

Structural and productivity shift of industries in Slovakia and Czech Republic: A comparative study

Martin Maris

Slovak Agricultural University,

Slovak Republic

martin.maris@uniag.sk

Abstract: The objective of this paper was to explore the labor productivity growth and employment changes, thereby describing structural changes in the economies of Slovakia and Czech Republic in the time span of 1996–2016. As the main research method we chose shift-share analysis. The decomposition of the method identified the factors behind structural changes. The results shown that during the study period, the main driver of labor productivity in both economies was the upgrade of productivity itself within the industries (the so-called “within effect”). Slovakia was able to outpace Czech Republic in case of industrial production, agriculture and professional services. Employment had been evolving in both economies differently, particularly, Slovakia recorded the drop in employment in the sector of industrial production, whereas Czech Republic did not. Both economies have recorded labor switch from the primary sector to the services sector or to manufacturing. Overall taken, despite of very similar natural and geographic conditions, same political integration trends, and also similar economic background, perhaps due to the influence of sovereign policies and institutions, these two economies have been evolving differently.

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1. INTRODUCTION

In this paper, we examine the labor productivity growth and corresponding employment shift within the industries of the national economies of Slovakia and Czech Republic. As a time period, we have chosen the time range of 1996–2016; 1996 as the base year and 2016 as a comparable year due to availability of data at the national level. Labor productivity and corresponding employment shares changes over the twenty year span have been observed in cross-sectional data available for both economies. National industries of both economies were broken down according to the NACE code system, thus, European standard classification of productive economic activities. For this purpose we have used high level SNA/ISIC aggregation A*10/11 standard.

This topic is particularly important for the EU member states due to the presence of the European single market which fosters competitiveness, however, it might contribute to rising regional gap between „more“ and „less“ productive member states. Moreover, if particular EU states are integrated into European Monetary Union, the macroeconomic imbalances might have more profound impact on the structural stability of the whole monetary block.

Recent analysis has pointed on substantial productivity growth rates in the 1990s and 2000s for the new EU member countries, particularly in the case of Czech Republic and Hungary. For instance, in the case of Czech Republic the average annual labor productivity growth rate was observed through several consecutive time periods (1993–1995: 6,2% ; 1995–2000: 4,91%; 2000–2005: 5,31% and 2005–2010: 3,03%). As we can see from these numbers, impressively strong pace of growth soon became rather moderate. The analysis also indicates that the contribution of sectoral employment shifts to productivity increase is rather limited. The results identified are a likely reason for productivity gains and the shift of workers to more productive sectors (Mitkova & Dawid, 2016).

Economic developments in the new EU member states during the transition period were also characterized by large shifts in the sectoral composition of GDP and employment, indicating a clear tendency of adjustment towards the broad economic structures in the EU-15. These broad shifts may thus be summarized under the headings of de-agrarization, de-industrialization and tertiarization (Havlík, 2005).

The objective of the paper is twofold. First, it is to evaluate and compare the magnitude of structural changes in labor productivity and employment rearrangement across the industries of the national economies of Slovakia and Czech Republic. The second one is to identify the main factors, which were driving these changes in both economies during the investigated time horizon.

This paper is structured as follows. The introductory part is followed by the sections explaining the conceptual background, data and methodological strategy. Sections 3 and 4 demonstrate the empirical results and the last part covers conclusions.

2. LITERATURE REVIEW

We have enormously higher incomes than did our great grandparents. People in industrialized nations are far wealthier than people living in less developed countries. In fact, Americans and many Europeans had higher incomes a century ago than people in poor countries do today. We know that economic growth results from the accumulation of factors of production, particularly the capital, and from increased productivity. In the paper, predominantly we concern by the labor productivity.

Labor productivity certainly grows as a result of technological progress, but it also grows because of the accumulation of capital per worker. Productivity tends to grow over long periods, as workers become better trained and educated and are equipped with more capital. It also changes systematically during the business cycle. Productivity tends to fall before the start of a recession and to recover during the recession and at the beginning of the recovery (Dornbusch, Fischer & Startz, 2011).

We simply define the productivity as the ratio of „output to inputs“ used in the production process, i.e. output per unit of input. In macroeconomics, a common partial productivity measure is (average) labor productivity. In general, labor productivity is equal to the ratio between a measure of output volume (gross domestic product, or gross value added) and a measure of input use (the total number of hours worked or total employment). Labor productivity growth has a great implication in the economic growth theories or efficiency – wage theories.

Blanchard and Johnson (2013) use the term „labor productivity growth“ and „technological progress“ interchangeably, as explained, in steady state – where each economy approaches, the labor

productivity growth equals the rate of technological progress. (Mankiw, 2009) relates the labor productivity as the key determinant of real wages. Explains, that the neoclassical theory of distribution tells us that the real wage, $\frac{W}{P}$ equals the marginal product of labor. If we take for instance Cobb-Douglas production function, then the marginal productivity by a factor is proportional to average productivity $\frac{Y}{L}$. Theory and history, both confirm the close link between labor productivity and real wages. This lesson is the key to understanding why workers today are better off than workers in previous generations. According the (National Bureau of Economic Research [NBER], 1986), the basic efficiency wage hypothesis states that workers productivities depend positively on their wages. These approaches are based on the potential benefits to the firm of higher wages: increased effort level and reduced shirking by employees; lower turnover costs; a higher quality (productive) of the labor force; and improved morale, more easily facilitated teamwork, and greater feelings of loyalty by workers to the firm.

(NBER, 2011) relate productivity to economic development and structural change. They identified three factors that help determine whether (and the extent to which) structural change goes in the right direction and contribute to overall productivity growth. First, economies with revealed comparative advantage on exporting of primary products are at a disadvantage, due to the smaller the scope of productivity – enhancing structural change. Second, countries that maintain competitive or undervalued currencies tend to experience more growth-enhancing structural change. Finally, countries with flexible labor markets experience greater growth-enhancing structural change.

Structural change, narrowly defined as the reallocation of labor across sectors, featured prominently in the early literature on economic development by (Kuznets, 1973). One of the best documented patterns of structural change is the shift of labor and capital from production of primary goods to manufacturing and later to services. This featured prominently in explanations of divergent growth patterns across Europe, Japan and the U.S. in the post –WW-II period, (Jorgenson & Timmer, 2011).

The number of authors point structural changes on changes in sectoral composition of output and employment in the national economy. For instance (Fourastié, 1954; Fisher, 1939; and Clark, 1940) refer that during the process of economic development, employment first shifts from agriculture to manufacturing and then to services. This is a core aspect of the three-sector hypothesis (as cited in Mihnenoka & Senfelde, 2017). Also, Micallef (2016) has provided the evidence about the labor productivity and its change in the cross-sectional data on the micro level, for example of the Malta. The results suggest that the changing structure of the Maltese economy, with the expansion of very labor-intensive services, played an important role in the economy's labor productivity decline in recent years, holding other factors constant. Conversely, outsourcing and corporate organization changes have provided benefits to the productivity.

Marjanovic (2015) further specifies, that interrelated process of structural changes which follow or are followed by economic development, we call structural transformation. The essence of structural transformation is the accumulation of physical and human capital, but also the changes in composition of demand, production, employment and trade.

The number of authors studied patterns of structural change and productivity growth in countries over the world. For instance, (de Vries, Erumban, Timmer, Voskoboynikov & Wu, 2012) studied structural transformation and its implications for productivity growth in BRIC countries from 1980s onwards. The results of decomposition analysis suggests that for China, India and Russia reallocation of labor across sector is contributing to aggregate productivity growth, whereas Brazil is not. Similarly, (Timmer, Vries & Vries, 2007) studied structural transformation and its productivity implications in Sub-Saharan African (eleven), Asian (eleven) and Latin America (nine) countries from 1950 onwards. Based on the findings, the process of structural change stalled in many African and Latin American countries during

the mid-1970s and 1980s. When growth rebounded in the 1990s, workers mainly relocated to market services industries, such as retail trade and distribution. Conclusively, though such services have higher productivity than much of agriculture, they are not technologically dynamic and have been falling behind the world frontier.

The Czech Republic and Slovakia were part of the communist bloc of the countries in Europe and constituted the Czechoslovak Federation. In 1993, when the Czechoslovak Federation was split into the two independent states, the Czech Republic had better economic structure than Slovak Republic. Rojíček (2007) explains, that during the study period of 1995 – 2005, the structure in terms of the output (Gross value added – GVA, current prices) of the Czech economy had been changing gently, primary sector decreased by 2,1% and construction by 3,2% ; the secondary sector held position around 31% of GVA and the third sector rose by 3,1%. This trend was similarly followed of the trend of employment in above mentioned sectors. For instance, during the study period, employment share in primary sector dropped by 2,6%; secondary sector just 1%; followed by the construction by 0,9% and the third sector recorded increase by 4,8% . When comparing GVA and labor productivity, Czech Republic counted for 2,5% increase of labor productivity annually and GVA only 2% increase in average.

Rojíček (2007) also compared the structural changes in terms of employment in Slovakia and Czech Republic. The coefficient of the structural intensity in the case of the Slovakia was influenced by the change of several industries on total GVA, mainly agriculture and the trade. In case of the Czech Republic the coefficient was influenced by the changes in construction, agriculture and some services especially for the manufacturing industry

In case of the Slovakian economy (Výrostová, 2010), states that Slovakia has been experiencing gradual structural change and their consequences since its socialism regime fall in 1989. Over 1989 in Slovakia (in that time Czechoslovakia) had become deep social and political changes, followed by the economic changes, consisted in removing of free market barriers, the transformation of the market economy, transformation of production structure of the economy, change in political and economical orientation from former Soviet Union countries on Western European countries, the evolution of the private sector and others. Moreover, (Kotulic, Huttmanova, Vozarova and Nagy 2014a) add, that through the period from 2000-2012, we can observe the enormous decline of employed persons in the primary sector in the long term (Agriculture, forestry and fishing) by 44%, similar downturn, but much moderated also recorded the sector of industry, which declined by 4%, however the chosen branch of the service sector and sector of the construction marked a substantial growth in employment, like sales, transportation and accomodation rose by 29%, professional activities by 56% and construction by 41%. Furthermore, the authors analyses the employment and output through the employment elasticity, as a change in employment given the change in output. They conclude, that during the observed period 1995 – 2012, employment elasticity indicator became $\epsilon = 0.02$, which means an increase in employment and output, together with increasing in labor productivity (Kotulic, Huttmanova, Vozarova & Nagy, 2014b).

In terms of the labor productivity , Slovakia since the 2007 shown higher relative labor productivity rate as Portugal and since the 2010 the highest productivity from the group of Central Eastern Europe countries (Slovak Academy of Sciences [SAV], 2014, p.21). When comparing Slovak and Czech economy in terms of relative labor productivity, based on the data of the authors (SAV, 2014, p.61), between 2004 – 2013, Slovakia had been rising by 3,4% and Czech Republic just only by 1,7%. In case of GVA in constant prices, Slovakia had been rising by 4,2% and Czech Republic only 2,4%.

Overall, the pace of labor productivity growth differs worldwide, but also continentally. For instance in a new millennium, we might observe that the labor productivity growth have slow down and during the time period of 2008 – 2014, labor productivity in EU-15 had been rising only by 0,2% annually,

whereas during 2001 – 2008, it was 1,5% p.a. The similar trends, we might also observe in case of the Japan (0,3% vs. 4,0%) and evenly US (1,9% vs. 4,0%).

Focusing solo on new member states, there are also relatively substantial differences between so called „old“ and „new“ member states. Among these states very high labor productivity rate during the time period of 2004 – 2014 was recorded by Romania (4,2%) a Latvia (4,0%). At the same period, Czech Republic had been growing modestly by 1,8% and Slovakia firmly by 3,3% (Spěváček and Žďárek et al., 2016).

Observing these recent trends in evolution of labor productivity growth arise questions not only about potential „catch-up“ effect of new member EU states on old EU member states, but also raise concerns about future economic growth of developed countries over the world. Stalemating labor productivity growth could have profounding implications for world economies, considering also other factors like government and public debt load, balance of payments deficits and other macroeconomic imbalances. Such a continuum, also might raise questions about technology and innovations stall or stall of their infusion to the economy and crisis of ability to materialize the human capital.

3. METHODOLOGY

As a main research method, standard shift-share analysis have been applied. The methodological approach comes from (Fagerberg, 2000), however the same approach with slight modifications is used by (Yilmaz, 2016 and de Vries et al., 2013) and others. The labor productivity was computed as a simple ratio of output (Gross value added – GVA) q in industry i in absolute value divided by the number of employees n in corresponding industry i in absolute value. The employment share of industry i was computed as share of labor n in industry i of total employment of the economy in absolute value. The same approach was used in both economies and in both years – 1996 as a base year and 2016 as a comparable year.

As was mentioned in the theoretical part of the paper, structural change means reallocation of labor across sectors. To measure the importance of reallocation of labor among sectors for growth, a conventional shift-share analysis was usually used. Yilmaz (2016) listed several variants of the shift-share analysis coming from (McMillan & Rodrik 2011; de Vries et al. 2013; Timmer & de Vries 2009 and Fagerberg, 2000). The basic shift share equation decomposes the change in aggregate productivity into a “within” and “between” (structural change) effect. In the paper, we concern by the methodological approach coming from (Fagerberg, 2000). Following him, labor productivity P can be computed as:

$$P = \frac{Q}{N} = \frac{\sum_i Q_i}{\sum_i N_i} = \sum_i \left[\frac{Q_i}{N_i} * \frac{N_i}{\sum_i N_i} \right] \quad (1.0)$$

Where i correspond to sectors $i = 1, 2 \dots m$, P is labor productivity, Q is the value added, and N is the labour input. Let $P = \frac{Q_i}{N_i}$ be the labor productivity in industry i , and $S_i = \frac{N_i}{\sum_i N_i}$ the share of sector i in total employment. Substituting P_i and S_i into (1.0) we have:

$$P = \sum_i P_i * S_i \quad (1.1)$$

Assuming that:

$$\Delta P = P_1 - P_0 \text{ and } \Delta S = S_1 - S_0$$

And using (1.1) we get

$$\Delta P = \sum_i [P_{i0} \Delta S_i + \Delta P_i \Delta S_i + S_{i0} \Delta P_i] \quad (1.2)$$

or expressed in terms of a growth rate:

$$\frac{\Delta P}{P_0} = \sum_i \frac{[P_{i0} \Delta S_i + \Delta P_i \Delta S_i + S_{i0} \Delta P_i]}{P_0} \quad (1.3)$$

From equation (1.3), we can observe that:

$\frac{P_{i0}\Delta S_i}{P_0}$ (I) presents the contribution of productivity growth resulting from the relocation of labor between sectors (i.e., the *static shift effect*). It will be positive if the share of high productivity sectors in total employment increases at the expenses of sectors with low productivity. Thus, it reflects the ability of a country to move resources from low to high productivity areas.

$\frac{\Delta P_i \Delta S_i}{P_0}$ (II) presents the interaction between the change in labor productivity within the individual sectors and the relocation of labor between sectors (i.e., the *dynamic shift effect*). This effect will be positive if the fast growing sectors in terms of productivity also increase their share of total employment. Hence, it reflects the ability of a country to reallocate its resources towards industries with rapid productivity growth.

$\frac{S_{i0}\Delta P_i}{P_0}$ (III) presents the contribution to productivity growth which results from the change in labor productivity within the individual sectors (i.e., *within growth effect*).

The standard *structural bonus hypothesis* of industrial growth postulates a positive relationship between structural change and economic growth as economies upgrading from low- to higher productivity sectors. The structural bonus hypothesis thus correspond to an expected positive contribution of the static shift effect to aggregate growth in labor productivity, formally written as:

$$\sum_i \left[\frac{P_{i0}\Delta S_i}{P_0} \right] > 0 \quad (1.5)$$

The *structural burden hypothesis* comes from Baumol's hypothesis of a structural burden of labor reallocation which predicts that employment shares shift away from progressive sectors towards those with lower growth of labor productivity, (Havlik, 2005):

$$\sum_i \left[\frac{\Delta P_i \Delta S_i}{P_0} \right] < 0 \quad (1.6)$$

4. EMPIRICAL RESULTS AND DISCUSSION

As (Penender, 2002) further clarifies, the first term of Equation (1.3) is called the *static shift effect*. It is positive/negative if industries with high level of productivity attract more/less labor resources and hence increase/decrease their share of total employment.

Secondly, *dynamic shift effect* is captured by the sum of interactions of changes in labor shares times changes in labor productivity of sectors. If sectors increase both labor productivity and their share of total employment, the combined impact is a positive contribution to overall productivity growth. In other words, the interaction term becomes larger, the more labor resources shift toward sectors with fast productivity growth. The interaction effect is however negative, if sectors with fast growing labor productivity cannot maintain their shares in total employment. The negative effect is larger, the more industries with high productivity growth are faced with declining employment shares.

Thirdly, the *within effect* corresponds to growth in aggregate labor productivity under the assumption that no structural shift has ever taken place and each sector has maintained the same amount of shares in total employment as during the base year.

Table 1 and Table 2 presents results from the decomposition of labor productivity growth using equation (1.3) for Slovakia and Czech Republic, respectively. So, for instance, in case of the first sector A (Agriculture, forestry and fishing) we have proceeded as follows:

$$\text{Static shift effect (1.3.I): } \frac{[(6\,108,58 \cdot 0,0867) \cdot (0,0311 - 0,0867)]}{529,71} = \frac{-29,43}{529,71} = -0,056$$

$$\text{Dynamic shift effect (1.3.II): } \frac{[(1187,93 - 529,71) \cdot (0,0311 - 0,0867)]}{529,71} = \frac{-36,61}{529,71} = -0,069$$

$$\text{Within growth effect (1.3.III): } \frac{[0,0867 \cdot (1187,93 - 529,71)]}{529,71} = \frac{57,08}{529,71} = 0,108$$

$$\text{Total growth: } -0,056 - 0,069 + 0,108 = -0,017$$

The same approach holds in case of the other sectors of the economy and also in case of the sectors of the Czech Republic economy.

Table 1

Decomposition of productivity growth, the case of Slovakia (1996 – 2016)

| Code NACE | Sector | Static shift effect | Dynami c shift effect | Within growth effect | Total growth |
|------------|---|---------------------|-----------------------|----------------------|--------------|
| A | Agriculture, forestry and fishing | -0.056 | -0.069 | 0.108 | -0.017 |
| B | Mining and quarrying | -0.007 | 0.001 | -0.001 | -0.007 |
| C | Industrial production | -0.045 | -0.131 | 0.77 | 0.594 |
| D | Electricity, gas, steam and air conditioning supply | -0.005 | 0.001 | -0.002 | -0.006 |
| E | Water supply; cleaning and waste- water treatment , waste management and remediation activities | -0.004 | 0.002 | -0.008 | -0.01 |
| F | Construction | 0.003 | 0.001 | 0.025 | 0.03 |
| G | Wholesale and retail trade ; repair of motor vehicles and motorcycles | 0.043 | 0.038 | 0.107 | 0.187 |
| H | Transport and Storage | -0.006 | 0 | -0.003 | -0.009 |
| I | Accommodation and food services | 0.011 | 0.003 | 0.007 | 0.021 |
| L | Information and communication | 0.008 | 0.003 | 0.008 | 0.02 |
| K | Financial and insurance activities | 0.005 | 0 | 0 | 0.005 |
| L | Real estate activities | 0.002 | 0 | 0.001 | 0.003 |
| M | Professional, scientific and technical activities | 0.019 | 0.036 | 0.069 | 0.124 |
| N | Administration and support services | 0.028 | 0.057 | 0.039 | 0.124 |
| O | Public administration and defense ; compulsory social security | 0.003 | 0.004 | 0.098 | 0.105 |
| P | Education | -0.01 | -0.005 | 0.037 | 0.022 |
| Q | Health care and social assistance | -0.002 | 0 | -0.01 | -0.012 |
| R | Arts, entertainment and recreation | 0.007 | -0.001 | -0.002 | 0.004 |
| S | Other activities | 0.005 | 0.001 | 0.002 | 0.008 |
| All | | 0 | -0.059 | 1.244 | 1.185 |

Source: Own computation, www.slovak.statistics.sk, 2018

In the case of the Slovakia, as Table 1 presents the total growth results from the sum of three respective effects. The dominant factors which influenced the results are productivity and employment changes in each industry respectively, however with different weights. In case of Slovakia, the majority of industries have recorded the positive total growth effect due to the growth of the employment or productivity, or both factors (service industries), whereas in some other industries the drop in employment was offset by the growth in productivity (industrial production) and some industries became losers (agriculture, water supply and others).

In more details, the overwhelming part of total productivity growth is accounted for by productivity growth within an individual industry (within growth effect - III). Highest productivity growth has recorded the sector of the Industrial production (C), with considerable lag, Wholesale and retail trade industry (G), followed by the industry of Professionals (M) and Administration (N).

Transfer of resources from low to high productivity activities (static shift effect – I) does not appear to have been an important factor. In general, we might observe the shift of the work force from primary

(agriculture and forestry) and secondary industries (manufacturing) towards to the third (services) or evenly quaternary industries (knowledge based and science), what is in line with so called „three sector hypothesis“.

A dynamic shift effect (II) had somewhat impact most notably for instance, in the sector of the Industrial production (C) in a negative sense, however in others shown mostly only scant effect.

Generally speaking, the labor productivity in all industries of the national economy of Slovakia over the twenty year span had been driven by the improvement of the productivity within the individual industries of itself. Thus, improving factor might be the inflow of technologies, physical and human capital built-up resulting from the influx of foreign direct investments and state interventions. Also should be noted, that Slovakian economy recorded shift of the workforce mainly from primary sector of the economy to the higher ones.

In terms of the evaluating structural bonus and structural burden hypothesis, the result for first one became for Slovakia “flat”, that means that through the examined period, workforce vertically migrated between sectors, especially from primary and secondary to the third and quarternal and the result became zero in aggregate form. In terms of the structural burden hypothesis the figure is negative, what can be also reasoned by the labor switch towards the service sector. However, the validity and application of theory has not been deeper examined.

Table 2

Decomposition of productivity growth, the case of Czech Republic (1996 – 2016)

| 4 | Sector | Static shift effect | Dynamic shift effect | Within growth effect | Total growth |
|-----|--|---------------------|----------------------|----------------------|--------------|
| A | Agriculture, forestry and fishing | -0.03 | -0.003 | 0.006 | -0.026 |
| B | Mining and quarrying | -0.01 | 0.006 | -0.011 | -0.015 |
| C | Industrial production | 0.006 | 0.01 | 0.473 | 0.488 |
| D | Electricity , gas, steam and air conditioning supply | -0.006 | 0.002 | -0.006 | -0.01 |
| E | Water supply; cleaning and waste- water treatment, waste management and remediation activities | 0 | 0 | -0.003 | -0.003 |
| F | Construction | -0.022 | 0.006 | -0.028 | -0.044 |
| G | Wholesale and retail trade; repair of motor vehicles and motorcycles | -0.007 | -0.015 | 0.278 | 0.255 |
| H | Transport and Storage | -0.007 | 0.001 | -0.009 | -0.015 |
| I | Accommodation and food services | 0.005 | -0.002 | -0.015 | -0.012 |
| L | Information and communication | 0.01 | 0.016 | 0.031 | 0.057 |
| K | Financial and insurance activities | 0.004 | 0.004 | 0.022 | 0.03 |
| L | Real estate activities | 0.002 | 0.001 | 0.002 | 0.005 |
| M | Professional, scientific and technical activities | 0.021 | 0.011 | 0.015 | 0.047 |
| N | Administration and support services | 0.006 | 0.003 | 0.009 | 0.017 |
| O | Public administration and defence; compulsory social security | 0.004 | 0 | 0.003 | 0.007 |
| P | Education | 0.003 | 0 | 0.009 | 0.013 |
| Q | Health care and social assistance | 0.017 | -0.002 | -0.007 | 0.007 |
| R | Arts, entertainment and recreation | 0.005 | 0.001 | 0.001 | 0.007 |
| S | Other activities | 0 | 0 | -0.004 | -0.004 |
| All | | 0 | 0.038 | 0.766 | 0.804 |

Source: Own computation, www.czso.cz, 2018

Czech Republic, presented in Table 2 had shown similar picture. The factors which had been driving the total growth of the industries have acted differently in relation to each industry. The majority of

service sector industries and also Industrial production sector (C) have recorded positive growth from employment and also from productivity, whereas other ones (construction, electricity and water supply, others) became negative due to either effect or both ones.

The more detail, the total productivity growth of the industries of the Czech economy was largely driven by the within growth effect, most notably in the sector of Industrial production (C) and Wholesale and retail trade sector (G). The static shift effect has shown similar results as in the Slovakian case, thus the shift of the workforce from primary sectors (agriculture, forestry and mining) and construction to higher ones (manufacturing, services and knowledge based). A dynamic shift effect (II) in general, had only marginal effect across all sectors of the Czech economy.

In general, the drag of the labor productivity across the sectors of the Czech economy had been similarly driven as in case of the Slovakia by the productivity within the individual sectors of itself. Similarly, technology inflows and physical and human capital built-up might play the crucial role.

In terms of the evaluating structural bonus and structural burden hypothesis, the result for first one became for Czech the same as in Slovakia, what means zero in aggregate form, due to workforce switch between the sectors of the economy. In terms of the structural burden hypothesis the figure is positive.

However, since the break-up of the Czech-Slovakia federation in 1992, both countries have passed “itself evolution” and we might observe subtle differences also in the terms of productivity growth in the sectoral industries of both economies. For instance, from the point of the view of the within growth effect (rising productivity in individual industries by itself), the Slovakia in some important industries had shown more robust productivity growth. Most notably the sector of the Industrial production (C) in Slovakia had outpaced the Czech one by 38,5%. Also the Agriculture (A) (94,3%) and Professional services (M) (78,2%) shown significant differences.

Conversely the Wholesale and retail trade industry (G) in the Czech Republic had outpaced Slovak ones by 61,5%. However, if we explore the dynamic and static shift effect (rising productivity and employment together or only rise of the employment in individual industries), Czech Republic was able to raise employment in the most industries, whereas Slovakia had recorded a drop in employment, for instance in the Industrial production (C) or Agriculture (A) more significantly.

However, both economies have recorded differences in terms of change in employment shares in some important industries. For instance Slovakia over the searched period recorded employment share drop in Industrial production (C), however Czech Republic lost employment in the Construction (F) and Wholesale industry (G). There were also differences in terms of changes in productivity and employment shares of industries in both economies (dynamic shift effect). In aggregate form, the effect in Slovakia became negative, which suggest the validity of the structural burden hypothesis, but for Czech Republic the effect became positive.

5. CONCLUSION

The objective of the paper was to evaluate structural changes within the national industries of Slovakia and Czech economy over a twenty year span of 1996 – 2016, based on productivity and employment growth.

As a major research method we opted to shift-share analysis of its ability to measure the importance of reallocation of labor among sectors and to understand structural change patterns along with their repercussions on growth in many countries, Yilmaz (2016). The results have shown similar results counted for both economies. It was found, that in both economies the major driver of the growth has been labor productivity growth within the industries (within effect). Also there were found some differences in terms of productivity rates among certain industries of both economies, respectively. In both economies, was

found shift of the workforce between the sectors of the economy (from primary and secondary to the third and quaternary sector, pattern was observed).

Overall taken, despite of the both nations share common history, geographical and natural conditions, inclusion of the same geopolitical and economic structures, and similar economic background, perhaps due to act of sovereign policies and governmental institutions they can take different paths of its evolution.

One of the main limitations of the shift-share methodology stems from its static nature. In most applications, the technique is applied over a period of several years, although only examining the changes between the initial and the end period. This means that the continuous changes are not taken into account, (Barff & Iii, 1988). Moreover, since the model is primarily descriptive in nature, it does not identify the causes of change, hence, it is often combined with an exploratory regression for instance to give a reason for the resulting changes (Andrikopoulos, Brox and Carvalho; 1990).

In conclusion, it might to be said, that also new EU member states, including Slovakia and Czech republic, will perhaps undergo through the period of protracted labor productivity growth, like their western counterparts. Taking into account also currently incoming so called „Industry 4.0“ reflecting of both country's reliance on strong manufacturing sector, particularly the dependence on the automotive sector, losing productivity may erode of country's competitiveness and economic growth. It is inevitable for the government to take over the role of policymaker in the field of the education, R&D, institutional environment and infrastructure development for preparing the resources of the countries for another wave of globalization and pervasive digitalization.

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