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Economic Indicators Paradigm on the Labour Market in Lithuania and Slovakia

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Labour markets in the EU have been profoundly changed. Recently, unemployment rates have declined due to the economic recovery. The economic growth that Europe has been enjoying is extremely labour-intensive. Statistical data show that unemployment has been falling for several consecutive years. Labour markets of the former Eastern European countries are attractive for investors for their skilled labour and low cost of labour. Nevertheless, there are processes and phenomena occurring which can have damaging consequences to the labour markets. The present study compares current trends in the Slovak and Lithuanian labour market. Since the existing analyses usually address economic situation in the V4 countries, Baltic countries or compare their performance with developed EU countries, the originality of the paper lies in comparing the selected economic indicators on the Slovak and Lithuanian labour markets. The purpose of the study is to analyse and compare selected macroeconomic indicators of individual countries, to find paradigms of development on the labour market and to predict development forecasts in individual macroeconomic indicators. The authors' research revealed that long-term sustainable growth in the labour market is secured in both countries, based on the analysis of the development of indicators affecting the labour market. A polynomial model and the moving average model are used for the analysis. The arrival of the new crisis could stop this growth, but the countries have learned from the last crisis. Therefore, they are gradually making decisions to alleviate the consequences.

Keywords: *Labour Market; Unemployment; Economic Indicators; Economic Development; Industry 4.0.*

Introduction

The first reference to Industry 4.0 appeared in 2011 (Slusarczyk, 2018). Cyber-physical systems, Internet of Things (IoT), cloud and cognitive computing are the main constituents of this concept (Hozdic, 2015; Slama, Puhlmann, Morrish & Bhatnagar, 2016). Industry 4.0 aims at connecting resources, services, and humans in real-time throughout the production on the basis of Cyber Physical Systems (CPS) and the Internet of Things (IoT) (Bauernhansl *et al.,* 2016). These technologies have a huge impact on almost every aspect of the smart enterprise, including the employment of people with disabilities and eye problems (blind and visually impaired, B&VI) in particular (Strober, 2018; Gilchrist, 2016; French, 2017). In industrialized countries of the world, the number of jobs in manufacturing has declined rapidly due not only to automation, but also to the relocation of production capacities to less developed countries, mainly to low-cost countries. The relocation of production capacities has mainly to do with the cost of labour. Of course, countries such as Germany, the USA or France are searching for countries to place their manufacturing plants according to other criteria, such as the host country development, educational background of population, political stability, various government benefits and support, price level and membership in international organizations. In the United States, nearly 8 million manufacturing jobs have been lost due to these practices of large corporation over the past 30 years, accounting for almost 40 % of the industry. Therefore, industrialized countries have decided to use Industry 4.0 in their manufacturing plants for which huge investments have been earmarked. According to the PwC 2016 survey by 2020, industrial enterprises want to invest at least 5 % of its annual digital revenue on digitisation, which corresponds to $US 907 billion (PwC, 2016). In this way, relocations of manufacturing enterprises to other countries and maintenance of production capacities in home countries can be avoided. This is a challenge that businesses and governments of the countries concerned must be prepared for. Klaus Schwab, president of the World Economic Forum at the address of the Fourth Industrial Revolution, said: "In its scale, scope and complexity, this transformation will be unlike anything humankind has experienced before" (Schwab, 2016).

In today's globalized world, there is an ongoing process of division of labour and changes in labour, creating an even wider scope for exchange processes and the competitiveness of subjects on the domestic market (Balcerzak, 2016; Peleckis, 2016; Sinicakova & Gavurova, 2017; Ribau, Moreira, Raposo, 2017; Ivanova & Cepel, 2018). Employment forms that did not exist before are arising across Europe. Some transform the

relationships between employees and employers; others change the organization and patterns of work, and some do both. The project by Eurostat identifies nine forms of employment that are new or have become critically significant since 2000. While they differ widely in their characteristics and employment relationship, they increase flexibility for both employees and employers. Developments in society, in particular the demand for greater flexibility by employees and employers, have brought new employment forms. These developments altered the conventional employer – employee relationship. New forms of employment feature unconventional work arrangements, workplaces or irregular work scheduling. There are many discussions held on emerging employment forms across the European Union. They seek to make the job market more flexible, they seek to ensure social protection, improve working conditions etc. Recent employment forms include employee sharing, job sharing, interim management, casual work, ICT-based mobile work, voucher-based work, portfolio work, crowd employment, and collaborative employment. They, however, have brought about a number of consequences. Employee sharing, interim management, and job-sharing are beneficial for employees as they combine flexibility and secure jobs. Telework provides employees flexibility, yet this type of working arrangement goes hand in hand with the risk of higher stress levels and workinglong hours hours. In addition, home-based teleworking may put work-life balance in danger. Other employment forms, such as crowd and collaborative employment may enhance employee jobs. Voucher-based jobs indicate less job security, fewer options to develop one's career, but provide legal work, more social benefits or more satisfactory salary. Casual work does not pay high income, does not provide employees job security or good social protection. High level of flexibility may be seen as an advantage by some while others would rather have some consistency and stability. Labour markets can also benefit from employee sharing, job sharing and interim management. The most disadvantageous is the casual work. All the emerging forms of employment can assist in consolidating the job market, but their capacity to create jobs is not high. These employment forms can help innovate the job market, and make it more appealing to both employees and employers. There may also be a risk of labour market segmentation due to voucher-based work and casual work for the aforementioned reasons.

Generally, people are not aware of new employment possibilities. In order to increase their use, appropriate steps are to be taken to extend knowledge of them among employers and employees. Some forms of employment, namely casual work, ICT-based work, and crowd employment need to be safeguarded against possible complications. On the one hand, employees need to be protected, and on the other, new employment forms need to be easy to use by employers. The balance could be supported by laws. New employment forms should be regulated unambiguously; they should be monitored in order to be complied with. It was suggested that the new forms of employment should cover not only the issue of labour and social protection, such as for instance regional development, sectoral development and business development. (www.eurofound.europa.eu)

Even though there is shortage of quality and skilled workforce on the labour market, employers have not used the characteristics of the generation Y to fill positions, yet. Thus, there is a need to attract millennial employees by responding to their needs. It is necessary to adjust the existing human resource practices to make them appealing for the millennials. Labour shortage in manufacturing sector indicates that manufacturing jobs are not interesting for young people due to unpleasant working environment and low wages. This is despite the fact that employers do not only require dexterity but also flexibility, adaptability and soft skills, which millennials can offer and expect from employers. Nevertheless, a vast number of employers have not adapted to millennials in the workforce and their expectations and requirements. Several authors (Kordos, 2015; Kordos & Krajnakova, 2018; Svec & Madlenak, 2017) argue that members of this generation are characterized by creativity, they are innovative, they prefer flexible working patterns and their big advantage is that they were actually born with the technology so there is nothing impossible for them. This is why there is a lack of jobs in this area. Recruiting a new generation can hamper the perception of such employment. In many companies, personnel management has been limited to the recruitment and employee stabilization while forgetting to pay attention to education in the light of further development and improvement of this generation in the area of their interest, which will in turn contribute to the improvement of the results of labour (www.kariera.cz). Education and vocational training need to be remodelled and upgraded by the efforts of governmental and non-governmental stakeholders (Sumer, 2018). New technological change, globalization of markets, also change in management practices are thought to complement graduate skills and thus drive up demand (Akerman, 2015; Van Reenen 2011; Blinder & Krueger 2013; Foster-McGregor, Stehrer, & De Vries, 2013; Green 2012). The state should create favorable conditions for the formation and influencing the structure of economy. The effects of various factors, driving sources and processes at the micro and macro level and achieving significant effects (Mura, Haviernikova & Machova, 2017).

Data and Methodology

In the study, the selected indicators of economic development in both countries have been examined. Being different in geography and economic structure, the common indicators encompass the EU membership, affiliation to the former Eastern bloc countries, social and democratic political system, negative population growth, common currency and similar education system. The purpose of the study is to analyse and compare selected macroeconomic indicators of individual countries, to find paradigms of development on the labour market and to predict development forecasts in individual macroeconomic indicators. To achieve the main objective the following mathematical-statistical methods were employed: comparison, time series analysis, correlation and regression.

The correlation analysis found interdependence between two variables (X, Y), and the value of the correlation coefficient r was obtained. X is the independent variable and Y is the dependent variable, in which we see how they affect the development of X on Y.

Popular correlation analysis is based on the idea, that the straight line may connect data points. In such a case, the correlation coefficients and the linear regression coefficients just reflect this idea. For the analysis of our data such methodology in some cases is acceptable, but in some is not. A polynomial regression and percent of the moving average was utilized to show the change in the dependent variable Y from the change of the independent variable X. A polynomial model is suitable for some of our data analysis, aimed to fit a k order polynomial to our data:

$$\bar{Y} = b_0 + b_1 x_i + b_2 x_i^2 + \cdots + b_k x_i^k + \varepsilon_i$$

$\bar{Y}$ is the vector of dependent variable and b_i^k are regression coefficients, indexes *i* varying from 1 to *m* for the independent variables x_i^k.

A polynomial model gives rather good fit to real GDP per capita data, R^2 is more than 0.945 (Figure 2). However, this model is not suitable for the analysis of percentage change of real GDP per capita, because the dynamics of the growth rates is far from the linear function. For such a case, much better suits the moving average model.

$$\Theta_t = \frac{A_t + A_{t-1} + \cdots A_{t-n+1}}{n}$$

Where Θ_t is the moving average point at time *t*, and *n* is a number of data points A_t used for the evaluation of Θ_t, when *n* is 3 and more.

All data was obtained from official statistic offices in Slovakia and Lithuania and Eurostat and OECD reports.

Empirical Results

Gross domestic product (GDP) is considered as an essential economic indicator because it best represents the performance of an economy based on the outcome of production factors located in the national territory (Ivanova & Masarova, 2018). Economic growth is a very important factor that affects unemployment. Theoretically, a positive correlation should exist between growth and employment or negative with unemployment (Aurangzeb & Asif, 2013). An increase in economic activity has a positive effect on the labour market variables - employment rises and the unemployment rate falls. In the period of economic downturn, reverse processes take place. (Pesliakaite, 2015). Data analysis showed that the first half of 2018 can be called the continuation of last year's global economic development. The situation on the labour market, falling unemployment, favourable financing conditions and, as a result, increased investment, increased the confidence of businesses and consumers and created favourable conditions for the development of the world economy. True, economic activity in the euro area is worse than expected, although real GDP growth was higher than forecasted. Nevertheless, trends in the development of the Lithuanian economy remain strongly positive. The country's GDP grew by 3.5 % in the 2018. It is forecasted that GDP this year and next year will increase by 3.2 %, respectively, and 2.7 percent to a lesser extent. The deceleration of the EU economic cycle, which will be accelerated by the end of the year to the end of the European Central Bank's (ECB) promotion program, is also a source of disturbing moods for international trade.

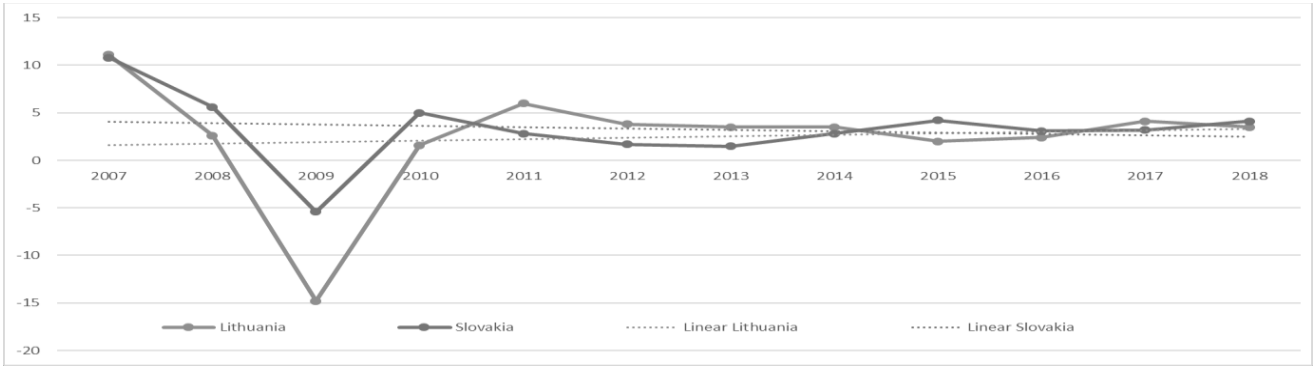


Figure 1. Real GDP Growth Rate – Volume, %

Along with Lithuania's GDP, the share of gross domestic product per capita grew. In 2017, the share of GDP per capita was EUR 12,700. It should be noted that, since 2016, the decrease of this indicator has stopped and in the period from 2016 to 2017 it has started to rise and increased accordingly by 3.45 and 5.83 percent. GDP per capita is predicted to rise this year and next year. GDP increased by € 600 per capita in 2018 in both countries.

Slovak real GDP growth in the reference period, except in 2009, was positive. Production in the automotive sector, after the decline in production during the crisis, has resumed and has continued in a positive trend since 2010. When comparing both countries, it can be said that real GDP growth rates are the values that are needed for sustainable growth. This positive trend is also visible in the unemployment area of the labour market. The linear trend of development assumes a slight increase in Lithuania and a slight decrease in the SR.

Next, the development of GDP growth rate in individual countries was analysed and a prognosis for the development of real GDP growth was made. The forecast seems to be useful as it predicts the development of national economy and it is possible to deduce certain trends in economic development when comparing individual countries, in this case Slovakia and Lithuania were compared. It can be inferred that the development will be more positive in Lithuania than in Slovakia in the following 4 years. It is assumed that the development will be different due to the orientation of both economies. By the end of the forecast period, the growth in the Slovak Republic will be approaching stagnation while the growth in Lithuania will be approximately at the level of growth in the Slovak Republic in 2007. In the following analyses, the causes of this phenomenon will be examined.

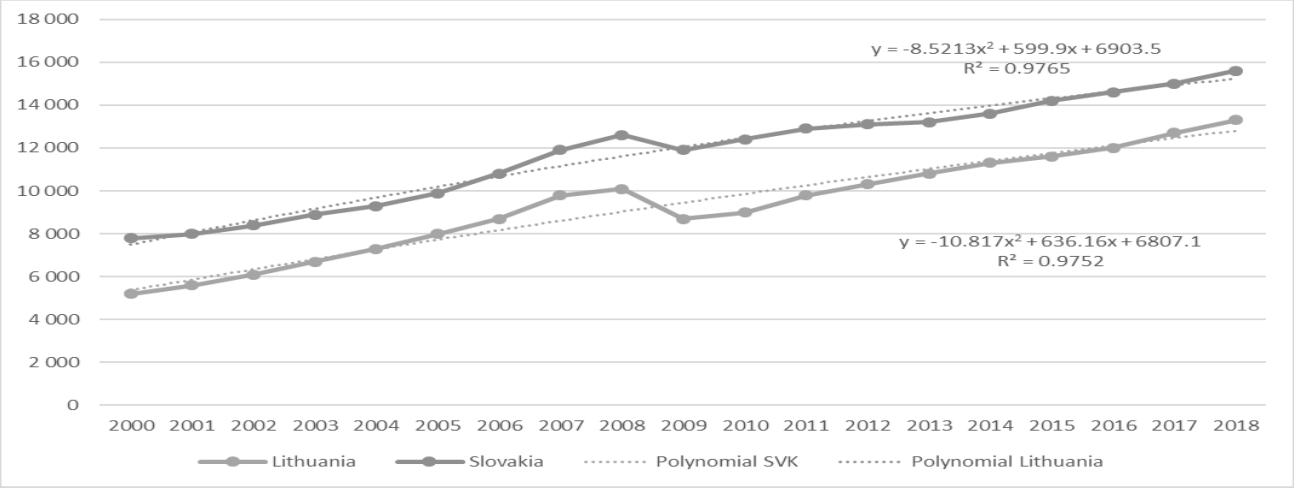


Figure 2. Real GDP per Capita, Eur

Developments in GDP growth per capita are positive in both countries. GDP was growing in all the monitored years, except for 2009. The economic crisis affected the positive development, while the growth rate of GDP in Lithuania was higher (13.86 %) than in the Slovak Republic (5.56 %). Detailed development of the percentage change in GDP per capita is shown in the Figure 3.

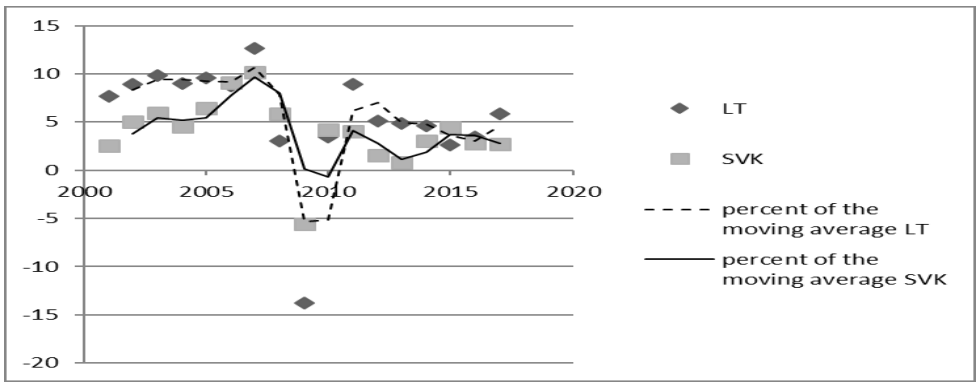


Figure 3. Percentage Change Real GDP per Capita, %

Despite the positive trend in GDP growth per capita in absolute terms, the percent change in growth is slowing. We have used percent of the moving average in Figure 3. It has stated that the situation is similar in both countries and the development will be influenced mainly by the external impacts of the development of global economies, especially those of the European Union. These trends cannot be predicted in the forecasts.

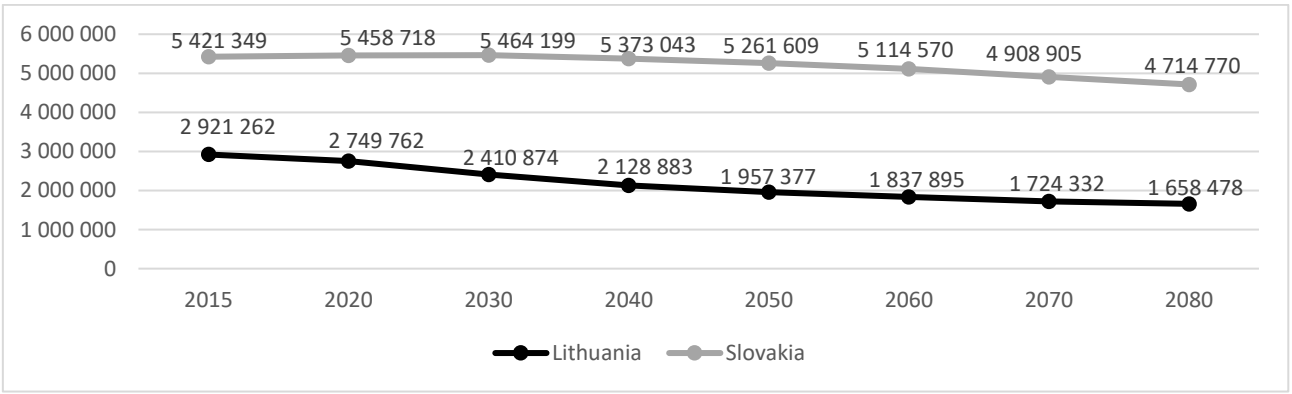


Figure 4. Population Projections in Slovakia and Lithuania by Eurostat

This negative change in the Lithuanian population is determined by two components: natural population change (the difference between the number of live births and the number of deaths) and net migration. A negative natural change (also referred to as a natural decrease) is determined when the birth of live babies is less than that recorded in

deaths. Net migration (including statistical adjustment) is the difference between the total population change and natural change. Net migration (including statistical adjustment) excluding immigration and emigration may still cover other changes in the population. Data for two consecutive years which cannot be attributed to factors of birth, death, immigration or emigration, such as internal migration between regions (in the context of regional population changes) in the case of the regional dimensions in question. An equally negative trend in the development of Slovak population can be observed. The decline in the population has been a long-term phenomenon in the Slovak Republic since the revolution in 1989. This can be attributed to increased divorce rates, children born to older mothers, and/or inadequate social support of families. No improvements in terms of the population development can be expected.

The unemployment rate in Lithuania is steadily decreasing, and as the number of job vacancies increases, businesses are pushed into raising wages. It is worth mentioning that the demand for employees is significantly higher than their supply. In the first quarter of this year, the average monthly salary before taxes rose by 10 % to EUR 888, which was the highest quarterly growth over the analysed 5-year period. Such wage growth was significantly overshadowed by the general increase in the price level in the country. Compared to the end of 2017, price growth slowed down significantly reaching 2.9 percent at the end of May. It was also influenced by reduced of basic foods prices. Inflation is volatile in Lithuania, but still far behind the growth rates of the EU, which is 1.9 %.

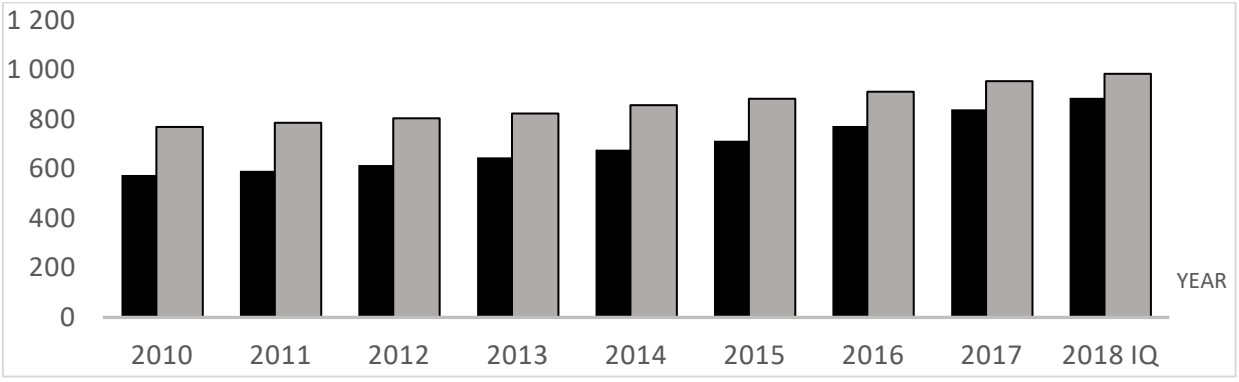


Figure 5. Average Earnings (Monthly) Gross, EUR

The development trend of average gross monthly incomes is the same in Lithuania and Slovakia. There was no decrease in average monthly income in the monitored period. The average monthly income is higher in absolute value in the Slovak Republic. Year-on-year increases in gross income are higher in Lithuania than in the Slovak Republic. From 2011 to 2017, the total increase was 45.95 % in Lithuania and 27.96 % in the Slovak Republic. After the addition of the linear trend line, positive growth in gross incomes in both countries can be expected.

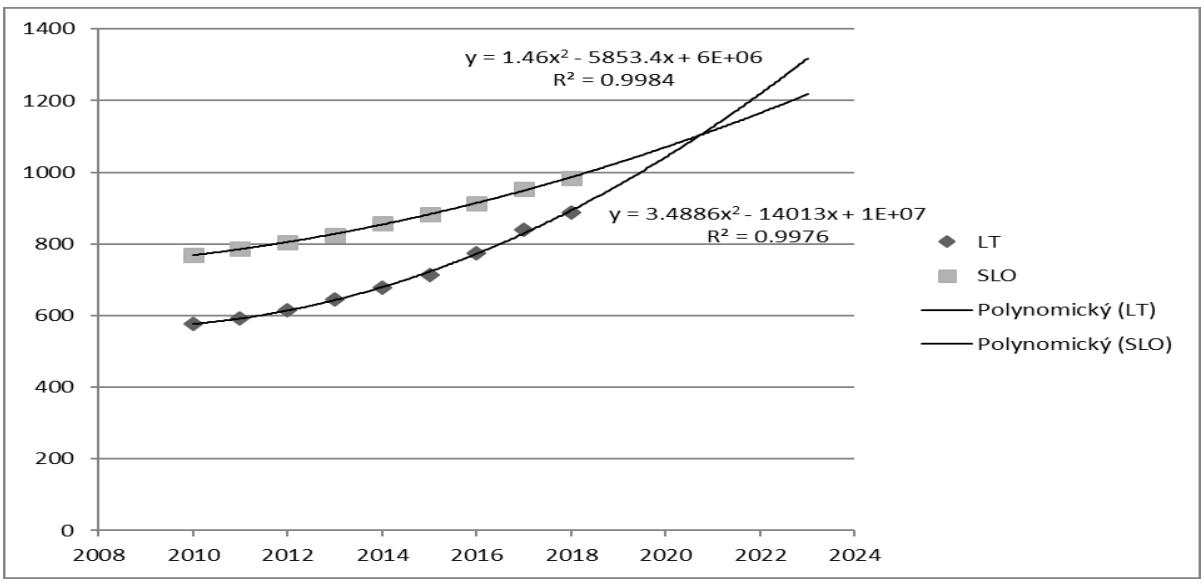


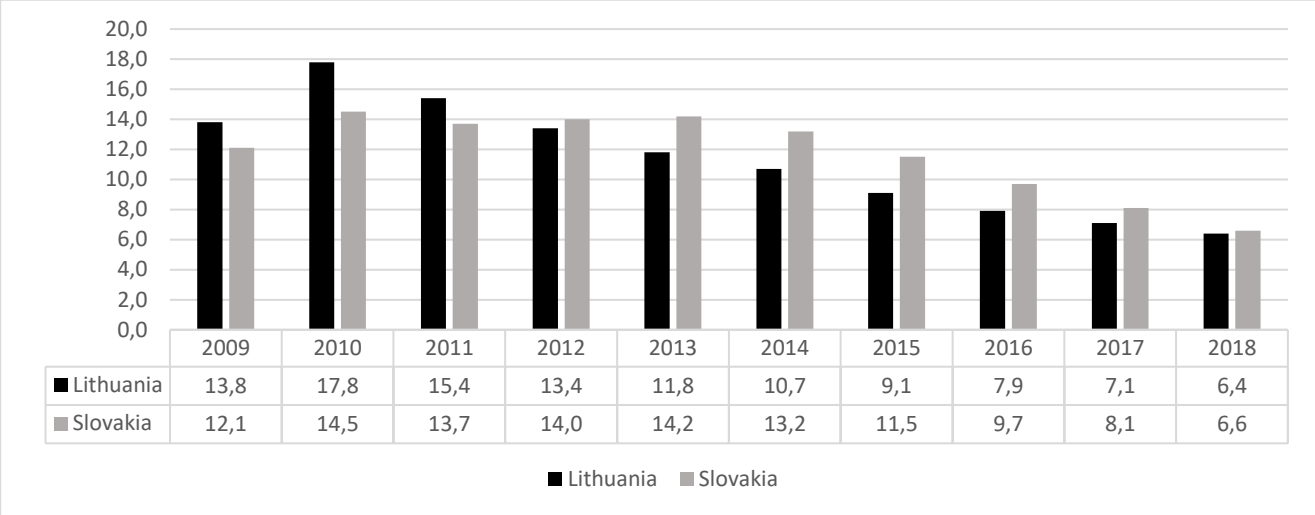
Figure 6. Percentage Change Average Earnings (Monthly) Gross, EUR

Based on the polynomial linear trend of prognosis created for the next 5 years, it is clear that average wages in both countries will grow faster than in the reporting period. The growth rate will be higher in Lithuania. Thus, this trend indicates that the average wage in Lithuania will be equal to the Slovak Republic. In addition, the average wage in

Lithuania is expected to be higher than in Slovakia at the end of the forecast period. Both countries are trying approximate to the wage levels of developed EU countries. Correlation between Slovakia and Lithuania is 0.99, so it means strong dependence.

The situation in the country's labour market is shifted by the significant increase in labour productivity and the increase in the level of economic activity. In the first three months of this year, tangible investments in manufacturing increased by 6.5 %. Over the past year, growth stood at 16%. Thus, the production capacity of companies and export potential were increased. The beginning of this year was also good for the construction industry. Investments in engineering structures grew by as much as 46 % in the first quarter of this year, while the average growth of the last three quarters amounted to 31 %. The construction of residential buildings is on the rise again after several quarters of a recession. The volume of construction of non-residential buildings increased by 20% in the first quarter of this year, and it was the fifth consecutive quarter when growth exceeded 10%. The construction segment is again among the most contributing to the development of the country's economy.

After the 2008 global crisis, the Lithuanian economy, which began to grow in 2010, has contributed to the improvement of key labour market indicators in 2018. Employment rates also increased in the second quarter, reaching 72.1 %. Unemployment was down to 6.1 percent in the second quarter. was This was caused by the growing demand for labour, rising wages and, most likely, recent changes to the Labour Code, which allowed employers to hire new employees more courageously.



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Lithuania	13,8	17,8	15,4	13,4	11,8	10,7	9,1	7,9	7,1	6,4
Slovakia	12,1	14,5	13,7	14,0	14,2	13,2	11,5	9,7	8,1	6,6

Figure 7. Unemployment rate in Lithuania and Slovakia, %

It should be noted that while unemployment rates have declined, in 2018, registered unemployment in Lithuania is higher than in 2017. This is likely to have had a significant impact in 2017. Amended rules for unemployment insurance payments, which significantly increased the maximum unemployment benefits, extended the duration of payment of benefits and reduced the required length of service. This means that the incentives to return to the labour market in Lithuania, which has by then been one of the lowest in the European Union, may be further reduced, while unemployment insurance payments will require more money. The first 2018 half of the unemployment insurance payments have increased by about 60 % compared to the same period in 2017 and are completely equal to the premiums collected. Thus, before the change of rules, much more money was collected than paid out.

Starting in 2010 in Lithuania the unemployment rate declined annually, but in 2018 the growth of registered unemployment was observed in the first half of the year. Comparing the 2017 and the first half of the 2018, in 2018 the number of the unemployed in the first half of the month was higher than in the same months in 2017. Considering that last year the population of Lithuania decreased by 39 thousand, this tendency is reasonably worrying.

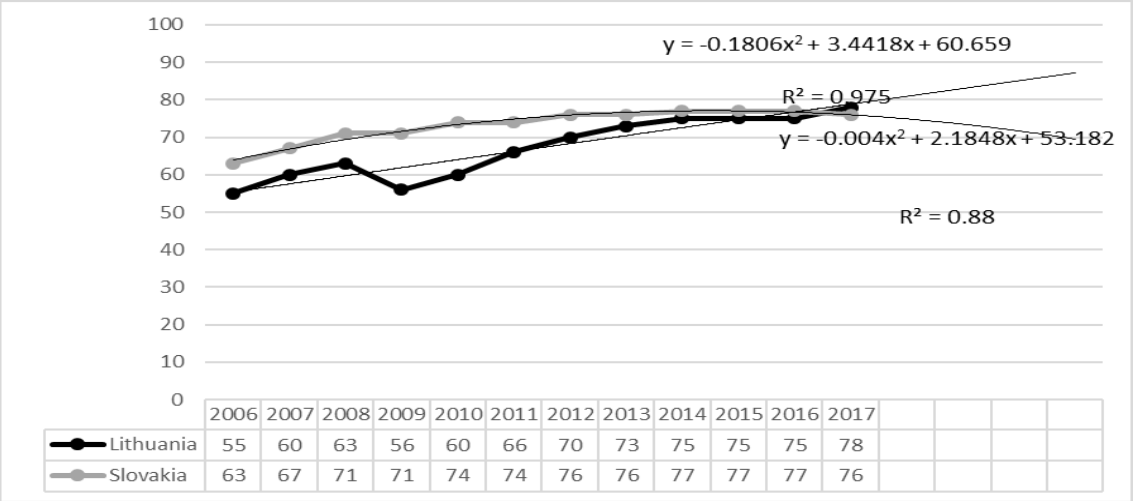
If the increase in the unemployment rate continues until the end of the year, it will be the first time in twenty years when during the economic crisis and with the growth of the GDP the unemployment rate will increase. Growth in the economy usually leads to job creation and, as a result, declining unemployment. On the contrary, unemployment is rising during the economic downturn. In Lithuania, it has been established that when the economy grew by 1%, the unemployment rate is on average 0.4 percent lower. Exceptions to this tendency in the last twenty years in Lithuania were found only in 2000–2001, when the country's economy survived the effects of the Russian economic crisis, and in 2008–2010, year of the global financial crisis (Pesliakaite, 2015).

At more than 8 %, the target for registered unemployment would be almost twice as high as the one before the 2008 recession when it dropped to 3.7 percent. The number of the long-term unemployed remains constant in Lithuania. According to the OECD data, the long-term unemoloyed account for 38 % of all the unemployed. The OECD countries average is about 31 %. At the same time, the number of vacancies in Lithuania has increased since 2009 reaching more than 20 thousand. It is almost by a quarter more than it was in 2016. The shortage of employees has been identified

in several business surveys. According to some of them, up to 37 % of country's entrepreneurs are facing labour shortage.

It should be noted that the general situation on the labour market keeps deteriorating: employment rates are rising, the number of vacancies is decreasing, and the shortage of open positions is clearly evident. This is due to demographic changes in Lithuania - the decline of the working-age population, population aging, and the processes of emigration.

In 2008, the world economy faced the economic crisis. Slovakia was it by the global crisis as well. It was a period of stagnation. Markets saw a decline in purchases of goods and services. The Slovak population spent less money than they did before to protect their savings. This situation, however, forced companies and organizations to make collective redundancies. From the outbreak of the economic crisis, unemployment rate went up in Slovakia. Slovakia along with other European countries was hit by the major economic crisis in 2009. Late 2009, the unemployment rate stood at approximately 14 %. The reasons were mainly the openness of the Slovak economy driven by automobile exports and Slovaks returning from abroad. The key challenge was to create new jobs as the supply dramatically exceeded the demand. The euro area economy recorded acceleration in growth in 2015. Export and import recorded accelerated growth compared to previous years. Stronger economy made unemployment rate go down. Moreover, the Youth Employment Project, under which more than 130,000 jobs were created, led to decreased unemployment rates. Figure 8 shows the development of unemployment rate in Slovakia over the past ten years. The unemployment rate was the highest during the economic crisis, and taking an upward trend. The highest unemployment rate was 14.5 % in 2010. In the following year, the decline was almost 1 %, but in 2012 and 2013 the unemployment rate was again above 14 %. It is, however, important that the unemployment rate has fallen in recent years, standing at 6.6 % in 2018.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Lithuania	55	60	63	56	60	66	70	73	75	75	75	78
Slovakia	63	67	71	71	74	74	76	76	77	77	77	76

Figure 8. GDP per capita in PPS (EU28 = 100 %)

Figure 8 confirms our findings with regard to the real GDP development. Figure 8 illustrates the trend of development and its forecast for GDP per capita in purchasing power parity. Even in this case, higher growth is expected in Lithuania until 2021. The trend of stagnation in the GDP growth rate in the Slovak Republic was confirmed by polynomial trend also in this figure. Correlation between Slovakia and Lithuania is 0.85, so it means strong dependence.

Conclusions

The situation in the labour market in 2018 will continue to be dynamic and challenging. The pressure on the labour market will not be decreased unless emigration is reduced, sufficient number of jobs created, new factories built and investment into discovering Lithuania and its cheap labour is made. Employers are facing the challenge of attracting new employees and retaining old ones every day. Companies are becoming more creative. They spend much more time to and financial resources on attracting new staff.

The situation varies enormously in the regions. Each region of Lithuania has several or more highly successful enterprises. They, however, suffer a great deal from the shortfall of qualified workers. In the regions of Lithuania, it is possible to find a job much faster than in the capital or other large cities for there is no competition. The companies based in the regions are able to offer a good salary, and taking into account lower living expenses there, it's becoming an attractive option to work in the regions.

The situation is the same in the Slovak Republic. Profound differences in unemployment can be seen between the west and the east of the country. Regional disparities are gradually being reduced by appropriate instruments in the labour market. The Slovak economy continues to show positive economic and social growth. Nowadays, the problem of labour shortage is emerging, and companies are starting to hire more and more foreign workers (mainly from Bulgaria, Serbia, and Romania). It can be concluded that the long-term sustainable growth in the labour market is secured in both countries, based on an analysis of the development of indicators affecting the labour market. Another crisis could stop the growth, but the countries have learned from the last crisis and they are taking steps to minimise the potential impact of such a crisis.

Based on the indicators obtained and analysed, it can be inferred that both countries will continue to develop positively in the next period. The only indicator with a negative trend in Slovakia (real GDP growth rate) was confirmed in the analyses performed.

The more rapid growth rate of indicators in Lithuania than in the Slovak Republic will require further research into the causes of this phenomenon. It is already clear that Lithuania has a greater share of services in GDP than Slovakia. Since 2008, the percentage of value-added services is 60 % of GDP on average in Lithuania. The Slovak Republic reaches the average of 55 % of GDP. According to the World Bank, this indicator can follow the same development trend in both countries. The Slovak Republic has a higher share in manufacturing, especially in the automotive industry. The average share of the manufacturing sector in the period under review was 20.5 % of GDP in Slovakia, while in Lithuania it was 16.5 % of GDP. The orientation on the automotive industry will pose a great risk to the labour market when the INDUSTRY 4.0 concept will be applied in its entirety. According to OECD, the most vulnerable jobs are those that require the medium level of qualification. This criterion and the concentration of existing jobs in the so-called marketable sectors, currently being the key drivers of the Slovak economic development, have made Slovakia one of the most vulnerable OECD (2019) countries. In terms of NUTS 2, the highest degree of threat is posed for the region of Western Slovakia (up to 70 % of jobs). The Government of the Slovak Republic adopted the strategic document on the development of smart industry in Slovakia already in 2016. The concept responds to the fourth industrial revolution, in which the industrial production is entering a breakthrough stage, after the era of steam, electricity and computers comes the period of digitization. In Lithuania, smaller negative impacts of Industry 4.0 on the economy can be expected due to the orientation of the economy. The impact of Industry 4.0 on the Lithuanian economy will be researched next. Automation will be a major challenge for governments in the coming years. On the one hand, automation can bring higher tax revenues, but on the other hand, it is necessary to safeguard jobs for people and to avoid pay cuts. The more rapid growth rate of indicators in Lithuania than in the Slovak Republic will require further research into the causes of this phenomenon.

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