

Automotive industry as an Engine of Economic Growth in Slovakia

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Abstract: Slovakia is currently one of the major centers of the world's automotive industry, producing the highest number of passenger cars per capita in the world. Automotive production represents about 40 % of total industrial production in Slovakia. The importance of automotive industry lies not only in direct effects on overall production, employment, or added value, but also in other effects generated indirectly in other sectors of the Slovak economy. The aim of submitted paper is to highlight the importance of automotive industry for national economy and quantify overall effects of this industry in relation to the nominal gross domestic product, employment and export.

Keywords: nominal GDP, unemployment rate, export

JEL Classification: E23, E24

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1. Introduction

The automotive industry is an important industrial sector of the Slovak economy. The share of cars in total industrial production reached 44 % in 2016, it also represents 33 % of total export. For several years, Slovakia has been leading the world ranking in the number of cars produced per 1 000 inhabitants. At present, the automotive industry has the largest share of gross domestic product (about 12 %). It is also one of the largest employers. In this industry was directly employed 127 000 employees in 2016, another 250 000 employees were subcontractors (SITDA).

The development of automotive industry in Slovakia is linked to the arrival of German car company Volkswagen AG in Bratislava. The second wave of investment took place between 2003 and 2006 with arrival of PSA Peugeot Citroën and KIA Motors, which built its plant in Trnava (PSA) a Žilina (KIA). The automotive industry has become the engine of growth of Slovak economy.

2. Data and Methodology

The input data for our analysis was obtained mainly from the annual reports of Volkswagen Slovakia, a. s., KIA Motors Slovakia, s. r. o. and PCA Peugeot Citroën Slovakia, s. r. o. Another source of information was data of the Slovak Investment and Trade Development Agency and the Statistical office of the Slovak republic.

At the beginning we analyzed the state of automotive industry in Slovakia and its evolution over the period 2006 - 2016. Consequently, we monitored the development of the most important macroeconomic indicators for the same period that directly or indirectly affects this industry. Using correlation analysis, we identified relationship between selected macroeconomic indicators and production volume, number of employees and export level of automotive industry.

3. Automotive Industry in Slovakia

In the year 2016 the Slovak automotive industry has crossed one million of vehicles produced in 2016. Overall in all three factories, more than 1,040 mil. cars were produced. Since 2006, when all three car companies have been on the market, the number of vehicles produced is steadily increasing. A decrease was recorded in only three years. The first one is year 2009, when the global financial crisis hit not only Slovakia but also the countries where exporters are exporting. Another year is 2014, when the EU imposed sanctions on Russia for Crimea annexation. This export reduction was particularly jeopardized Volkswagen and KIA, for which Russia is main importer. The fall in production volume in 2016 has caused by Volkswagen emission scandal. As a result, production volume in the company decreased in 2016.

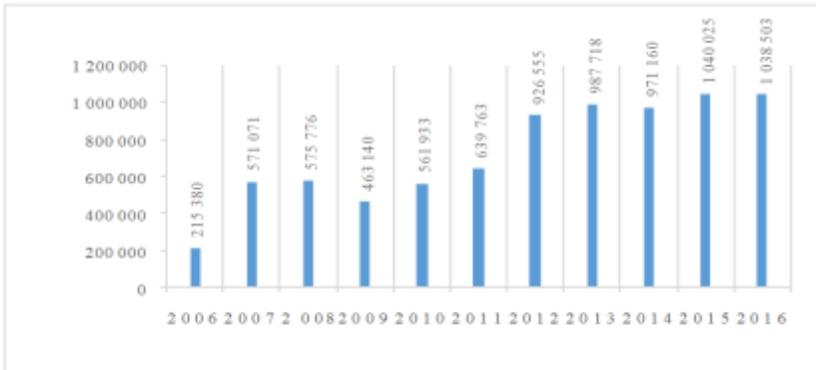


Figure 1 Number of cars manufactured by automotive companies in Slovakia
Source: Slovak Investment Trade Development Agency

Calculated per 1 000 inhabitants, we are the country that currently produces the largest number of cars per 1 000 inhabitants in the world. If Jaguar Land Rover starts production, the number of cars produced per 1 000 inhabitants will be even higher from year 2018.

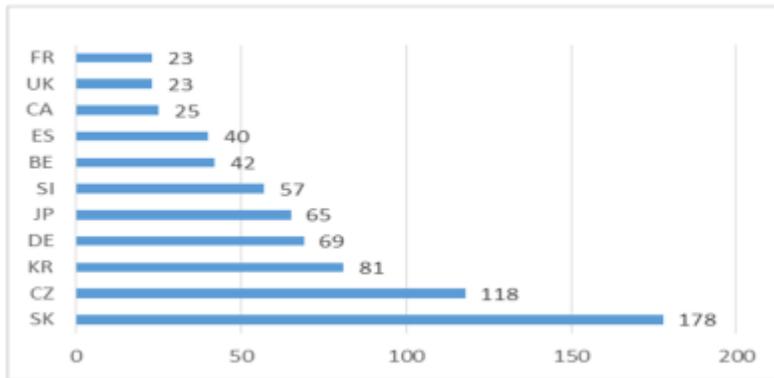


Figure 2 Global comparison of car production by country per 1 000 inhabitants
Source: Slovak Investment Trade Development Agency

4. Development of the Slovak economy in 2006 - 2016

Slovak economy from the establishment of republic independent has undergone many changes. The fundamental change was the entry of Slovakia into the EU in 2004 and euro as national currency since 2009. However, 2009 was also a year when not only the Slovak economy was hit by global crisis, which also reflected its development.

Gross domestic product is the most commonly used indicator of economic performance and social progress. In period 2006 - 2008, the Slovak economy grew in real terms by more than 60 %. This significant increase meant an average annual growth per capita of almost 6 %, which was one of the highest in the European Union. As a result,

Slovakia has moved closer to the developed EU countries. The financial crisis has considerably slowed down the convergence process in 2009. In the next years there is a continuous increase in GDP (Figure 3).

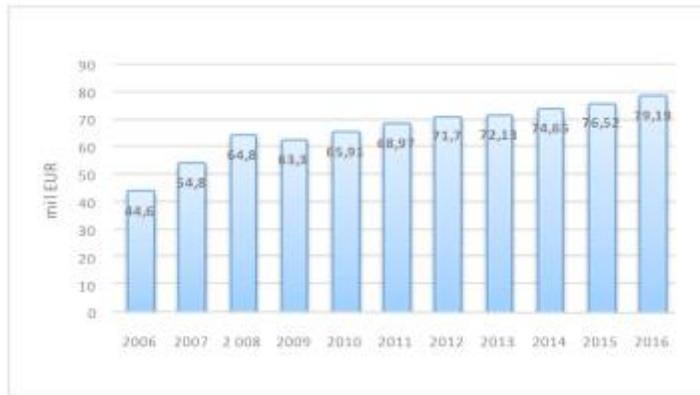


Figure 3 Nominal GDP in Slovakia
Source: Statistical Office of the Slovak Republic

In 2016, more than 120 000 people worked in car manufacturers. An additional 250 000 jobs were created indirectly by suppliers across the national economy. Of course, it also affected the total employment in Slovakia. The share of automotive industry in employment is about 9 %. The relative unemployment rate in Slovakia was decreasing until 2008. The financial crisis had an impact on increased unemployment rate in 2009. From 2010 to the present, the unemployment has been decreasing. Currently, the unemployment rate is at the same level as in 2008, i.e., a year before the crisis.

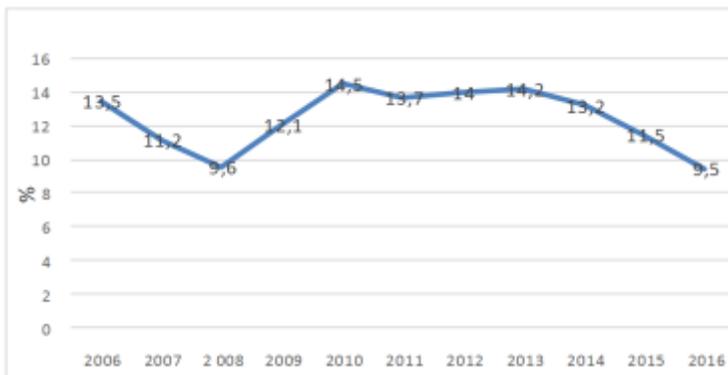


Figure 4 Unemployment rate in Slovakia
Source: Statistical Office of the Slovak Republic

The financial crisis also affected export from Slovakia in 2009, which fell over the previous three years. In 2010, there has been an increase and this trend persists. Total volume of export in 2016 compared to 2015 increased by 3,5 %. From the goods point of view, export of passenger cars and other motor vehicles increased significantly by 1503,3 mil. EUR (Slovak Investment Trade Development Agency).

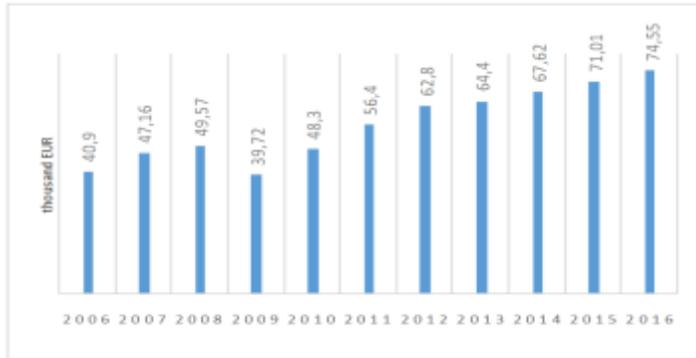


Figure 5 Export from Slovakia
Source: Statistical Office of the Slovak Republic

5. Results and discussion

The automotive industry accounts for 43 % of the Slovak industry's GDP. The automotive sector has a significant share of export, accounting for 26 % of total export. One of the major benefits that the country has in this sector are jobs. This sector generates more than 200 000 jobs directly in the automotive industry and indirectly and in other industries (Trend).

For these reasons, we can assume that the Slovak economy is connected and dependent on the automotive industry. Vehicle production volume has been steadily rising since 2006 and GDP is also increasing. Since more than 90 % of vehicles manufactured are exported, steady production growth also means an increase in export. Based on this, we can assume that there is a significant relationship and consequent between car manufacturers and economy in Slovakia.

To determine the relationship between car manufacturers and the Slovak economy, we used correlation coefficient for these possible relationships:

- We assume that there is a relationship between number of employees in car manufacturers and unemployment rate in Slovakia.
- We assume that there is a relationship between number of cars produced and Slovak export.
- We assume that there is a relationship between carmaker's revenues and Slovak nominal GDP.

Since 2006, when PCA and KIA entered the automotive market in Slovakia, the number of employees working in automotive industry annually increased. The decline occurred only when the crisis also hit automotive industry in 2009. There has been an overall decline in production, thus reducing the number of employees.

Since 2006, the unemployment rate was falling until financial crisis in 2009. The last four years there has been a decrease in unemployment rate in Slovakia.

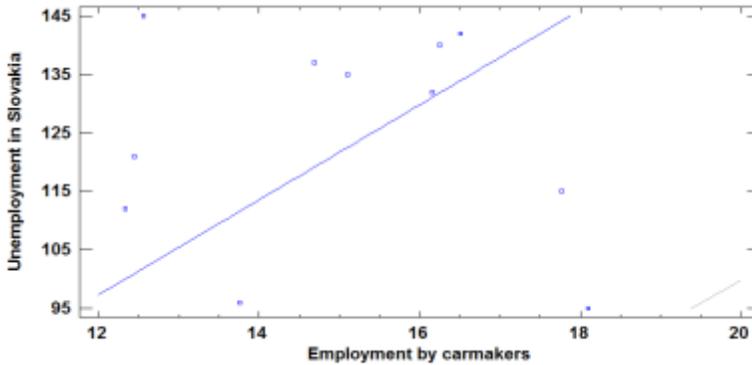


Figure 6 Correlation between employment by car manufactures and unemployment rate in Slovakia
Source: Own processing on based on data from Annual Reports of KIA, PCA, Wolkswagen and Statistical office of the Slovak Republic

Based on Kendall correlation coefficient ($r_K = -0,0182$; $p = 0,9379$) there is not a statistically significant linear correlation between selected indicators. Therefore we reject our first assumption.

Car manufacturers are major exporters in the country. More than 90 % of cars are exported. This export represents around 25 % of total Slovak export. For this reason, it is assumed that there will be a strong relationship between the number of cars produced and national export.

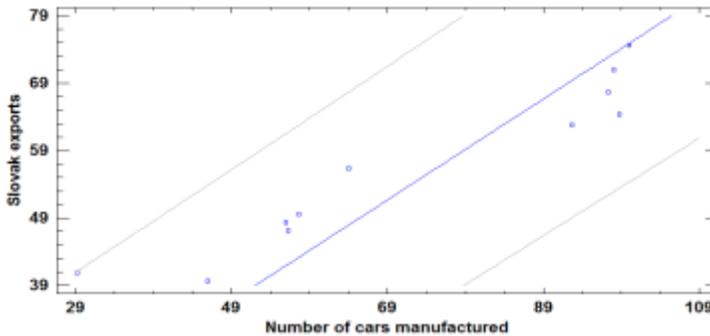
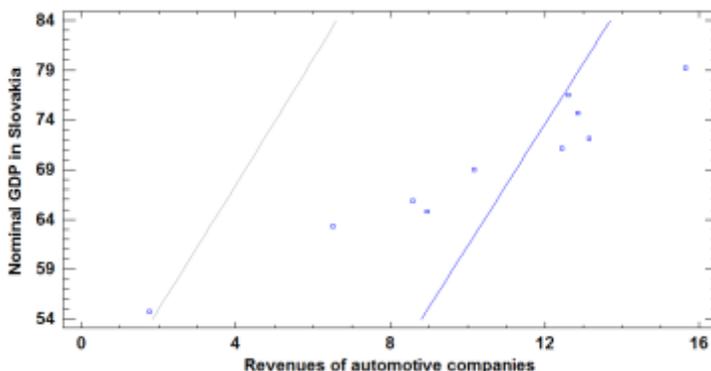


Figure 7 Correlation between number of cars manufactured by automotive companies and Slovak export
Source: Own processing on based on data from Annual Reports of KIA, PCA, Wolkswagen and Statistical office of the Slovak Republic

Based on Kendall correlation coefficient ($r_K = 0,8545$; $p \leq 0,01$) there is a statistically significant linear correlation between selected indicators. Therefore we confirm our second assumption.

Car manufacturers are ranked among the leading companies in terms of sales revenue. On the basis of revenues, Volkswagen is the number one, KIA second and PCA number fourth in the list of non-financial companies (Trend).



Tab 8 Correlation between revenues of automotive companies and nominal GDP generated by Slovak economy
Source: own processing on based on data from FinStat and Statistical office of the Slovak Republic

Based on Kendall correlation coefficient ($r_K = 0,8222$; $p \leq 0,01$) there is a statistically significant linear correlation between selected indicators. Therefore we confirm our third assumption.

6. Conclusions

Based on the analysis, it can be assumed that the automotive industry will continue to grow thanks also to the arrival of another automaker in 2018. However, we need, above all, educated workforce, science and research development as well as local development of subcontractors. Too much orientation of Slovak industry to this sector will pose great potential risks in the future. For this reason, other sectors need to be developed to break down potential risks.

Based on Kendall correlation coefficient we can:

- reject a relationship between the number of employees in car manufacturers and the unemployment rate in Slovakia.
- confirm a relationship between the number of cars produced and Slovak export.
- confirm a relationship between the carmaker's revenues and the Slovak nominal GDP.

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