimum wage on selected indicators of the labour market than negative effects.

Keywords:

minimum wage, rate of unemployment by educational attainment, long-term unemployment, average hours actually worked per week, temporary employees

JEL Classification: E24, E32, E37

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Introduction

The relation between the minimum wage and the unemployment is a current topic in political-economical practice in the Visegrad group countries (V4). The debate on the relation between these variables is related to the flexibility of the labour market, which is important for the level and dynamics of the economic output.

Non dynamic or insufficiently flexible labour markets lead to the increase of unemployment, increase of social expenses, they prolong phases of the recession and a weaken the economic recovery. Some institutional factors can help to increase the flexibility of the labour market (as described by Cermakova, 2020). However, economic regulation, not only of the labour market, has its supporters and its opponents among economists and politicians.

One of the institutional factors which influence the flexibility of the labour market is the legislative protection of the employment. Besides fixed-term employment contracts we can also include into this institutional factor: the minimum wage, the overtime pay and obligatory non-wage benefits. Supporters of the regulation of the minimum wage are convinced that a higher minimum wage reduces the unemployment and that it guarantees higher living standards of low-income groups. Also the unemployed people are more willing to look for a job and leave the social system of the state if the minimum wage is higher. The opponents of the regulation of the minimum wage claim that a high minimum wage forces the employed people to leave the labour market and reduces chances of the unemployed people to find a job.

The goal of this article is to evaluate the presence and character of the effects of the minimum wage on selected indicators of the labour market of the V4 countries, to estimate the intensity of the effects of the minimum wage of particular segments of the labour market. In this article we compare results for individual countries with each other and results of the international and domestic research. The article is divided into following parts. The first part provides an overview of the results of international and domestic empirical analysis concerning the confirmation of the effects of the minimum wage on the employment, or respectively the unemployment. The second part describes sources of data and the method of the analysis. The third part includes the empirical testing of the effects of the minimum wage on selected indicators of the labour market under the conditions of the V4 countries. The last part summarizes the results of the analysis and compares them with the international and domestic research.

1. Comparison of international analysis of the effects of the minimum wage on the unemployment

The minimum wage is a part of an institutional factor in the labour market EPL – Employment Protection Legislation which includes rules for employing and dismissing employers. A part of economists believes that this institutional factor prevents effective labour market functioning, however, on the other hand it can lead to the stabilization of the employment. (G. Bertola, T. Boeri and S. Cazes, 1999, S. Cazes and A. Nesporova,

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2003, 2004, S. Ferraro, B. Hänilane, K. Staehr, 2018, H. Son, 2016). S. Scarpetta (1996) considers the EPL to be a factor which supports young people, long-term unemployed and others who are hard to employ. Other authors consider the EPL to be an obstacle in the labour market (e. g. R. Jackman, R. Layard and S. Nickell, 1996). The conclusions concerning the relations between the variables also differ because of the econometrics measurements that don´t give us a single conclusion for all countries, territories, age, national and gender groups, and others. Nowadays a piece of work by O. Blanchard and J. Wolfers (1999) is already a classic study where the unemployment is influenced by the institutions of the labour market. According to these authors the minimum wage can increase the effect of the unfavourable shocks for the unemployment of less educated employers. S. Ederveen and L.Thissen (2004) states that low-skilled workers, who get wages higher than their productivity, are too expensive for the employers. Empirical research in the USA indicates only a small impact of the minimum wage on employment. Concretely, increase of the minimum wage by 10 % reduces the employment of young people by 1 to 3 % and the total employment by 0,1 to 0,3 %. The same impact also applies to England. The authors´ research also shows the significant increase of unemployment in new countries of the EU by increasing the minimum wage.

Unity between theory and empirical research is in the area of the relation between the minimum wage and improvement of living standards and income inequality. G. Betcherman, A. Luinstra and M. Ogawa (2001) states that a higher minimum wage increases the standard of living. A. Obadić, N. Šimurin and R. Sonor (2014) tested the influence of taxes, social security contributions and institutions on the labour market, they used fixed and random effects of panel models between 2000 and 2011. According to the conclusions of their analysis the social contributions and the tax on wages and salary income led to a significant reduction of income inequality in states of the EU. Tax policy, institutions on the labour market, being a member of the trade union reduced the income inequality in the EU countries 28. J. Zarkovic-Rakic (2015) states that tax cuts using the reduction of social contributions increased wages of high qualified workers more than of low-skilled workers in Serbia. Because of this fact according to the analysis tax cuts should be used selectively instead of nationwide.

On the other hand, N. K. Aksentievič and N. D. Bogovič (2003) compared wages and standards of living in the Republic of Croatia, and they discovered that wages are not the main factor of the income inequality. According to M. Čoka, P. Domadenik, T. Redek and M. Verbič (2009) the unfavourable influence of rigidities on the labour market has several negative consequences for economics, for example it slows down the creation of jobs, increases discrimination of young people, women, and low-skilled people, affects the unemployed people, slows down the economic restructuring and harms the competitiveness. P. Babos (2014) analyses the employment of 9 countries which entered the EU in 2004. More rigid labour market and strong trade unions reduce the success of gaining work with a contract of indefinite duration. According to companies work with a contract of definite duration is the way how to increase the flexibility of rigid labour markets.

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S. Machin and A. Manning (1994) estimated that reduction of the regulation of the minimum wage by Wages Council increased the income inequality and led to the unemployment growth. J. R. Warren and C. Hamrock (2010) prove that a higher minimum wage weakens the relation between the rate of unemployment and the rate of graduating from university. Students tend to study longer when the rate of unemployment is high (they have lower chances to find a job after graduation), while when the minimum wage is higher, they do not study for such a long time (there are higher wages at available jobs). G. Betcherman, A. Luinstr and M. Ogawa (2001) find out that the growth of the minimum wage leads to the reduction of available jobs paid by the minimum wage. The interesting study by P. M. Orreniuse and M. Zavodný (2008) states that the growth of the minimum wage has more impact on low-skilled immigrants than on domestic workers. The reason is that the immigrants earn less than the domestic workers, mainly due to lower education, limited language skills and low social capital.

T. Yuen (2003) claims that changes in the minimum wage have a strong negative impact on employers with low wages. A. J. Wellington (1991) confirmed in his study that increasing the minimum wage by 10% will reduce the unemployment of young employers, ethnic and gender groups by 0,6 %. The effects of the minimum wage for young employers, ethnic and gender groups are the same. A study by D. Neumark and W. Wascher (2002) discovered that the effects of the minimum wage on the employment depend on employers who were used for that research. If the rate of the minimum wage is lower than the balanced wage rate, it doesn´t have any influence on the employment. When the minimum wage is higher than the balanced wage it could have a negative impact on the employment, which corresponds to the economical theory. A. J. Grossberg and P. Sicilian (2004) analyzed the influence of the minimum wage on the duration of unemployment. They claim that the influence of the minimum wage depends on the relation between the minimum wage and the minimum wage on the local market. In case of employed men the authors discovered that when the minimum wage is under the median of wages it leads to the reduction of the employed. When the minimum wage is above the median of wages, it leads to the growth of the employed. No relation concerning women was discovered. Estimations of Ch. Brown, C. Gilroy and A. Kohen (1983) in the USA confirmed that the growth of the federal minimum wage by 10 % will reduce the employment of young people aged 16 - 19 by 1 %. The authors also discovered significant impacts of changes in the minimum wage on changes of employment according to the gender and the race. Another conclusion of these authors was that the growth of the minimum wage has a significant impact on the diminution of unemployment of young people aged 20 - 24.

B. T. Hirsch, B. E. Kaufman and T. Zelenska (2011) present a very interesting study where they believe that it does not matter how big the change of the minimum wage is, as it does not have a significant impact on the employment, because for the employers it is more important to increase some other costs, which the owner of the company has to absorb.

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A. Manning (2012) also presents a very interesting idea; he proposes an alternative to the minimum wage in the form of “the minimum wage for seniors” (e. g. starting at the age of 30). Then he suggests a higher minimum wage for London, which means for big cities. The incomes are higher there than in other parts of England, so the regular minimum wage has a lower impact on the employment than it would have outside big cities. D. N. F. Bell and R. E. Wright (1996) claims that the influence of the Wage Boards and Wage Councils on the wage development is low and that it is not possible to consider the institute of the minimum wage to be problematic. S. Machin and J. Wilson (2004) study the economical effects of the minimum wage in the household sector in Great Britain and they pointed out that there is a slight reduction of the employment due to the growth of the minimum wage.

As we have previously shown (Jašová, 2016), regression models indicated a very weak unfavourable impact of the minimum wage indicator on structural unemployment in the V4 countries and also increased vulnerability of some groups of workers on the labour market under economic recession (Kadeřábková, 2020).

M. Kosters and F. Welch (1972) studied a method where the growth of the minimum wage influences long term and short-term unemployment. According to them the growth of the minimum wage increases the danger of losing a job for young people of colour. White adult men profit from the changes of the minimum wage the most. Wage penalty for femails and informal employees was confirmed by Adair, 2020.

Even another group of authors confirmed a low and insignificant influence of the minimum wage on employment. We can name for example T. Butcher, R. Dickens and A. Manning (2012) who confirmed this relation in the USA and England. A. Dube, T. W. Lester a M. Reich (2010) revealed a strong influence of the minimum wage on incomes but no effects on employment in the USA. The authors revealed regional and local differences in employment trends, but they are not related to the minimum wage policy.

D. Metcalf (2007) states that the unfavourable influence of the minimum wage on employment is not proved. P. G. Cotterill and W. J. Wadycki (1976) discovered that within the subsector the employers got a higher wage where the influence of the federal and state wage was higher. They did not prove that the employers replace the adults with the younger generation when the minimum wage grows. T. P. Lianos (1972) confirmed the influence of the minimum wage on employment in agriculture in the southern part of the USA. The estimation of reduction of the labour was significant when the minimum wage grows. J. R. Behrman, R. C. Sickles and P. Taubman (1983) discovered a negative influence of the minimum wage on employment.

The authors tend to agree with other authors who claim that the federal policy of the minimum wage is not the right policy. T. G. Moore (1971) revealed that increasing the minimum wage would have a negative impact mostly on young employees of colour and that women aged 16 - 19 are more affected than men.

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2. Description of the source of data used and the method of the analysis

The influence of the minimum wage on selected indicators of the labour market, its character and intensity in particular V4 countries, was analyzed using a timeline of the *Monthly minimum wages* (below: the minimum wage), which is expressed in the purchasing power parity - below: PPP (Eurostat, 2017). The V4 countries were chosen for the common research due to the similar economic development. It is caused by the administrative measures during the transition from a centrally planned economy to a market economy, by a similar structure of economics and by a similar level of their openness that leads to the tendency to unlimited changes. In all member countries, the minimum wage is also directly set by law.

The development of the labour market (according to various divisions) is being studied by using the Eurostat data (Eurostat, 2017). Selected indicators of the labour market are divided from different angles of view. Particularly unemployment rates by sex, age and educational attainment level - % (below unemployment rate by educational attainment); long-term unemployment (12 months or more), as a percentage of the total unemployment, by sex and age - % (below long-term unemployment); unemployment by sex, age and duration of unemployment - 1000 people (below unemployment by duration); unemployment by sex, age and type of employment sought - 1000 people (below unemployment by type of employment sought); average number of actual weekly hours of work in main job, by sex, professional status, full-time/part-time and occupation - hours (below average number of actual weekly hours of work); temporary employees by sex, age and educational attainment level - 1000 people (below temporary employees by educational attainment level); employment by sex, occupation and educational attainment level - 1000 people (below employment by occupation and educational attainment level); employment by sex, age, professional status and full-time/part-time - 1000 people (below employment by professional status); employment by educational attainment level - 1000 people (below employment by educational attainment level.

Data on employment incentives (average annual status) and start-up incentives (average annual status) was also drawn from Eurostat (Eurostat, 2017). GDP indicators at constant prices, import prices and household consumption deflator (in all cases, year-on-year changes in %) were used from the OECD (Global Economic Outlook, 2017).

Besides these numerical variables, timelines of categorical variables were compiled: gender, age, education, length of unemployment, type of job sought, occupational status, occupation and V4 countries. These timelines have a quarterly frequency and provide information about the period from the 1st quarter 2000 to the 3rd quarter 2016. The exception is the employment and start-up incentives indicators, which are available only since Q1 2004. From the original timelines of numerical variables, year-on-year changes in % (minimum wage, unemployment by duration, unemployment by type of job sought, average number of hours actually worked per week, temporary employees by education, employment by occupation and education, occupational status and employment by level of education, employment support, start-up incentives, GDP at

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constant prices, import prices and household consumption deflator) and in percentage points (unemployment rate by educational attainment and long-term unemployment) that better affect the dynamics of the labor market.

All used timelines were tested by the ADF test (Eviews, 2013), which confirmed their stationarity. Also, all timelines (excluding employment by education level, published even after seasonal adjustment) were seasonally adjusted using the Census X12 method (Eviews, 2013). We use a linear regression to assess the intensity and the nature of the impact of the minimum wage on selected labor market indicators. The impact of the minimum wage on selected labor market indicators in detailed classification from different points of view is then extracted by defining categorical variables in the interaction with the minimum wage. In this way, we can specifically determine the impact of the minimum wage on the labor market, e. g. by gender or age, but also by education and occupation altogether. An adjusted R^2 is applied for choosing the most suitable model to approximate the analyzed data. The Jarque Berus test (Eviews, 2013) is used to test the residual normality. To test the autocorrelation of residues, Breusch-Godfrey's test is applied (Eviews, 2013). For testing the heteroskedasticity of the residuals, the Wald test (Eviews, 2013) is used. To measure the viability of multi-collinearity, the Variable Inflation Factor (Eviews, 2013) is used in the analysis. The failure of normality of residuals tests due to fluctuations in the development of some segments of the explained variable and the calculated year-on-year changes in the case of a large amount of observations allows assuming the validity of a central limit theorem that states that the *t* - tests are asymptotically valid. The reason for the presence of heteroskedasticity in the models (except for the explained long-term unemployment variable) is the same as for the abnormality. Thus, the point estimates will not be influenced or deflected.

The impact of minimum wage on selected labor market indicators is examined using the method of least squares. The observed regression coefficient value then indicates the intensity of the impact of the minimum wage on the labor market and the sign of its character. In the text, in the case of a positive sign, a positive influence is mentioned and, in the case of a negative sign, a negative influence. In the text, in the case of a positive sign, we speak about a positive influence, in the case of a negative sign, we speak about a negative influence. In the case that the categorical variable in the interaction with the minimum wage is not statistically significant in the model, we speak about not proving the effect of the minimum wage on the selected labor market indicator.

The positive value of the regression coefficient means that with the growth of the minimum wage, the selected labor market indicator grows. The negative value of the regression coefficient means that with the growth of the minimum wage, the labor market indicator decreases. Regression coefficients in the range of 0.01 to 1.39 in our analysis indicate a very low sensitivity of the selected labor market indicator to the development of the minimum wage, at a range of 1.40 to 2.79 a weak sensitivity, in the range of 2.80 to 4, 19 indicate a moderate sensitivity, in the range of 4.20 to 5.59 and

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the range of 5.60 to 7.00 a very strong sensitivity of labor market indicators to the change in the minimum wage.

Tables 4 to 7 in the Annex provide a complete overview of proven positive and negative sensitivity of labor market indicators to changes in the minimum wage and the frequency of statistically unprovable effects. The table also summarizes the assessment of the intensity of the mapped influence. Columns 1 and 2 then divide the positive regression coefficients into the unfavorable (the unemployment) and the positive (hours worked and the employment) indicators. Columns 3 and 4 provide information on a positive impact (the unemployment) and on a negative impact (hours worked and the employment). Tables 4 to 7 contain, for each country V4, the total average values of positive and negative effects, and the nature and sums of the unproven impact, and also the average values for unemployment and hours worked and the employment calculated from the values of each categorical variables in interaction with the minimum wage.

3. An overview of the results from the empirical testing of the impact of the minimum wage on selected labor market areas in the V4 countries

For a better orientation in the estimates, we divide the results of the analysis of the influence of the year-on-year change in the minimum wage on the year-on-year changes of selected labor market indicators in each country into three groups. The first group will summarize all the proved positive values of the regression coefficients of the categorical variables of selected labor market areas in interaction with the minimum wage. The result will be, on the one hand, pushing people out of the labor market with the year-on-year growth in the minimum wage (unemployment rate by education, long-term unemployment, unemployment by duration and unemployment by type of job sought). However, there will also be an increase in people's chances in the labor market with the year-on-year growth in the minimum wage (the average number of hours actually worked per week, the number of temporary staff by education, employment by occupation and education, employment by occupational status and employment by level of education). The second group will summarize all the proven negative values of the regression coefficient of the categorical variables of selected labor market areas in interaction with the minimum wage, resulting in a statement on increasing the chances of people on the labor market with year-on-year growth of the minimum wage (case of unemployment rate by educational attainment, long-term unemployment, unemployment duration and unemployment by type of job sought). However, it will also involve pushing people out of the labor market with the year-on-year growth in the minimum wage (average number of hours actually worked per week, temporary employment by education, employment by occupation and education, employment by occupational status and employment by educational attainment). In the third group, no statistically significant effects of the year-on-year growth of the minimum wage on selected labor market indicators was confirmed. The results are presented in the following regression analysis. Labor market indicators in all countries are viewed in the structure listed in Part 2 of this article.

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3.1 Development of the impact of the minimum wage on labor market indicators in the Czech Republic

A. The positive values of the regression coefficient in the Czech Republic, which indicate the positive sensitivity of the selected labor market indicator to changes in the minimum wage, were not statistically significant and therefore cannot be presented and evaluated in the analysis (see also the blank lines in columns 1 and 2 of Table 4 in the Annex).

B. The negative values of the regression coefficient for the Czech Republic were showed in eight cases, which means that the year-on-year growth of the minimum wage is accompanied by a decrease in eight labor market indicators (columns 3 and 4 in Table 1 of the Annex). Of this, the overall average positive effect was of a medium intensity (-3,16). In particular, the year-on-year growth of the minimum wage was found to have a positive impact on *the unemployment rate by educational attainment.* It concerns women aged 15-24 with a lower basic education, but the low regression coefficient indicates only a very low intensity of the influence. Equally, the year-on-year growth in the minimum wage also affects the *long-term unemployment* of women aged 25-49. In the case of *the unemployment by type of a job sought*, there is a strong intensity of the favourable effect of the year-on-year change in the minimum wage for women aged 25-54 and 55-64 working full-time. The effect of a moderate intensity was found at men aged 25-54 and 55-64 (Office of the Government of the Czech Republic, Department of Analyzes and Information, 2014) and also in at women aged 15-24 working full-time. The overall average adverse effect was very low (-0.45). This includes the year-on-year growth of the minimum wage to the average number of hours actually worked per week of employees performing basic activities. A very weak sensitivity to the year-on-year growth of the minimum wage was also revealed in the indicator for *temporary employees by education,* concerning men aged 55-64 years and women aged 15-24 and 55-64 years. We also include the indicator of *the employment by occupation and education* for men with a lower basic education performing only basic activities. For the indicator of *the employment by occupational status*, it concerned employed men and women aged 55-64 and men aged 55-64 with a professional status of an employee. For the indicator of *the employment by educational attainment*, it concerned women aged 25-54 with a lower basic education and men (aged 55-64) and women (15-24) with a university education. Overall, in the Czech Republic, the average negative sensitivity of selected indicators to the year-on-year growth of the minimum wage can be assessed as weak, with a regression coefficient of -1.50.

C. An unproved regression, thus no statistically significant effect of the year-on-year growth of the minimum wage was found in the Czech Republic in the analysis of *the unemployment by duration.* In total in the Czech Republic, the frequency of the unproven effects for all combinations of categorical variables in interaction with the minimum wage was 75 (see Table 4 in Annex - column 5). The most obvious figure was *the average number of hours actually worked per week* (16). Then it concerned *the employment by occupation* and education and the indicator of *the employment by educational attainment* (14). On the contrary, all the combinations of categorical

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variables in interaction with the minimum wage were statistically significant for the indicator of *the unemployment by type of a job sought* and for *the indicator of the temporary employees by education.*

3.2 Development of the impact of the minimum wage on labor market indicators in Slovakia

A. The positive value of the regression coefficient for Slovakia was demonstrated between the minimum wage and the four labor market indicators (see Table 5 in the annex - columns 1 and 2). Of these, the overall average negative impact was very weak (+1.08), and it was only the impact of the year-on-year change in the minimum wage on the indicator of *the unemployment by duration*. In particular, it concerned women employed for 1-2 months. The overall average negative impact had a very weak intensity (+0,15). In particular, the negative impact was proved for the indicator of *the average number of hours actually worked per week.* Nevertheless, in the occupational position of the employed person, it was the profession of managers, technicians, service and sales workers, agricultural workers and craftsmen. In the case of a professional status, employees were managers, service and sales staff and agricultural workers. Then it concerned *the indicator of employment by occupation and education* thanks to men with lower basic education working in service and sales. It also concerned the indicator of *the employment by occupational status.* In particular, we speak about women aged 55-64, both in the occupational status of the employed person and the employees. In Slovakia, we estimate the average positive sensitivity of selected indicators to the year-on-year growth of the minimum wage as very weak (regression coefficient was +0.23).

B. The negative value of the regression coefficient between the minimum wage and the labor market indicators was found in Slovakia in six cases (see Table 5 in Annex - columns 3 and 4). From this, the overall average positive effect was of a medium intensity (-3,19). A very weak positive sensitivity to the year-on-year growth of the minimum wage was proved for the indicator of *the long-term unemployment.* In particular, it concerned men aged 15-24, 25-49 and 50-64 and women aged 15-24 let and 25-49 let. A very strong positive impact was proved for the indicator of *the unemployment by type of the job sought.* The result was a very strong sensitivity for men aged 15-24 and 25-54 and a very strong impact for men aged 55-64 and women aged 15-24 and 25-54 employed full-time. The overall average negative effect was very low (-0.89). In the case of men and women aged 15-24 a 55-64 there was a very weak intensity for the indicator of *temporary employers by education.* For the indicator of *the employment by occupation and education* there was a very low negative effect for men with higher education performing basic activities. The indicator of *the employment by occupational status* is associated with a very low negative effect of the minimum wage for men aged 55-64 in the occupational status of employees. A negative effect of the indicator of *the employment by educational attainment* had the same intensity, it concerned men with a lower education aged 15-24 and women aged 25-54. It also concerned men and women with a higher education aged 15-24 let and 25-54. In the

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case of people with a university education, it concerned men and women aged 25-54 let a 55-64. In Slovakia, the average negative sensitivity of selected indicators to the year-on-year growth of the minimum wage is assessed as weak with a regression coefficient of -1.71.

C. No statistically significant effect of the year-on-year growth of the minimum wage was demonstrated in Slovakia when analyzing only the indicator of *the unemployment by educational attainment* (M. Brezová and L. Pániková, 2011). In Slovakia, the number of unproven effects in all combinations of categorical variables in interaction with the minimum wage was 61 (see Table 5 in the Annex - column 5). The highest number was the indicator of *the employment by occupation and education* (14). Then it was the indicator of *the unemployment rate by educational attainment* (12) and the indicator of *the average number of hours actually worked per week* (10). On the contrary, all combinations of categorical variables in interaction with the minimum wage were statistically significant for the indicator of *temporary employees by education.*

3.3 Development of the impact of the minimum wage on labor market indicators in Hungary

A. The positive value of the regression coefficient for Hungary was proved between the minimum wage and the three labor market indicators (see Table 6 in Annex - columns 1 and 2). Of this, the overall average positive effect was very low (+0.29). The positive effect appeared for the indicator of *the employment by occupation and education* for women with a higher education employed as mechanicians. Also it was the indicator of *the employment by occupational status* when it concerned men aged 15-24 in the professional status of the employee and the employee. For the indicator of *the employment by educational attainment* it concerned only men with a higher secondary education aged 55-64. Overall, in Hungary, we consider the average positive sensitivity of selected indicators to the year-on-year growth of the minimum wage as very weak (the regression coefficient was +0.29).

B. The negative value of the regression coefficient between the minimum wage and the labor market indicators was found in Hungary in six cases (see Table 6 in Annex - Columns 3 and 4). Of which, the overall average positive effect was weak (-2.56). Of this, there was proved a very weak positive sensitivity for the indicator of *the unemployment rate by educational attainment* (*G.* Kertesi and J. Kollo, 2003). In particular, it concerned men and women with a lower basic education aged 55-64. The same intensity of sensitivity was also proved for the indicator of *the long-term unemployment* of men and women aged 15-24 let and 25-49 and of men aged 50-64. A very strong positive effect was proved for the indicator of *the unemployment by type of the job sought.* This was the result of a moderate sensitivity for men aged 15-24, a strong intensity of sensitivity for men aged 25-54 and women aged 15-24 and also a very strong sensitivity for men and women aged 55-64 and women aged 25-54 working full-time. The overall average negative effect was very weak (-0.11). In particular, it concerned the indicator of *the average number of hours actually worked per week.* For the employed person it concerned the following professions: technicians, agricultural

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workers, craftsmen, operators of basic machinery. In case of the occupational status, it concerned the following professions: technicians, administrative staff, agricultural workers, craftsmen, machine operators and basic activities. There was also a very weak influence of the minimum wage for the indicator of *the employment by occupational status* when it concerned women aged 55-64 according to both occupational statuses. For the indicator of *the employment by educational attainment* we speak about men with a university education aged 55-64. Overall, in Hungary, the average negative sensitivity of selected indicators to the year-on-year growth of the minimum wage is very low, with a regression coefficient of -1.29.

C. No statistically significant effects of the year-on-year growth in the minimum wage was demonstrated in Hungary in the analysis only of indicators of *the unemployment by duration* and *temporary staff by education.* In Hungary, the number of unproven effects in all combinations of categorical variables in interaction with the minimum wage was 71 (see Table 6 in Annex - column 5). The highest number was the indicator of *the employment by educational attainment* (16). Then it concerned *the employment by occupation and education* (15), the indicator of *the unemployment rate by educational attainment* and the indicator of *the unemployment by duration* (10 for both cases). On the contrary, all combinations of categorical variables in interaction with the minimum wage were statistically significant for the indicator of *the unemployment rate by type of job sought.*

3.4 Development of the impact of the minimum wage on labor market indicators in Poland

A. The positive value of the regression coefficient for Poland was proved between the minimum wage and the five labor market indicators (see Table 7 in the Annex - columns 1 and 2). Of this, the overall average positive effect was very weak (+0.54). It was proved for the indicator of *the average number of hours actually worked per week.* Specifically, they were professionals according to both professional statuses. In case of the indicator of *the temporary staff by education,* it concerned men and women aged 55-64. The indicator of *the employment by occupation and education* was represented by men working as managers and craftsmen with lower basic education. Then it concerned male and female technicians with lower basic education and women with higher secondary education. The indicator of the employment by occupational status was represented by employed women aged 55-64. The last indicator with a very weak sensitivity on the year-on-year growth of the minimum wage is *the employment by educational attainment.* In particular, it concerned men and women with higher secondary education aged 55-64 and also women with lower basic education aged 15-24. In Poland, we estimate the average positive sensitivity of selected indicators to the year-on-year growth of the minimum wage as very weak (the regression coefficient was +0.54).

B. The negative value of the regression coefficient between the minimum wage and the labor market indicators was found in five cases in Poland (see Table 7 in the Annex, columns 3 and 4). Of this, the overall average positive effect was very low (-1.03). From

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this, it was proved for the indicator of *the unemployment rate by educational attainment* (Office of the Government of the Czech Republic, Department of Analyzes and Information, 2014). In particular, it concerned men and women with lower basic and higher secondary education aged 15-24, 25-54 and 55-64. A very weak intensity of sensitivity was shown for the indicator of *the long-term unemployment* for men and women aged 15-24, 25-49 and 50-64. The indicator *the unemployment by duration* concerns the development of men´s unemployment during the period of 6-11 months. Then men and women who were unemployed for 12-17 months to 47 months. There was proved a medium sensitivity to the year-on-year growth of the minimum wage for the indicator of *the unemployment by type of the job sought.* For this indicator, the development was a result of the moderate sensitivity of men aged 25-54 and 55-64 and of women aged 15-24 working full-time. There was also a weak sensitivity for men aged 15-24 and a strong sensitivity for women aged 25-54 working full-time. The overall average negative effect was very low (-0.33). In particular, the negative effect was shown for the indicator of *the employment by educational attainmen*t, specifically in the case of women aged 15-24 with lower basic education. In Poland, the average negative sensitivity of selected indicators to year-on-year growth of the minimum wage is assessed as very weak with a regression coefficient of -1.00.

C. No statistically significant effects of the year-on-year growth in the minimum wage was proved in Poland. The total number of unproven effects for all combinations of category variables in interaction with the minimum wage was 61 (see Table 7 in Annex - column 5). The highest number was the indicator of *the average number of hours actually worked per week* (16). Then it was the indicator of *the employment by educational attainment* (15) and the indicator of *the employment by occupation and education*, or respectively the employment by professional status (11 for both). On the contrary, all combinations of categorical variables in interaction with the minimum wage were statistically significant for the indicator of *the unemployment by educational attainment* and *the long-term unemployment.*

4. Conclusions and analyses

In this paper, we tried to confirm the influence (its character and intensity) of the year-on-year growth of the minimum wage on selected labor market indicators by regression analysis. We also compare the results of our empirical analysis for V4 countries with each other and with selected foreign and domestic studies. The obtained results allow us to outline the nature of the causal relationship and its intensity on the mezzo-level of the labor market in the V4 countries, which so far has not been done for the V4 countries. The suitability of applying the analysis of the character/intensity of the relationship and the indication of the causal relationship to the extended set of indicators of the unemployment was confirmed some new practical implications revealed by the regression analysis.

A summary of the total results of a detailed analysis of the effects of the minimum wage on labor market indicators is summarized in Tables 1 to 3 in the text of this part of the conclusions. A complete set of conclusions is included in the tables in the appendix of

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the entire article (see Table 4 to 7). Columns 1 and 2 of the tables in the appendix highlight the nature and intensity of the positive effect of the year-on-year growth in the minimum wage on selected labor market indicators obtained through positive regression coefficient values. Columns 3 and 4 of the tables in the appendix present negative values of the regression coefficient, from which we deduce the nature and intensity of the negative influence of the year-on-year growth of the minimum wage on selected indicators of the labor market. The number of unproven effects for all combinations of category variables in interaction with the minimum wage is shown in column 5 in all tables in the appendix.

In compliance with Part 2 of the article, the intensity of the effects of the year-on-year changes in the minimum wage on selected labor market indicators is assessed as very weak, weak, medium, strong and unproven. First, in part A of these conclusions, the positive values of the regression coefficient are compared, including their distribution to negative and positive effects across the particular V4 countries. Part B is then a comparison of the negative values of this regression coefficient, including the distribution of positive and negative effects. Part C gives an overview of the unproved effects of the minimum wage on selected labor market indicators. The overall summary then compares the obtained results with the results of foreign and domestic research.

Table 1: The intensity of the identified positive effects of the minimum wage on selected labor market indicators

Indicator/ V4 country	Czech Republic	Slovakia	Hungary	Poland
In total	x	very weak	very weak	very weak
Negative effect	*x*	very weak	*x*	*x*
Unemployment by duration	x	very weak	x	x
Positive effect	*x*	very weak	very weak	very weak
The average number of hours actually worked per week	x	very weak	x	very weak
Temporary employees by education	x	x	x	very weak
Employment by occupation and education	x	very weak	very weak	very weak
Employment by professional status	x	very weak	very weak	very weak
Employment by educational attainment	x	x	very weak	very weak

Source: Our own calculation based on Eurostat data and OECD.

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The positive regression coefficient values for the Czech Republic were not statistically significant. In the case of Poland, the positive effect of the minimum wage on the five labor market indicators was proved. In the case of Slovakia, it concerned four labor market indicators and in the case of Hungary, it concerned three labor market indicators. In total, in Slovakia, Hungary, and Poland, the positive sensitivity of selected indicators to the year-on-year growth of the minimum wage is very weak (regression coefficients were +0.23, respectively +0.29 and +0.54). Of this, the overall average negative effect in Slovakia was very weak (+1.08). The overall average positive effects were very weak in Slovakia, Hungary, and Poland (+0.15, +0.29 and +0.54). A very weak negative effect of the year-on-year change in the minimum wage appeared only in Slovakia for the women unemployed for 1-2 months. On the contrary, the very weak positive influence was shown for the indicator of *the average number of hours actually worked per week.* In Slovakia, the employed people were managers, technicians, service and sales workers, agricultural workers and craftsmen. Employees were managers, service and sales workers, and agricultural workers. In Poland, they were experts in both professional statutes. For the indicator of *the employment by occupation and education* it concerned men with lower basic education working in service in Slovakia and managers and craftsmen in Poland.

Polish women with lower secondary and higher secondary education worked as technicians and Hungarian women with higher secondary education as assemblers. It was also an indicator of *the employment by professional status*, wherein Slovakia and Poland we talk about women aged 55-64 working as female employees, and also in Slovakia as employed persons. In Hungary, we speak of men aged 15-24 in both professional statuses. In the case of the indicator of *the temporary employees by education,* it concerned Polish men and women aged 55-64 years. For the indicator of *the employment by educational attainment,* it concerned men in Hungary and both sexes in Poland aged 55-64 with higher secondary education. In Poland, it also concerned women with lower basic education aged 15-24.

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Table 2: B. The intensity of the proven negative effects of the minimum wage on selected labor market indicators

Indicator/ V4 country	Czech Republic	Slovakia	Hungary	Poland
In total	weak	weak	very weak	very weaká
Positive effect	*medium*	*medium*	*weak*	very weak
Employment by educational attainment	very weak	x	very weak	very weak
Long-term unemployment	very weak	very weak	very weak	very weak
Unemployment by duration	x	x	x	very weak
Unemployment by type of the job sought	strong	very weak	strong	medium
Negative effect	*very weak*	*very weak*	*very weak*	*very weak*
The average number of hours actually worked per week	very weak	x	very weak	x
Temporary employees by education	very weak	weak	x	x
Employment by occupation and education	very weak	very weak	x	x
Employment by professional status	very weak	very weak	very weak	x
Employment by educational attainment	very weak	very weak	very weak	very weak

Source: Our own calculation based on Eurostat data and OECD.

Negative regression coefficient values for the Czech Republic were found in eight cases, in Slovakia and Hungary in six cases and Poland in five cases. In total, in the Czech Republic and Slovakia the average negative sensitivity of selected indicators to the year-on-year growth of the minimum wage can be assessed as weak (the regression coefficient was -1.50, respectively -1.71). In Hungary and Poland, we speak about very weak effects with the regression coefficient -1.29, or respectively -1.00. Of these, the average overall positive effect had a medium intensity (-3.16 and -3.19) in the Czech Republic and Slovakia. In Hungary, this effect was weak (-2.56) and very weak in Poland (-1.03). The overall average negative effect was very weak in all V4 countries (- Czech Republic -0.45, Slovakia -0.89, Hungary -0.11 and Poland -0.33). From this, the very weak positive effect of the year-on-year growth of the minimum wage was found for the indicator of the unemployment by educational attainment in the case of Czech and Polish women with lower basic education aged 15-24. In Hungary and Poland, it concerned men and women with lower basic education aged 55-64. In poland, it concerned men with lower basic and higher secondary education aged 15-24 and women with higher secondary education. At the age of 25-54 it concerned e both sexes with both levels of education, and at the age of 55-64, it concerned both sexes with higher secondary education. Equally, the year-on-year growth of the minimum wage also affects *the long-term unemployment* of Czech, Slovak, Hungarian and Polish women aged 25-49. We also include Slovakia, Hungary, and Poland in the case of men

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and women aged 15-24, Poland and Slovakia for men aged 25-49 and 50-64, and Poland for women aged 50-64. The indicator of *the unemployment by duration* concerns the men unemployed for 6-11 months. Then also men and women unemployed for 12-17 months and 24-47 months. In the case of the indicator of *the unemployment by type of the job sought* in the Czech Republic, there is a strong intensity of the positive effect on women working full-time aged 25-54, respectively aged 55-64. The same sensitivity was also estimated for Polish women and Slovak men aged 25-54 and Slovak men aged 15-24 working full-time. Very strong effects of the minimum wage were discovered in Slovakia and Hungary for women aged 25-54 and men aged 55-64. In Slovakia and Hungary we also include women aged 15-24, respectively 55-64. A strong intensity of the positive effects was found for men, aged 25-54, in the Czech Republic, Hungary and Poland. In the Czech Republic and Poland, it also concerned men aged 55-64 and in Hungary men aged 15-24. Czech, Hungarian and Polish women are only listed here in the age range of 15-24 years. A weak sensitivity to the minimum wage was confirmed in Poland for men aged 15-24.

There is a negative effect of the growth of the minimum wage on *the average number of hours actually worked in the week* for Czech and Hungarian employees performing basic activities. In Hungary, the very low sensitivity to the minimum wage was also found in the case of employed persons working as technicians, agricultural workers, craftsmen, machine operators. As far as the professional status of employees, it concerned these professions: technicians, administrative staff, agricultural workers, craftsmen and machine operators. A very weak sensitivity was also shown for the indicator of *the temporary employees by education*, in the case of the Czech Republic it concerned men aged 55-64 and women aged 15-24 and 55-64. A very weak effect was shown for Slovak men and women aged 15-24 and 55-64. For the indicator of *the employment by occupation and education* we speak about a very weak sensitivity for men with lower basic education in the Czech Republic and men with higher secondary education performing basic activities in Slovakia. For the indicator of the employment by professional status it concerned women and men with the occupational status of the employed person aged 55-64 in Hungary and the Czech Republic. The professional status of employees in the case of men was found in the Czech Republic and Slovakia, and in the case of women in Hungary of the same age. For the indicator of *the employment by educational attainment* it concerned women with lower basic education aged 25-54 in the Czech Republic and Slovakia. A very weak sensitivity was also found in the case of lower basic education for men aged 15-24 and 25-54 in the Slovak Republic, and for men and women aged 15-24 in Poland. Then it concerned higher secondary education in Slovakia for men aged 15-24 and for women aged 15-24 and 25-54, and for men aged 55-64 in Poland. In the case of university education, we speak about Slovak and Hungarian men aged 55-64, Czech and Slovak women aged 15-24, Slovak men and women aged 25-54 and Slovak women aged 55-64.

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Table 3: C. The number of unproved effects of the minimum wage on selected labor market indicators

Indicator/ V4 country	Czech Republic	Slovakia	Hungary	Poland
In total	**75**	**61**	**71**	**61**
Employment by educational attainment	10	12	10	0
Long-term unemployment	4	1	1	0
Unemployment by duration	9	9	10	5
Unemployment by type of the job sought	0	1	0	1
The average number of hours actually worked per week	16	10	7	16
Temporary employees by education	0	0	4	2
Employment by occupation and education	14	14	15	11
Employment by professional status	8	9	8	11
Employment by educational attainment	14	5	16	15

Source: Our own calculation based on Eurostat data and OECD.

Nonsignificant regression was identified in the Czech Republic and Hungary within the analysis of *unemployment by its duration*, in Slovakia within the analysis of *unemployment rate by education attainment level* and in Hungary together with the *indicator of temporary employees by education*. In Poland, no statistically important effect of the annual minimum wage increase on the selected labour market indicators has been proven. In the Czech Republic, the frequency of the unproven effect with all combinations of categorical variables in interaction with minimum wage was 75, in Hungary 71, and in Slovakia and Poland it was 61. In the Czech Republic and in Poland it mainly involved the *average number of the actual weekly hours of work* indicator, in Hungary the *employment by education attainment level* indicator (all indicators 16) and in Slovakia the *employment by occupation and education* indicator (14). On the contrary, all combinations of categorical variables in interaction with minimum wage in the Czech Republic and in Hungary were statistically significant with the *unemployment by the TYPEe of employment sought* indicator, in the Czech Republic and Slovakia it was also the *temporary employees by education* indicator. In Poland they were the *unemployment rate by education attainment level* and *long-term unemployment* indicators.

The overall conclusion of the empirical analysis using the value of regression coefficient points at the prevalence of the average negative effect of minimum wage on the selected labour market indicators in all V4 countries. Of this, the total average positive effect on the *unemployment area* in the Czech Republic and in Slovakia was of medium intensity (-3,16 a -3,19). In Hungary, this effect was weak (-2,56) and in Poland it was very weak (-1,03). As negative effect could not be localized in these countries, the

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situation is consistent with D. N. F. Bell´s and R. E. Wright´s statement (1996) that the institute of minimum wage cannot be considered problematic. Considering the weak intensity of the total average negative effect in Slovakia (+1,08), and the middle intensity of positive effect (-3,19), it can also be stated that the result is consistent with the conclusion of the analysis of structural and cyclical unemployment in V4 (Jašová, 2016), where the year-on-year increase of the minimum wage was accompanied by improved expectations of returning to the labour market for the unemployed. In general, labour markets in V4 countries are characterized by low flexibility. This feature is a heritage from the communist era and is connected to the tradition of low labour mobility. Households in V4 countries by tradition own their housing (Hromada, 2021) and are reluctant to commute (Kadeřábková, 2019).

Conclusions on the effect of minimum wage on the *employment* consolidation by foreign authors (G. Bertola, T. Boeri and S. Cazes, 1999, S. Cazes and A. Nesporova, 2003, 2004) are consistent with the result of the analysis in Hungary and Poland, as the total average positive effect exceeds the total average negative effect (+0,29 vs -0,11, or +0,54 vs -0,33). On the contrary, the higher value of regression coefficient of the total average negative effect in Slovakia proved the negative effect of minimum wage on employment as well as J. R. Behrman, R. C. Sickles and P. Taubman (1983).

At the same time, in case of the *unemployment rate by education attainment level* indicator, only very weak effect was identified on Czech and Polish women aged 15 – 24 years and Hungarian and Polish men and women aged 55 – 64 years with lower education, which is not stated in O. Blanchard´s and J. Wolfers´s study (1999), as it claims that minimum wage can increase unemployment of less educated workers. In case of *long-term unemployment* the very weak positive effect of the year-on-year increase of minimum wage of women aged 25 – 49 in all V4 countries is not consistent with M. Čok)´s, P. Domadenik´s, T. Redek´s and M. Verbič´s study (2009), who point out the negative consequences of rigidities in labour market concerning discrimination of women on behalf of decreasing competitive ability. Localization of the very weak positive effect (from -0,12 to -0,37) in case of men and women aged 15 – 24 years (Slovakia, Hungary, Poland) can be considered a higher risk of losing employment with young people, which is mentioned by M. Kosters and F. Welch (1972). In case of the *unemployment by the TYPEe of employment sought* indicator, the estimated strong positive effect with Slovakian men and Hungarian women and very strong effect with Slovakian women aged 15 – 24 years working full-time is considered in compliance with the estimations of Ch. Brown, C. Gilroy and A. Kohen (1983), which speak about a significant effect of the increase of minimum wage on the decrease of unemployment with young people aged 20 and 24.

In case of the *average number of the actual weekly hours of work* indicator in Slovakia, a very weak positive effect is estimated with workers in agriculture in positions of employees contrary to the estimation by T. P. Lianos (1972), who proved significant negative effect of minimum wage on employment in agriculture in the southern part of the USA. On the other hand, in Hungary the estimated negative effect was consistent

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with this author, however, it was only very weak intensity. In case of the *employment indicator by occupation and education*, the very weak positive effect was localized in Poland with male managers and craftsmen with lower education and with women with both lower and higher secondary education, who worked as technicians. This conclusion can be considered consistent with T. G. Moore´s survey (1971), which disclosed bigger negative effect of the increase of minimum wage on women than on men. The very weak positive effect in case of less educated men in Slovakia working in services and sales is inconsistent with the findings of S. Machin´s and J. Wilson´s study, by which the household care sector went through a slight employment reduction on behalf of the increase of minimum wage. The *employment by occupational status* indicator in Hungary in case of men aged 15 – 24 suggested in both occupational statuses very weak positive effect, which was not confirmed by A. J. Wellington (1991), when he estimated a decrease in employment of young people by 0,6 per cent alongside the increase of minimum wage by 10 percent. The same conclusion was reached by M. Kosters and F. Welch (1972). The *temporary employees by education* indicator showed weak negative effect in the Czech Republic (men aged 55 – 64 and women aged 15 – 24 and 55 – 64) and very weak negative effect in Slovakia (men and women aged 15 – 24 and 55 – 64), as according to P. Babos (2014) companies use temporary labour as a tool for increasing the flexibility of labour markets.

In Poland, with both men and women aged 55 – 64, the conclusion of the analysis was not consistent with this foreign survey, as the very weak positive effect was identified. The *employment rate by education attainment level* indicator suggested very weak negative effect on men aged 55 – 64 and women aged 15 – 24 with university education in the Czech Republic, which corresponds with the conclusion by P. G. Cotterill and W. J. Wadycki (1976), which shows that they did not prove that employers replace adults with youngsters while there is an increase in minimum wage. The results follow the same course in Slovakia, where very weak effect was indicated on both men aged 15 – 24 and men and women aged 25 – 54. In case of higher secondary education, there was weak negative effect on men and women aged 15 – 24 and 25 – 54. In relation to this indicator we can also state that women in the Czech Republic and men in Slovakia with lower level of education, men and women with higher secondary education and women with university education as well as women with lower education in Poland aged 15 – 24 were affected by very weak negative effect. These findings are consistent with Ch. Brown´s, C. Gilroy´s and A. Kohen´s estimations (1983) of decreased unemployment of young people aged 16 and 19 caused by the increase of the minimum wage.

The disclosure of non-significant regression counting 75 in the Czech Republic, 71 in Hungary, and 61 in Slovakia and Poland is consistent with B. T. Hirsch´s, B. E. Kaufman´s and T. Zelenská´s work (2011), who assumes that the extent of change of minimum wage has insignificant effect on employment. A. Dube, T. W. Lester and M. Reich (2010) claim that the differences in employment trends are not related to minimum wage policy. D. Metcalf (2007) did not prove the negative effect of minimum wage on

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employment. Neither do S. Machin and A. Manning (1994) consider the regulation of minimum wage significant in terms of unemployment increase.

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Annexes

Table 4: Overview of estimated values of regression coefficients and overall decision on consistence with one of two theoretically defined variants of minimum wage effect on selected indicators of labour market including frequency of unproven sensitivity (Czech Republic)

Indicator/ V4 country	Proven sensitivity of related labour market indicators on minimum wage and evaluation of its intensity				Frequency of unproven effect of minimum wage on labour market indicator
	Positive effect		Negative effect		
	Regression coefficient	Intensity evaluation	Regression coefficient	Intensity Evaluation	
	1	2	3	4	5
Czech Republic total	**0**	**x**	**-1,5**	**weak**	**75**
Negative (1 and 2) a Positive effect (3 and 4)	***0***	***x***	***-3,16***	***medium***	
Unemployment rate by education attainment level			***-0,19***	***very weak***	***10***
SEX=Women,AGE=15-24,EDUCATION=Lower elementary			-0,19	very weak	
Long-term unemployment			***-0,17***	***very weak***	***4***
SEX=Women,AGE=25-49			-0,17	very weak	
Unemployment by duration					***9***
Unemployment by type of employment sought			***-4,35***	***strong***	***0***
SEX=Men,AGE=25-54, OCCUPATION TYPE =Full time			-3,75	medium	
SEX=Men,AGE=55-64, OCCUPATION TYPE =Plny uvazek			-4,07	medium	
SEX=Women,AGE=15-24, OCCUPATION TYPE = Full time			-4,16	medium	
SEX=Women,AGE=25-54, OCCUPATION TYPE = Full time			-4,45	strong	
SEX=Women,AGE=55-64, OCCUPATION TYPE = Full time			-5,33	strong	
Positive (1 and 2) and Negative effect (3 and 4)	***0***	***x***	***-0,45***	***very weak***	
Average number of actual weekly hours of work			***-0,07***	***very weak***	***16***
OCCUPATION=Basic activities, OCCUPATION STATUS=Employees			-0,07	very weak	
Temporary employees by education			***-0,66***	***very weak***	***0***
SEX=Men,AGE=55-64			-0,72	very weak	
SEX=Women,AGE=15-24			-0,51	very weak	
SEX=Women,AGE=55-64			-0,75	very weak	
Employment by occupation and education			***-0,4***	***very weak***	***14***
OCCUPATION=Basic activities, SEX=Men,EDUCATION=Lower elementary			-0,4	very weak	
Employees by occupation status			***-0,17***	***very weak***	***8***
OCCUPATION STATUS=Employed persons,SEX=Men,AGE=55-64			-0,19	very weak	
OCCUPATION STATUS = Employed persons,SEX=Women,AGE=55-64			-0,12	very weak	
OCCUPATION STATUS =Employees,SEX=Men, AGE=55-64			-0,21	very weak	
Employment by educational attainment			***-0,66***	***very weak***	***14***
EDUCATION=Lower elementary,SEX=Women,AGE=25-54			-0,48	very weak	
EDUCATION=University,SEX=Men,AGE=55-64			-0,46	very weak	
EDUCATION=University, SEX=Women,AGE=15-24			-1,05	very weak	

Source: Our own calculation based on Eurostat and OECD data.

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Table 5: Overview of estimated values of regression coefficients and overall decision on consistence with one for two theoretically defined variants of minimum wage effect on selected labour market indicators including frequency of unproven sensitivity (Slovakia)

Indicator/ V4 Country	Proven sensitivity of related labour market indicators on minimum wage and evaluation of its intensity				Frequency of unproven effect of minimum wage on labour market indicator
	Positive effect		Negative effect		
	Regression coefficient	Intensity evaluation	Regression coefficient	Intensity evaluation	
	1	2	3	4	5
Slovakia total	**0,23**	**very weak**	**-1,71**	**weak**	**61**
Negative (1 and 2) and Positive effect (3 and 4)	***1,08***	***very weak***	***-3,19***	***medium***	
Unemployment rate by education attainment level					***12***
Long-term unemployment			***-0,28***	***very weak***	***1***
SEX=Men,AGE=15-24			-0,23	very weak	
SEX=Men,AGE=25-49			-0,32	very weak	
SEX=Men,AGE=50-64			-0,37	very weak	
SEX=Women,AGE=15-24			-0,23	very weak	
SEX=Women,AGE=25-49			-0,27	very weak	
Unemployment by duration	***1,08***	***very weak***			***9***
SEX=Women,DURATION=1-2m	1,08	very weak			
Unemployment by type of employment sought			***-6,09***	***very strong***	***1***
SEX=Men,AGE=15-24, OCCUPATION TYPE =Full time			-5,1	strong	
SEX=Men,AGE=25-54, OCCUPATION TYPE = Full time			-5,46	strong	
SEX=Men,AGE=55-64, OCCUPATION TYPE = Full time			-6,93	very strong	
SEX=Women,AGE=15-24, OCCUPATION TYPE = Full time			-6,23	very strong	
SEX=Women,AGE=25-54, OCCUPATION TYPE = Full time			-6,71	very strong	
Positive (1 and 2) and Negative effect (3 and 4)	***0,15***	***very weak***	***-0,89***	***very weak***	
Average number of actual weekly hours of work	***0,12***	***very weak***			***10***
OCCUPATION=Managers, OCCUPATION STATUS=Employed persons	0,16	very weak			
OCCUPATION=Managers, OCCUPATION STATUS =Employees	0,14	very weak			
OCCUPATION=Technicians , OCCUPATION STATUS = Employed persons	0,08	very weak			
OCCUPATION=Workers in services and sales, OCCUPATION STATUS = Employed persons	0,12	very weak			
OCCUPATION= Workers in services and sales, OCCUPATION STATUS =Employees	0,07	very weak			
OCCUPATION=Agriculture workers, OCCUPATION STATUS = Employed persons	0,12	very weak			
OCCUPATION= Agriculture workers, OCCUPATION STATUS =Employees	0,15	very weak			
OCCUPATION=Craftsmen, OCCUPATION STATUS = Employed persons	0,11	very weak			
Temporary employees by education			***-2,04***	***weak***	***0***
SEX=Men,AGE=15-24			-2,13	weak	
SEX=Men,AGE=55-64			-2,03	weak	
SEX=Women,AGE=15-24			-1,95	weak	
SEX=Women,AGE=55-64			-2,06	weak	
Employment by occupation and education	***0,44***	***very weak***	***-0,57***	***very weak***	***14***
OCCUPATION=Workers in services and sales,SEX=Men, EDUCATION=Lower elementary	0,44	very weak			
OCCUPATION=Basic activity,SEX=Men, EDUCATION=Higher secondary			-0,57	very weak	
Employment by occupation status	***0,15***	***very weak***	***-0,15***	***very weak***	***9***
OCCUPATION STATUS =Employed persons,SEX=Women,AGE=55-64	0,16	very weak			
OCCUPATION STATUS =Employees,SEX=Women,AGE=55-64	0,15	very weak			
OCCUPATION STATUS =Employees,SEX=Men,AGE=55-64			-0,15	very weak	
Employment by education attainment level			***-0,59***	***very weak***	***5***
EDUCATION=Lower elementary, SEX=Men,AGE=15-24			-0,45	very weak	
EDUCATION= Lower elementary,SEX=Men,AGE=25-54			-0,46	very weak	
EDUCATION= Lower elementary, SEX=Women,AGE=25-54			-0,88	very weak	
EDUCATION=Higher secondary,SEX=Men,AGE=15-24			-0,48	very weak	
EDUCATION=Vyssi stredni,SEX=Men,AGE=25-54			-0,43	very weak	
EDUCATION= Higher secondary,SEX=Women,AGE=15-24			-1	very weak	
EDUCATION= Higher secondary,SEX=Women,AGE=25-54			-0,6	very weak	
EDUCATION=University,SEX=Men,AGE=25-54			-0,5	very weak	
EDUCATION=University,SEX=Men,AGE=55-64			-0,46	very weak	
EDUCATION=University,SEX=Women,AGE=15-24			-0,83	very weak	
EDUCATION=University, SEX=Women,AGE=25-54			-0,47	very weak	
EDUCATION= University, SEX=Women,AGE=55-64			-0,51	very weak	

Source: Our own calculation based on Eurostat and OECD data.

Table 6: Overview of estimated values of regression coefficients and overall decision on consistence with one fo two theoretically defined variants of minimum wage effect on selected labour market indicators including frequency of unproven sensitivity (Hungary)

Indicator/ Country V4	Proven sensitivity of labour market indicators on minimum wage			Frequency of unproven minimum wage effect on labour market indicator	
	Positive effect		Negative effect		
	Regression coefficient	Intensity evaluation	Regression coefficient	Intensity evaluation	
	1	2	3	4	5
Hungary total	**0.29**	**very weak**	**-1.29**	**very weak**	**71**
Negative (1 and 2) and Positive effect (3 and 4)	***0***	***x***	***-2.56***	***weak***	
Unemployment rate by education attainment level			***-0.18***	***very weak***	***10***
SEX=Men,AGE=55-64,EDUCATION=Lower elementary			-0.21	very weak	
SEX=Women,AGE=55-64,EDUCATION= Lower elementary			-0.14	very weak	
Long-term unemployment			***-0.27***	***very weak***	***1***
SEX=Men,AGE=15-24			-0.32	very weak	
SEX=Men,AGE=25-49			-0.26	very weak	
SEX=Men,AGE=50-64			-0.28	very weak	
SEX=Women,AGE=15-24			-0.23	very weak	
SEX=Women,AGE=25-49			-0.26	very weak	
Unemployment by duration					***10***
Unemployment by type of employment sought			***-5.26***	***strong***	***0***
SEX=Men,AGE=15-24, TYPE OCCUPATION=Full time			-3.85	medium	
SEX=Men,AGE=25-54, TYPE OCCUPATION= Full time			-4.96	strong	
SEX=Men,AGE=55-64, TYPE OCCUPATION= Full time			-6.07	very strong	
SEX=Women,AGE=15-24, TYPE OCCUPATION= Full time			-4.97	strong	
SEX=Women,AGE=25-54, TYPE OCCUPATION= Full time			-5.71	very strong	
SEX=Women,AGE=55-64, TYPE OCCUPATION= Full time			-6	very strong	
Positive (1 and 2) and Negative effect (3 and 4)	***0.29***	***very weak***	***-0.11***	***very weak***	
Average number of actual weekly hours of work			***-0.08***	***very weak***	***7***
OCCUPATION=Technicians,OCCUPATION STATUS=Employed persons			-0.06	very weak	
OCCUPATION=Technicians, OCCUPATION STATUS =Employees			-0.08	very weak	
OCCUPATION=Administrative workers, OCCUPATION STATUS =Employees			-0.06	very weak	
OCCUPATION=Agriculture workers, OCCUPATION STATUS = Employed persons			-0.1	very weak	
OCCUPATION= Agriculture workers, OCCUPATION STATUS =Employees			-0.08	very weak	
OCCUPATION=Craftsmen, OCCUPATION STATUS = Employed persons			-0.06	very weak	
OCCUPATION=Craftsmen, OCCUPATION STATUS =Employees			-0.08	very weak	
OCCUPATION=Machine operators, OCCUPATION STATUS =Employed persons			-0.06	very weak	
OCCUPATION=Machine operators, OCCUPATION STATUS =Employees			-0.08	very weak	
OCCUPATION=Basic activities, OCCUPATION STATUS =Employed persons			-0.08	very weak	
OCCUPATION=Basic activities, OCCUPATION STATUS =Employees			-0.09	very weak	
Temporary employees by education					***4***
Employment by occupation a education	***0.44***	***very weak***			***15***
OCCUPATION=Monteri,SEX=Women,EDUCATION=Vyssi stredni	0.44	very weak			
Employment by occupation status	***0.18***	***very weak***	***-0.16***	***very weak***	***8***
OCCUPATION STATUS =Employed persons,SEX=Men,AGE=15-24	0.18	very weak			
OCCUPATION STATUS =Employees,SEX=Men,AGE=15-24	0.19	very weak			
OCCUPATION STATUS = Employed persons,SEX=Women,AGE=55-			-0.16	very weak	
OCCUPATION STATUS =Employees,SEX=Women,AGE=55-64			-0.16	very weak	
Employment by education attainment level	***0.37***	***very weak***	***-0.38***	***very weak***	***16***
EDUCATION=Higher secondary,SEX=Men,AGE=55-64	0.37	very weak			
EDUCATION=University,SEX=Men,AGE=55-64			-0.38	very weak	

Source: Our own calculation based on Eurostat and OECD data.

Table 7: Overview of estimated values of regression coefficients and overall decision on consistence with one for two theoretically defined variants of minimum wage effect on selected labour market indicators including frequency of unproven sensitivity (Poland)

Indicator/ Country V4	Proven sensitivity of labour market indicators on minimum wage				Frequency of unproven minimum wage effect on labour market indicator
	Positive effect		Negative effect		
	Regression coefficient	Intensity evaluation	Regression coefficient	Intensity evaluation	
	1	2	3	4	5
Poland total	**0.54**	**very weak**	**-1**	**very weak**	**61**
Negative (1 and 2) and Positive effect (3 and 4)	***0***	***x***	***-1.03***	***very weak***	
Unemployment rate by education attainment level			***-0.16***	***very weak***	***0***
SEX=Men,AGE=15-24,EDUCATION=Lower elementary			-0.16	very weak	
SEX=Men,AGE=15-24,EDUCATION=Higher secondary			-0.18	very weak	
SEX=Men,AGE=25-54,EDUCATION= Lower elementary			-0.19	very weak	
SEX=Men,AGE=25-54,EDUCATION= Higher secondary			-0.15	very weak	
SEX=Men,AGE=55-64,EDUCATION= Lower elementary			-0.15	very weak	
SEX=Men,AGE=55-64,EDUCATION= Higher secondary			-0.15	very weak	
SEX=Women,AGE=15-24,EDUCATION= Lower elementary			-0.14	very weak	
SEX=Women,AGE=15-24,EDUCATION= Higher secondary			-0.18	very weak	
SEX=Women,AGE=25-54,EDUCATION= Lower elementary			-0.2	very weak	
SEX=Women,AGE=25-54,EDUCATION= Higher secondary			-0.16	very weak	
SEX=Women,AGE=55-64,EDUCATION= Lower elementary			-0.12	very weak	
SEX=Women,AGE=55-64,EDUCATION= Higher secondary			-0.14	very weak	
Long-term unemployment			***-0.58***	***very weak***	***0***
SEX=Men,AGE=15-24			-0.55	very weak	
SEX=Men,AGE=25-49			-0.63	very weak	
SEX=Men,AGE=50-64			-0.66	very weak	
SEX=Women,AGE=15-24			-0.5	very weak	
SEX=Women,AGE=25-49			-0.59	very weak	
SEX=Women,AGE=50-64			-0.58	very weak	
Unemployment by duration			***-1.06***	***very weak***	***5***
SEX=Men,DURATION=6-11m			-0.89	very weak	
SEX=Men, DURATION =12-17m			-1.02	very weak	
SEX=Men, DURATION =24-47m			-1.29	very weak	
SEX=Women, DURATION =12-17m			-0.92	very weak	
SEX=Women, DURATION =24-47m			-1.19	very weak	
Unemployment by type of employment sought			***-3.61***	***medium***	***1***
SEX=Men,AGE=15-24, OCCUPATION TYPE=Full time			-2.65	weak	
SEX=Men,AGE=25-54, OCCUPATION TYPE = Full time			-3.45	medium	
SEX=Men,AGE=55-64, OCCUPATION TYPE = Full time			-3.88	medium	
SEX=Women,AGE=15-24, OCCUPATION TYPE = Full time			-3.71	medium	
SEX=Women,AGE=25-54, OCCUPATION TYPE = Full time			-4.37	strong	
Positive (1 and 2) and Negative effect (3 and 4)	***0.54***	***very weak***	***-0.33***	***very weak***	
Average number of actual weekly hours of work	***0.15***	***very weak***			***16***
OCCUPATION=Experts,OCCUPATION STATUS=Employed persons	0.16	very weak			
OCCUPATION=Odbornici, OCCUPATION STATUS =Employees	0.15	very weak			
Temporary employees by education	***1.19***	***very weak***			***2***
SEX=Men,AGE=55-64	1.2	very weak			
SEX=Women,AGE=55-64	1.17	very weak			
Employment by occupation a education	***0.46***	***very weak***			***11***
OCCUPATION=Managers,SEX=Men,EDUCATION=Lower elementary	0.42	very weak			
OCCUPATION=Craftsmen,SEX=Men,EDUCATION= Lower elementary	0.44	very weak			
OCCUPATION=Technicians,SEX=Men,EDUCATION= Lower elementary	0.34	very weak			
OCCUPATION=Technicians,SEX=Women,EDUCATION= Lower elementary	0.58	very weak			
OCCUPATION=Technicians,SEX=Women,EDUCATION=Higher secondary	0.53	very weak			
Employment by occupation status	***0.16***	***very weak***			***11***
OCCUPATION STATUS=Employees, SEX=Women,AGE=55-64	0.16	very weak			
Employment by education attainment level	***0.68***	***very weak***	***-0.33***	***very weak***	***15***
EDUCATION=Higher secondary, SEX=Men,AGE=55-64	0.66	very weak			
EDUCATION= Higher secondary, SEX=Women,AGE=55-64	0.71	very weak			
EDUCATION=Lower elementary, SEX=Women,AGE=15-24			-0.33	very weak	

Source: Our own calculation based on Eurostat and OECD data.

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