sciendo
Review of Economic Perspectives – Národohospodářský obzor
Vol. 21, Issue 3, 2021, pp. 291–308, DOI: 10.2478/revecp-2021-0013

Does the instability of economic development affect the elasticity of the labour market?

Monika Daňová, Ivana Kravčáková Vozárová[1]

Abstract: Despite extensive research, the estimates of changes in employment are heterogeneous in different conditions of economic development. In this study, we examined the impact of the instability of economic growth on the elasticity of the labour market in a set of EU27 member states in the period 2000Q1–2019Q4.The sensitivity of the labour market was quantified in parallel by two available methods which are used for this purpose – by calculating the values of the arc elasticity coefficient and by regression analysis. Logarithmic linear regression models were compiled according to the analysis criteria individually for each member state. By comparing the values of the obtained elasticity indicators, differences in the responses of the labour market were identified. Our results show that the heterogeneity of opinions is to some extent natural. The elasticity of the labour market determined by calculating the values of the elasticity coefficient is characterized by a high variability of values. Similarly, the values of the regression coefficient reflect the nature of the macroeconomic development of the period under review. According to our findings, the frequent short-term trends of negative economic development result in a reduced sensitivity of the labour market to the changes in economic performance, manifested by a lower employment elasticity compared to its values in economies with a stable development trend. Based on this, we formulate the connection between the elasticity of the labour market and the positive and negative economic development. We condition the sensitivity of the labour market to the changes in the trend of economic development with the occurrence of longer-lasting trends of negative economic development.

Keywords: economic growth, elasticity, employment, labour market, stability of development trend

JEL Classification: E24, F43, J40, O47, R11

Received: 2 September 2020 / Accepted: 9 June 2021 / Sent for Publication: 9 September 2021

Introduction

Economic growth is an effective tool for increasing employment. Many authors quantify the size needed to reduce unemployment. The OECD (2019) states the need for at least 3% year-on-year GDP growth to maintain employment, Dahmani and Rekrak (2015)

[1] University of Presov, Faculty of management, Konštantínova 16, 080 01 Prešov, Slovakia, monika.danova@unipo.sk; ivana.kravcakova.vozarova@unipo.sk

speak of the need for 3.8% growth. According to Slušná (2011), Daňová and Kravčáková Vozárová (2020), the relationship between employment and economic growth is characterized by the rate of increase in employment due to a one percent increase in product, while drawing attention to the national specifics of the relationship. The variability of conclusions is obvious. It has its origins in the different relationship between economic growth and the labour market in specific economies.

Moreover, the relationship between economic growth and employment is not fixed. It changes by changing the factors of labour demand and labour supply. Such a change of relationship was also caused by the decline in economic activity in the 2008–2009 crisis period. Similarly, the subsequent economic recovery in the post-crisis period led to changes in employment. Both described situations originated in a change in economic activity, and both provoked a labour market reaction. However, the intensity of the reaction was different. As a result of the recession, the number of unemployed people worldwide increased to 205 million by the end of 2009, which is 27 million more than in 2007. The increase in the number of unemployed was not the same in all economies. The extreme increase in unemployment happened mainly in developed economies and in the group of countries of the European Union. By the end of 2009, the number of unemployed in this group of countries had increased by almost 14 million compared to the pre-crisis number, an increase of almost 50% (ILO 2011). The subsequent post-crisis economic recovery was also accompanied by changes in employment in the labour market. However, the increase in employment was smaller than the previous decline and was delayed. A comparison of post-crisis employment developments across the EU27 shows different behaviour of national labour markets.

In economically developed countries, in response to the economic recovery, employment (absolute and relative) grew relatively fast, reaching the pre-crisis level with a one-year delay. However, economically less developed countries reached the level of employment from the pre-crisis period with a delay of 5–7 years. In addition, many of them are characterized by quarterly fluctuations in performance and employment.

Such a delayed labour market response is a subject of discussions. Many discussions about the relationship between job creation and economic growth are taking place at a time when the economy is recovering from recession and adequate employment growth is expected. Also of interest are the relatively elastic job losses during negative economic development. The answers to these questions are practical to know. There are several reasons for this. On the one hand, there is the fact that employment is the world's most important source of income for 3.3 billion persons (ILO 2019). The workforce needs this income to finance its needs. The size of aggregate demand and state tax revenues depends on it. Simultaneously with the absence of job opportunities, the social obligations of the state are also dependent on it. On the other hand, labour is one of the factors of production. The production and development capacity of an economic system depends on its use. Its non-use reduces production capacity and limits growth and development opportunities. It is therefore practical to be able to anticipate changes in employment that will result from macroeconomic developments.

The aim of the study is to identify differences in the sensitivity of national labour markets towards the macroeconomic development across EU member states. We identify differences in employment elasticity and look for a possibility of generalizing conclusions. We

point out the importance of the stability of economic development for achieving the required changes in employment.

Literature Review

Reducing unemployment and achieving a high rate of economic growth are the top priorities for the economies of both developed and developing countries. In terms of a country's economic success, economic growth and employment are two extremely important macroeconomic variables and are essential elements of many countries' economic policies. In most macroeconomic literature, the term economic growth is defined as an increase in the amount of goods and services produced in a country during a period of progress. If we take into account that there are many countries of different economic sizes around the world, we see that some of these countries are very rich, some very poor and the vast majority are somewhere between these two extremes (Soylu et al. 2018). The relationship between economic growth and employment is one of the most discussed issues in the literature, as well as in European and national strategies. This is because, on the one hand, most European countries have persistent job shortages and have to solve the problem of unemployment, and on the other hand, employment is not growing sufficiently while the economy is growing (Herman 2011). Job creation is one of the main pillars of any economy. Globally, new employment is difficult to achieve, especially in a low-growth environment, as high levels of persistent unemployment are linked to structural weaknesses in the economy (Meyer 2017).

Economic development by default means a change in the performance of an economic system that occurs over time. Long-term trends show a growth trend. A more detailed look reveals the instability of this development, i.e. the alternation of periods of acceleration and deceleration of the growth of economic performance, or even periods of its shrinkage. In other words, economic performance over time can be characterized by greater or lesser, positive, or even negative changes. Some sources use the terms positive / negative economic growth to describe such developments (Kapsos 2005), explaining these as a trend of positive / negative changes in economic performance.

The relationship between economic growth and employment was first developed by Okun in 1962, known as the Okun's Law (Okun 1962). Okun's law describes a positive relationship between economic growth and employment or a negative relationship between economic growth and the unemployment rate. Okun's law explains the theory related to economic growth and employment growth, where production depends on the amount of work used in the production process (Meyer and Tasci 2012). The change that is taking place in the labour market, measured by changes in employment or unemployment of the available labour force, is mostly the result of changes in labour demand. This is caused by a change in the need to use labour in economic activities (Louail and Riache 2019) and is at the same time influenced by the operation of labour market instruments (Crivelli et al. 2012).

The global economic and financial crisis has caused a significant "decoupling" of the relationship between employment and GDP. Before the crisis (1999–2008), employment in the euro area and GDP growth had slowed markedly. However, this relationship fell apart with the onset of the Great Recession in 2008, when initial employment in the euro

area declined relatively modestly, due to a sharp decline in GDP. Employment in the second (double) recession of the euro area helped to restore the basic relations. Employment and GDP appear to have been significantly more closely linked since the recovery that began in early 2013. The recovery in euro area GDP since the second quarter of 2013 has been accompanied by higher-than-expected employment growth. From a macroeconomic point of view, this issue is important because the recovery of the labour market is crucial for kick-starting consumption as a result of the crisis (ECB 2016).

Several studies (Kapsos 2005, Dopke 2001) have also found that the relationship between economic growth and employment is usually positive and strong but has different strength in different countries and at different times. The reason for the differences in the strength of this relationship is considered to lie in the fact that the possibilities of increasing employment are limited by the need for labour. This need depends on the way in which the economy increases its creation. This can be achieved in several ways: either the amount of all inputs is increased and then we are talking about extensive growth, or growth is achieved by increasing the productivity of production factors, or a combination of both options occurs. Each of these methods causes a different need for additional manpower. It follows that the possibilities of increasing employment depend on specific conditions – the development stage of the economy, industry and region, and last but not least, the influence of several exogenous factors.

There are several factors that can trigger and influence the development of employment. Crivelli et al. (2012) described four types of factors – macroeconomic, structural, demographic, and fixed over time. Each of them can influence employment partially and in cooperation with others. Their impact on employment is therefore always individual. However, they always have a direct income effect on the system and its individuals, as well as long-term effects manifested by a slowdown in growth and development.

The simplified connection between employment growth and economic growth omits the fact that changes in employment are also influenced by other factors. Some of them are related to economic performance, while others have the above-mentioned exogenous character. The impact of stability and economic development trends is also significant, as a result of the fact that employment is created on the basis of the labour force requirements created by economic subjects in relation to the scope of their activities. Therefore, due to macroeconomic fluctuations, the changes in employment can still be expected. A decrease in employment can have a logical basis, as has been shown, for example, during the economic recession in 2008, when employment fell due to a sharp decline in production.

Improving people's living standards by promoting economic growth is the ultimate goal of most governments around the world. However, economic growth alone is not an effective tool for eradicating poverty (World Bank 2018). Economic growth is a prerequisite for increasing productive employment. It is a combined result of increased employment and increased labour productivity. As a result of increasing labour productivity and value added, the need for additional labour is declining even with positive economic growth. In addition, the ability to increase employment is limited by the size of the workforce, its age and educational structure, and its internal and external migration. E.g., Cazes et al. (2013), Shuvaev et al. (2018), found that the magnitude and nature of changes in labour employment are also influenced by increases and decreases in the labour force due to migration. By depleting the labour supply, they justify the generally low elasticity of the

labour market during high employment rate. These variables are specific to each economy and period.

Increasing productivity in individual countries by increasing the efficiency of capital, labour and other inputs is one of the appropriate solutions in the current situation. It can be seen that growth research is still the subject of interest and discussion among researchers (Ngo and Nguyen 2020). The relationship between labour productivity and economic growth was also analyzed by Rey and Hazem (2020). The stability of labour productivity was also addressed by Abou Hamia (2020), Hofman and Valderrama (2020).

Despite the lack of a unifying theory, there are several sub-theories that discuss possible factors influencing the level of economic growth. Two main streams can be distinguished. The first stream is represented by Solow (1956), Romer (1986, 1990), Lucas (1988) and others, who emphasize the importance of capital accumulation as well as capital and innovation capacity. The second stream is represented by representatives who focus either on the impact of efficiency on economic growth (Easterly and Wetzel 1989, Barro 1990, etc.) as well as on the theory of new economic geography (Krugman 1991, 2010) or the new institutional economy (Williamson 1975). This stream takes due account of the spatial characteristics of development, institutional and political systems, socio-cultural factors, demography and geographical specifics (Fouthe and Ndedi 2017). The relationship between institutions, politics and the labour market in the context of the institutional economy is undeniable. In particular, the first generation of institutional economists specifically emphasized the importance of institutions and other non-market parameters in determining wage and employment levels. It is precisely the result of the recommendations of this theoretical school that various modern institutions as well as labour market policies began to emerge, which include e.g. unemployment benefits, minimum wages, trade unions or active employment policy, etc. (Katselidis 2019). On this basis, different behavior of labour market institutions may also have different effects on labour market elasticity as well as productivity of the labour factor in individual countries.

Data and Methodology

The aim of the study was to identify differences in the sensitivity of national labour markets to the macroeconomic development across EU member states. The relationship is specified according to Okun's concept (1964). On the one hand, this relationship is explained by the size of the influence of lagging the real product behind its potential value, i.e. by the growth of unemployment above its natural rate. On the other hand, the relationship is explained by the interrelationship between output growth and unemployment movements. The analyses were performed in a set of EU27 Member States for the 2000–2019 period and for its partial sections so that they differentiate the different conditions of functioning of national labour markets. The obtained results were analysed and evaluated in groups of countries defined on the basis of the following criteria: nature and direction of economic development and stability of trends.

The selection of independent variables is based on the results of correlation analysis. We quantify the existence of connections between the dependent variable (employment of the labour force) and the considered factors by the determined values of the correlation coefficient. The relationship between the elasticity coefficient and the values of the economic growth rate was also subjected to this analysis. The tightness of the relationship (or

dependence) was divided into six categories according to the achieved value of correlation: a very strong indirect relationship (r between −0.75 and −1), a medium-strong indirect relationship (r between −0.75 and −0.5), a weak indirect relationship (r between −0.5 and 0), a weak direct relationship (r from between 0 and 0.5), a medium-strong direct relationship (r between 0.5 and 0.75) and a very strong direct relationship (r between 0.75 and 1) (Fotheringham et al. 2000).

As the correlation analysis does not express the causal relationship of the variables, in the next part of the analyses determining the elasticity of national labour markets, a logarithmic linear regression model was constructed for each EU27 country:

$$\ln E = \beta_0 + \beta_1 \times \ln Y + u, \tag{1}$$

where E – employment, Y – GDP at basic prices, *ln* – the natural logarithm of the relevant variable. The constant β_0 specifies the influence of national conditions on the labour market manifested in the employment of the workforce, the regressor β_1 expresses the elasticity of employment with respect to GDP and u is a random observation error.

In order to identify the impact of labour productivity growth on employment, the original regression model is in the following analyses supplemented by another independent variable, labour productivity. The general form of the model thus described is expressed by the equation:

$$\ln E = \beta_0 + \beta_1 \times \ln Y + \beta_2 \times \ln PP + u, \tag{2}$$

where the symbols E, Y, *ln*, β_0 and u have the same meaning as in the previous relation. Regressor β_1 expresses the elasticity of employment with respect to product, regressor β_2 expresses the elasticity of employment with respect to labour productivity. Overall, the elasticity of the labour market with respect to economic growth is quantified by the sum $\beta_1 + \beta_2$.

The constructed model concretizes the specific conditions of the country (Košta et al. 2011; Cazes et al. 2013; Shuvaev et al. 2018) by distinguishing between quantitative and qualitative economic growth. The advantage of using it is that it quantifies the debilitating effects of rising labour productivity on the ability of economic growth to support employment.

Islam and Nazara (2000) and Kapsos (2005) consider the elimination of the volatility of results caused by short-term changes in the relationship as an advantage of using the regression model in an analysis of the relationship between two macroeconomic variables. The obtained set of elasticity coefficients can be used primarily to determine the differences in the elasticity of labour markets across the EU27. Another way of using it is by identifying the nature of economic growth (Table 1).

Table 1. Labour market elasticity due to different development in GDP and labour productivity

Value ε	ΔGDP > 0	ΔGDP < 0
$\varepsilon < 0$	ΔE (%) < 0 ΔLP (%) > ΔGDP (%)	ΔE (%) > 0 ΔLP (%) < 0
$0 \leq \varepsilon \leq 1$	ΔE (%) > 0 ΔE (%) < ΔGDP (%) ΔGDP (%) < ΔLP (%)	ΔE (%) < 0 ΔLP (%) < 0 ΔLP (%) < ΔGDP (%)
$\varepsilon > 1$	ΔE (%) > 0 ΔE (%) > ΔGDP (%) ΔGDP (%) > ΔLP (%)	ΔE (%) < 0 ΔLP (%) > 0 ΔLP (%) > ΔGDP (%)

Source: Authors.
Legend: $\mathcal{E}$ – coefficient of elasticity, expresses the percentage change of the dependent variable caused by the unit change of the independent variable, ΔE – change of employment between 2 periods (in %), ΔLP – change of labour productivity between 2 periods (in %), ΔGDP – change of GDP between 2 periods (in %).

The stated advantages of using regression analysis in conditions of factor instability limit the usability of information in practical economic policy. Therefore, we verify the explanatory power of both regression models by the coefficient of determination. In addition, in order to determine the differences in employment elasticity in different macroeconomic conditions and to identify the cause of these differences, we supplement the regression analysis in parallel by calculating the coefficient of elasticity. The coefficient of elasticity is normally used to express the percentage change in the dependent variable caused by a one percent change in the independent variable. In our case, the percentage change in employment caused by a one percent change in GDP, which can be written in the relation:

$$\varepsilon = \frac{\Delta E/E}{\Delta Y/Y}, \tag{3}$$

where $\mathcal{E}$ – employment elasticity, E – employment expressed in number of persons employed, Y – GDP at basic prices.

The use of the concept of elasticity based on comparing the magnitude of changes in two variables is standard in many areas of research. It is relatively simple to use and has easily interpretable findings. It allows to express the percentage change in employment between two periods, resulting from a one percent change in GDP. It also makes it possible to identify the impact of the stability of the development of GDP and employment on the elasticity of the labour market.

We identify the trend of macroeconomic development in accordance with the NBER methodology (2008). We distinguish between periods of positive and negative economic growth and the frequency of their changes in the observed period 2000–2019. Expansion is the normal state of the economy, where GDP changes at basic prices are non-negative. We consider a decline in economic activity that lasts for more than a few months and is visible in real GDP and employment to be a criterion for a recession.

We identify the change in the elasticity of the labour market on the basis of the difference between the values of the elasticity indicator for the compared periods (periods of expansion and recession, periods of positive and negative economic growth):

$$\Delta\, elasticity = \beta_{1EXP} - \beta_{1REC}, \quad (4)$$

where the β_{1EXP} and β_{1REC} coefficients are the specification of the regression coefficient β_1 for periods with positive economic growth (β_{1EXP}) and with negative economic growth (β_{1REC}).

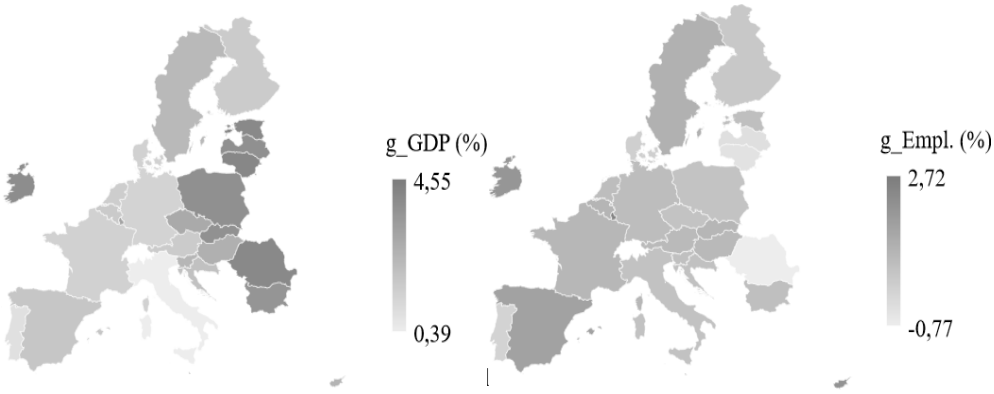
This allows us to find out under what conditions the instability of the development of the evaluated variables affects the elasticity of the labour market.

Elasticities are calculated using data from Eurostat databases. Employment and changes in employment, which we consider to be key labour market indicators, were taken from the Labour Market Database (Eurostat 2020). Data on the value of generated GDP at market prices were obtained from the National Accounts Database (Eurostat 2020). In order to eliminate the impact of changes in the price level on the informative value of the data, all data on the value of GDP were converted to constant 2015 prices using the relevant implicit price index. Time series of data are available in Eurostat databases on an annual and quarterly basis. Quarterly data were used in the analyses to identify growth and recession trends in GDP and employment and subsequent calculations of labour market elasticity. The obtained panel data were used to explain the sensitivity of the labour market to economic growth by changing employment due to different trends in economic development. The study uses the code designation of the EU27 member states according to the ISO 3166 standard.

Results and Discussion

The set of EU27 countries in the period 2000–2019 was characterized by different performance and employment of the workforce. Differences are also evident when monitoring the development of both indicators (Figure 1).

Figure 1. Comparison of changes in GDP and employment in the EU27 member states (average value for the 2000–2019 period)



Source: Author's calculations based on data from Eurostat database (2020).
Legend: g_GDP – average value of year-on-year changes in GDP in the observed period, g_Empl – average value of year-on-year changes in employment in the observed period.

Table 2. Results of the analysis of the relationship between GDP and employment in the EU27 (2000–2019)

	arc elasticity			E-Y model for periods with a positive change in GDP						E-Y model for periods with recession					
	Obs.	ε	Var (ε)	Obs.	β_0	β_1		R^2	r	Obs.	β_0	β_1		R^2	r
AT	80	0,316	0,298	65	1,841	0,569	***	0,893	0,950	4	1,090	0,635	*	0,894	0,945
BE	80	0,016	0,039	71	2,030	0,553	***	0,950	0,975	4	5,449	0,257		0,766	0,874
BG#	80	-0,252	2,952	73	6,069	0,209	***	0,476	0,657	4	21,817	-1,490		0,569	-0,753
CY	80	0,269	0,573	59	-0,537	0,761	***	0,958	0,976	4	-1,837	0,919	*	0,898	0,948
CZ	80	-0,156	2,197	70	6,241	0,213	***	0,903	0,964	4	12,654	-0,395		0,672	-0,821
DE	80	0,395	0,587	56	2,724	0,580	***	0,926	0,964	6	2,647	0,586	***	0,997	0,999
DK	80	0,055	0,210	57	6,827	0,096	*	0,066	0,284	4	6,594	0,118		0,437	0,993
EE	80	-0,126	2,470	67	4,782	0,191	***	0,593	0,794	6	4,186	0,261		0,264	0,910
EL	80	0,088	0,908	48	0,173	0,751	***	0,816	0,905	18	-1,513	0,906	***	0,961	0,979
ES	80	-0,055	0,170	62	0,463	0,749	***	0,701	0,818	13	-15,436	2,022	***	0,962	0,980
FI	80	0,112	1,251	54	5,396	0,220	***	0,425	0,653	9	-1,071	0,814	**	0,565	0,765
FR	80	0,179	0,849	66	3,142	0,532	***	0,938	0,967	4	11,890	-0,132		0,203	-0,454
HR	80	0,172	1,667	57	3,528	0,411	***	0,620	0,795	10	-7,068	1,549	***	0,733	0,856
HU	80	0,048	0,251	66	4,480	0,375	***	0,638	0,829	5	0,877	0,724	**	0,820	0,908
IE	80	-0,183	3,534	55	4,101	0,319	***	0,858	0,910	7	-6,551	1,316	***	0,876	0,935
IT	80	0,254	0,870	51	3,015	0,539	***	0,304	0,553	11	2,329	0,592	**	0,363	0,613
LT	80	0,266	0,192	72	7,934	-0,082	***	0,126	-0,354	3	7,380	0,073	**	0,997	0,998
LU	80	-0,303	2,007	58	-3,447	0,947	***	0,949	0,978	4	1,114	0,450	***	0,996	0,998
LV	80	0,206	1,375	61	7,378	-0,067	***	0,051	-0,203	5	-1,692	0,986	***	0,957	0,979
MT#	80	0,066	0,046	62	-0,648	0,764	***	0,982	0,992	5	1,567	0,465	***	0,948	0,976
NL#	80	0,150	0,272	66	5,346	0,304	***	0,650	0,825	7	7,488	0,126		0,159	0,397
PL#	80	0,163	0,528	70	6,432	0,279	***	0,846	0,909	5	7,078	0,223	***	0,980	0,995
PT	80	0,212	7,198	56	5,145	0,306	*	0,068	0,247	12	-1,524	0,927	*	0,277	0,514
RO#	80	-0,383	1,800	70	10,621	-0,150	***	0,412	-0,617	7	8,190	0,080		0,086	0,331
SE#	80	0,114	0,117	64	3,533	0,423	***	0,901	0,957	7	4,612	0,329	***	0,958	0,976
SI	80	0,392	4,410	66	5,066	0,193	***	0,476	0,698	6	-0,356	0,787		0,289	0,549
SK	80	0,016	0,447	75	5,264	0,256	***	0,909	0,956	6	4,733	0,311	**	0,714	-1,000

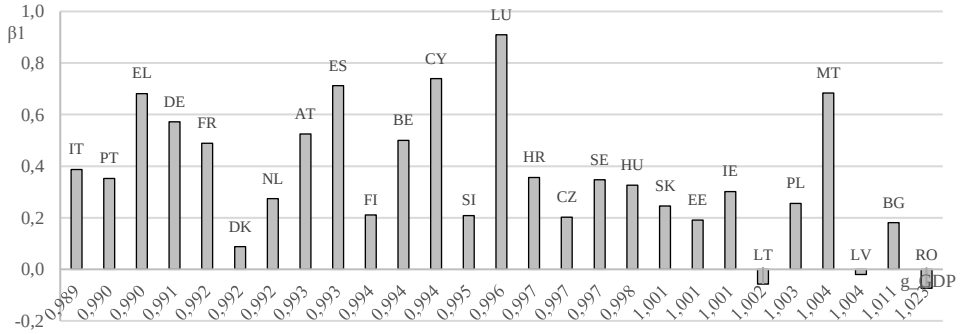
Source: Author's calculations based on data from Eurostat database (2020).
Legend: $\mathcal{E}$ – coefficient of elasticity, that expresses the elasticity of employment between periods 0 and 1, β_0 – location constant, that specifies the impact of national conditions on the labour market, β_1 – regression coefficient, which expresses the % change in employment caused by economic growth, Obs. – the number of observations, R^2 – the coefficient of determination and r – correlation coefficient, # – signs of recession with the duration of no more than 1 quarter.

Empirical analysis of the panel data identified cases where the interval ranges of percentage changes in GDP and changes in employment were comparable, as e.g. changes in GDP in the range −2.02–3.72% accompanied by changes in employment from the range −1.89–3.48% in Belgium and similar changes in GDP in the range −4.06–3.82% accompanied by a −4.43–3.30% change in employment in Portugal. Compared to these cases, the disparity of changes in economic growth and changes in employment is more frequent. As an example, while in Germany were the changes in GDP two times greater than the changes in employment, in Czech Republic was this ratio even wider – the changes in GDP were three times greater than the changes in employment.

Different interval of changes in GDP signals a different ability for economic growth across the set of countries. The fact that the same change in GDP (measured in %) causes a different reaction of the labour market signals a different relationship between economic growth and development and the labour market. The strength of this relationship is quantified by the values of the elasticity coefficient determined as the ratio of the percentage change in employment caused by a one percent change in GDP (Table 2, column 3) or by the values of the regressor determined by regression analysis of the GDP-employment relationship (Table 2, columns 7, 12). These values quantify the increased sensitivity to changes in the trend of economic development, especially in economies where this phenomenon is not relatively frequently recurring. This is documented by differences in the values of the β_1 coefficient for periods of expansion and recession in the group Belgium, Bulgaria, Czech Republic, Lithuania and Romania, where the least instability of economic development trends was found.

Regardless of the method of identifying the elasticity of the labour market, the values of the elasticity indicator show differences in the flexibility of the labour market response to GDP growth in the set of countries surveyed (Figure 2). It is clear that changes in employment are not just the result of GDP growth. In the background of the relationship are specific labour market conditions in each country, different conditions of resources and the sizes of economic growth in individual countries.

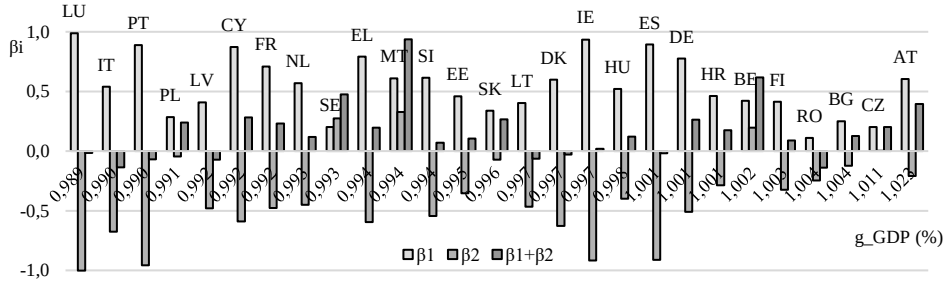
Figure 2. Economic growth and employment elasticity in the EU27 (2000–2019)



Source: Author's calculations based on data from Eurostat database (2020).

Economic growth has a positive effect on employment. If its source is growth in labour productivity, there is no reason to increase employment. By contrast, the change in employment is opposite (Figure 3). This does not apply if the growth rate of labour productivity falls behind the growth rate of GDP. Also, the negative impact of labour productivity is not endless. Labour productivity growth reduces the positive impact of economic growth on employment only in the short term (Daňová and Kravčáková Vozárová 2020; Nordhaus 2005; Junankar 2013). With a time lag, the negative impact changes to a positive one – employment grows and the value of the elasticity coefficient increases. Thus, in the case of labour productivity, its changes cause changes in the elasticity of the labour market. The instability of changes in labour productivity and the different nature of the effects over time make it difficult to predict the changes it will cause in the labour market.

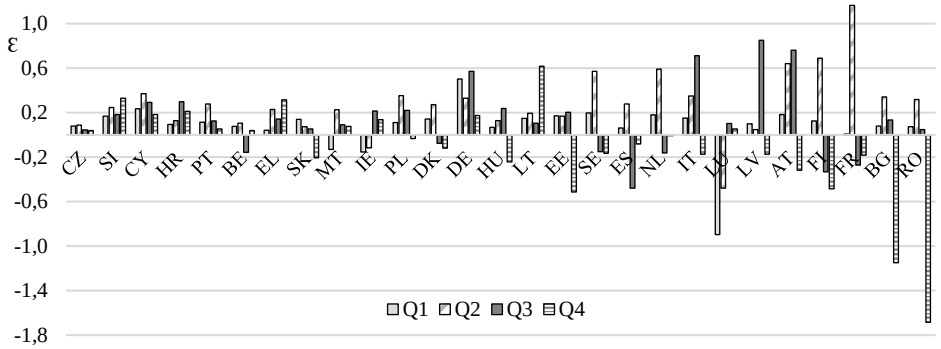
Figure 3. The impact of changes of labour productivity in the EU27 on labour market elasticity



Source: Author's calculations based on data from Eurostat database (2020).
Legend: β_1 – regressor quantifying the impact of economic growth on employment, β_2 – regressor quantifying the impact of labour productivity on employment, $\beta_1 + \beta_2$ – regressor quantifying the impact of extensive economic growth on employment.

Monitoring the development of GDP and employment over a period of time as a possible factor in the elasticity of the labour market identifies the instability of economic development. This can be observed in cycles of various lengths. In the quarterly frequency, differences are observable when comparing the development between Q4, Q1 and Q2, Q3. The period of deceleration in economic growth is characteristic for the period Q4–Q1, and acceleration is characteristic for Q2–Q3. Changes in employment do not correlate with changes in GDP, which is subsequently reflected in the values of the elasticity coefficient (Figure 4). We link this finding, similarly to Kitov and Kitov (2012), Seyfried (2005) and Tatoglu (2011), with a delay in the positive effects of economic growth on economic subjects and the consequent delayed labour market response (Christl et al, 2018). The generally low elasticity of the labour market is the result, among other things, of the influence of regulatory mechanisms of national labour markets. Comparisons of the occurrence and size of quarterly differences between countries in the sample show differences. We link these differences with national specifics in the sectoral structure of economic activities and with national specifics in the strength of labour market regulatory mechanisms.

Figure 4. Employment elasticity in Q1–Q4 in the EU27



Source: Author's calculations based on data from Eurostat database (2020).
Legend: Ɛ – employment elasticity coefficient, Q1–Q4 – first to fourth quarters of the year.

Compared to the recurring quarterly fluctuations, changes in GDP over the long term are irregular. Such fluctuations are identified as the alternation of periods of positive and negative economic growth. In the EU27, these periods have different frequencies and durations (Table 3). In line with the findings of others (Romer and Romer 2019), short-term declines predominate in the identified occurrences of negative economic growth. Interruptions of the growth trend for only one quarter are frequent. In the analysed set, out of the total number of trends of negative changes in GDP, up to 69.11% were trends lasting only one quarter.

Table 3. Changes in economic trends, duration of recession in the EU27 (2000–2019)

EU27 countries	Frequency of trend reversal[2]	Negative GDP development (number of quarters)	Recession development (number of quarters)
BG, CZ, ES, SK, BE, LT, HU	4–6	5–18	0–13
CY, EE, AT, NL, SI, FR, PL, RO, SE	7–9	10–21	2–6
PT, LV, DE, HR, IT	11–13	19–29	5–12
FI, DK, EL, LU, MT, IE	14–17	18–32	0–18

Source: Author's calculations based on data from Eurostat database (2020).

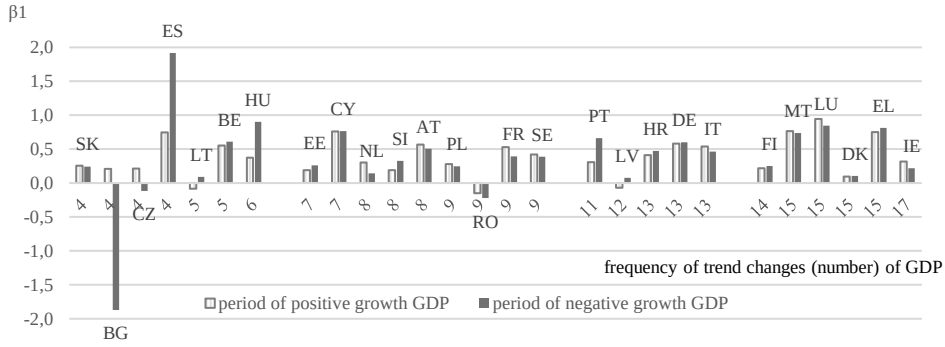
An objectively expected accompanying phenomenon of changes in GDP is a change in employment. In the EU27 sample in the observed period, this nature of development was characteristic only for a certain part of the period of negative economic growth (Table 3,

[2] Note to criterion of stability of the economic growth trend. Based on the frequency of alternating trends of positive and negative economic growth, the countries are divided into 4 groups.

columns 3 and 4). In countries with low instability of development trends, the decline in employment is accompanied by about 2/3 of the occurrence of negative GDP development. In countries with unstable development (number of interruptions of positive GDP growth more than 7, see Table 3), a negative change in employment was found in 1/2–2/3 of the incidence of negative GDP development.

The decline in employment with negative changes in GDP usually occurred only if the negative economic development lasted more than one quarter. The high number of short-term interruptions in the positive economic development trend did not result in a significant increase in labour market elasticity. Similarly, in all countries in the sample, renewed positive GDP growth had a positive effect on employment, but the strength of the impact was lower. Across the EU27, the strength of the labour market response to the instability of economic trends varied (see Figure 5).

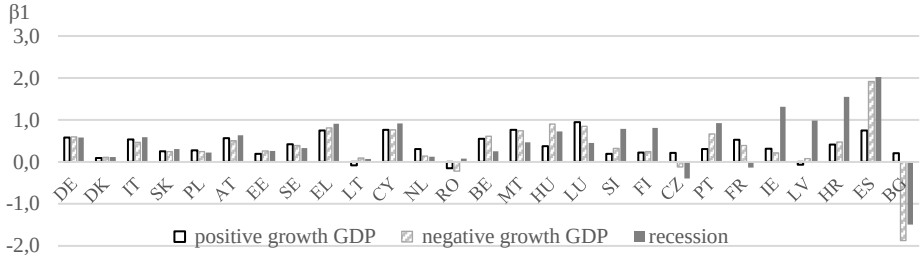
Figure 5. The influence of the number of changes in the trend of GDP development on the elasticity of the labour market



Source: Author's calculations based on data from Eurostat database (2020).

The occurrence of a maximum of 1–2 quarters of lasting periods of negative economic development is associated with a reduction in labour elasticity in periods of stagnation or recession (such as in Poland, Malta and Romania). With a longer-term negative development of GDP, there is an increase in elasticity in this period. The change in labour market elasticity increases as the period of negative GDP growth increases (see Figure 6). However, it differs from case to case. The reason for this are national specifics in the demand for work influenced by e.g. economic strength of economic entities, expectations of further development based on historical knowledge or the size of the contribution of labour productivity to economic growth. Another factor influencing the flexibility of the labour market response to development instability is the time lag of change limited, inter alia, by national labour market management mechanisms.

Figure 6. Employment elasticity in conditions of positive and negative GDP development in the EU27



Source: Author's calculations based on data from Eurostat database (2020).

Similar conclusions were also reached in the studies from Nordhaus (2005), Kapsos (2005), Anghel (2014) and others, when analysing the conditions under which positive and negative changes in economic performance and efficiency can affect employment.

Conclusion

The aim of the study was to identify differences in the sensitivity of national labour markets to the macroeconomic development across EU member states. With the intention of detecting changes in the relationship between economic growth and employment, we determined the elasticity of the labour market simultaneously by the coefficient of elasticity and by using logarithmic linear regression models constructed on the basis of defined criteria. The subject of the analyses were quarterly panel data that characterize the rate and sources of economic growth, employment of the labour force and their mutual relationship in the EU member states in the period 2000–2019.

The results of the performed analyses can be summarized in several levels. In particular, in a period of positive economic development, the labour market behaved inelastically in most countries (with the exceptions of Lithuania, Latvia and Romania), with the GDP growth leading to a positive change in employment. The parameters (namely character and strength) of the relationship changed with the change in the trend of economic development. In some countries, in the period of negative economic development, the impact of economic growth on employment increased, in other countries, this relationship was weakened.

As a reason for such a different reaction of labour markets, the influence of the frequency of changes of trends in economic development and the duration of negative GDP development was analysed. The number of changes of trends in economic development did not appear to be decisive. Across the surveyed countries, the observed cyclical fluctuations in output during the year are reflected in quarter-on-quarter differences in employment and quarter-on-quarter differences in labour market elasticity. Given their occurrence and size, their cause can be seen in the structure of economic activities. A similar finding was obtained from the analysis of the relationship over a longer period of time. According to our findings, frequent short-term trends of negative economic development result in a

reduced sensitivity of the labour market to changes in economic performance. In the event of negative economic developments, they are reflected in a reduction in employment elasticity due to an unstable macroeconomic environment. In contrast, in economies with stable economic development, the change in the trend is associated with an elastic labour market response. Therefore, in a stable economic environment, the impact of a change in the trend of economic development on the elasticity of the labour market can be expected. The reason can be seen in the pessimistic expectations of a longer-lasting negative economic development.

Acknowledgements: This research was supported by the Scientific Grant Agency of the Ministry of Education, Science, Research, and Sport of the Slovak Republic and the Slovak Academy of Sciences, grant number VEGA 1/0082/19 and by the Cultural and Educational Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic, grant number KEGA 024PU-4/2020.

Disclosure statement: No potential conflict of interest was reported by the authors.

References

ABOU HAMIA, M.A. (2020). Are developing countries accumulating sufficient total factor productivity to sustain their economic growth and job creation? Empirical evidence from the Middle East and North Africa region. *Review of Development Economics*. DOI:10.1111/rode.12693

ANGHEL, B., DE LA RICA, S., LACUESTA, A. (2014). The impact of the great recession on employment polarization in Spain. *SERIEs*, 5, 143–171. DOI: 10.1007/s13209-014-0105-y

BARRO, R. J. (1990). Government Spending in a Simple Model of Endogenous Growth. *Journal of Political Economy*, 98 (5), 103–125. DOI: 10.1086/261726

CAZES, S. VERICK, S., AL HUSSAMI, F. (2013). Why Did Unemployment Respond so Differently to the Global Financial Crisis Across Countries? Insights from Okun's Law. *IZA Journal of Labor Policy*, 2(10), 1–18. DOI: 10.1186/2193-9004-2-10

CRIVELLI, E., FURCERI, D., TOUJAS-BERNATÉ, J. (2012). Can Policies Affect Employment Intensity of Growth? A Cross-Country Analysis, IMF Working papers, International Monetary Fund, Washington.

DAHMANI, M.D., REKRAK, M. (2015). Revisiting the Relationship between Unemployment Rate and Economic Growth in Algeria, 1970-2014: Co-Integration Approach using ARDL model, MPRA Paper No. 92045, Munich University Library, Munich.

DAŇOVÁ, M., KRAVČÁKOVÁ VOZÁROVÁ, I. (2020). Regional Disparities in the Relationship between Economic Growth and Unemployment. *Scientific Papers of the University of Pardubice*, Series D, 28(2), 900. DOI: 10.46585/sp28020900

DÖPKE, J. (2001). The Employment Intensity of Growth in Europe (Kiel Working Papers 1021), Kiel Institute for the World Economy, Kiel.

EASTERLY, W. R., and WETZEL, D. L. (1989). Policy Determinants of Growth: Survey of theory and evidence, Policy, Planning and Research Working Papers Series No. 343, World Bank, Washington, pp. 1–41.

ECB Economic Bulletin. (2016), The employment-GDP relationship since the crisis, 6, European Central Bank, Frankfurt am Main.

EUROSTAT (2020). Database. [online]. Available from: https://ec.europa.eu/eurostat/data/database

FOTHERINGHAM, A. S., BRUNSDON, C., CHARLTON, M. (2000). Quantitative Geography: Perspectives on Spatial Data Analysis, Sage Publications, London.

FOUTHE, CH.D.D., NDEDI, A. (2017). Analyzing factors affecting economic growth within CEMAC countries. *SSRN Electronic Journal*, 1–10. DOI: 10.2139/ssrn.2986075

HERMAN, E. (2011). The Impact of Economic Growth Process on Employment in European Union Countries. *The Romanian Economic Journal*, 14(42), 47–67.

HOFMAN, A.A., VALDERRAMA, P. (2020). Long Run Economic Growth Performance in Latin America-1820-2016. *Journal of Economic Surveys*. DOI: DOI: 10.1111/joes.12383

CHRISTL, M., KÖPPL-TURYNA, M. and KUCSERA, D., (2018). Revisiting the Employment Effects of Minimum Wages in Europe. *German Economic Review*, 19, 426–465. DOI:10.1111/geer.12135

ISLAM, I., NAZARA, S. (2000). Estimating employment elasticity for Indonesian economy, ILO Area Office, Jakarta.

ILO. (2011). Global Employment Trends 2011: The challenge of a jobs recovery. International Labour Office, Geneva.

ILO. (2019). World Employment and Social Outlook: Trends 2019, International Labour Office, Geneva.

ISO. (2013). Codes for the standardization of names of countries and their subdivisions (ISO 3166-1), Geneva.

JUNANKAR, P. N. (2013). Is There a Trade-off Between Employment and Productivity?, IZA Discussion Paper, No. 7717, Institute for the Study of Labor, Bonn.

KAPSOS, S. (2005). The employment intensity of growth: Trends and macroeconomic determinants, International Labour Office, Geneva.

KATSELIDIS, I.A. (2019). Institutions, Policy and the Labour Market: The Contribution of the Old Institutional Economics. *Economic Thought History, Philosophy, and Methodology*, 8(2), 13-30.

KITOV, I., KITOV, O. (2012). Modeling unemployment and employment in advanced economies: Okun's Law with a structural break. *Theoretical and Practical Research in Economic Fields*, 5(3), 26–41.

KOŠTA, J. et al. (2011). Aktuálne problémy trhu práce v Slovenskej republike po vstupe do Európskej menovej únie, Ekonomický ústav SAV, Bratislava.

KRUGMAN, P. (1991). Geography and Trade. MIT Press, Cambridge.

KRUGMAN, P. (2010). The new economic geography, now middle-aged. *Regional Studies*, 45(1), 1–7. DOI: 10.1080/00343404.2011.537127

LOUAIL, B., RIACHE, S. (2019). Asymmetry relationship between economic growth and unemployment rates in the Saudi economy: Application of Okun's law during the period 1991–2017. *International journal of advanced and applied sciences*, 6, 83-88. DOI: 10.21833/ijaas.2019.10.013.

LUCAS, R. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*, 22, 3–42. DOI: 10.1016/0304-3932(88)90168-7

MEYER, D.F. (2017). An Analysis of the Short and Long-Run Effects of Economic Growth on Employment in South Africa. *International Journal of Economics and Finance Studies*, 9(1), 177–193.

MEYER, B., TASCI, M. (2012). An unstable Okun's Law, not the best rule of thumb. *Economic Commentary*, 8, 1–5.

National Bureau of Economic Research, (2008). Business Cycle Dating Committee, Cambridge.

NGO, M.N., NGUYEN, L.D. (2020). Economic Growth, Total Factor Productivity, and Institution Quality in Low-Middle Income Countries in Asia. *Journal of Asian Finance Economics and Business*, 7(7), 251–260. DOI: 10.13106/jafeb.2020.vol7.no7.251

NORDHAUS, W. (2005). The sources of the productivity rebound and the manufacturing employment puzzle, Working Paper 11354, National Bureau of Economic Research, Cambridge. DOI: 10.3386/w11354

OECD. (2019). OECD Labour Force Statistics 2019, OECD Publishing, Paris,

OKUN, A.M. (1962). Potential GNP, its measurement and significance, Cowles Foundation, Yale University.

REY, S., HAZEM, S. (2020). Labor Productivity and Economic Growth in a Hydrocarbon-Dependent Economy: The Algerian Case, 1984–2015. *European Journal of Development Research*, 32(3), 587–611. DOI: 10.1057/s41287-019-00229-z

ROMER, P. (1986). Increasing Returns and Long Run Growth. *Journal of Political Economy*, 94(2), 1002–1039. DOI: 10.1086/261420

ROMER, P. (1990). Endogenous Technological Change. *Journal of Political Economy*, 98(5), 71–102. DOI: 10.2307/2937632

ROMER, CH. D., ROMER, D.H. (2019). NBER Business cycle dating: Retrospect and prospect, National Bureau of Economic Research, Cambridge.

SEYFRIED, W. (2005). Examining the Relationship Between Employment and Economic Growth in the Ten Largest States. *Southwestern Economic Review*, 13–24.

SHUAEV, A. V., BOGDANOVA, S. V., BEREZHNAYA, E. V., BEREZHNEYA, O. V., SOLOVYOVA, N. V. (2018). Economic-statistical Analysis of Sustainable

Development of the Rural Labor Market. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, 9(2), 797–801.

SLUŠNÁ, Ľ., (2011). Analysis of the relationship between economic growth and unemployment, Working Paper No. 3, Economic Analysis & Policy Group, University of Economics in Bratislava, Bratislava.

SOLOW, R.M. (1956). A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics*, 70(1), 65–94.

SOYLU, Ö.B., ÇAKMAK, İ., OKUR, F. (2018). Economic growth and unemployment issue: Panel data analysis in Eastern European Countries. *Journal of International Studies*, 11(1), 93–107. DOI: 10.14254/2071-8330.2018/11-1/7

TATOGLU, F. Y. (2011). The long and short run effects between unemployment and economic growth in Europe. *Dogus University Journal*, 12(1), 99–113.

WILLIAMSON, O.E. (1975). Markets and Hierarchies, Analysis and Antitrust Implications: A Study in the Economics of Internal Organization, University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship, Champaign.

WORLD BANK (2018). Moving for Prosperity: Global Migration and Labor Markets (Policy Research Report), World Bank, Washington.