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TRADE PERFORMANCE IN THE AUTOMOTIVE INDUSTRY OF THE EUROPEAN OECD MEMBER COUNTRIES

JEL classification: F10, F14, L62

Abstract

The paper addresses the question of international trade performance of automotive sector of 21 European OECD Member countries within the period from 2000 to 2009. The methodology of this research is based on the implementation of different trade performance indicators like intra-trade balance, industry trade, composition of manufacturing exports import penetration indicator and other important indicators. During year 2014 and 2015, international competitiveness of automotive European OECD industry showed positive signs. An increasing demand for vehicles boosted the supply that leads to better trade performance. The basic aim is to measure international trade performance in the automotive industry of OECD Member countries. The main results of paper indicate international competitiveness detected by measuring, evaluation of the automotive industry particularly on foreign markets, recommendations and proposals in order to reach a higher level of international trade.

Key words: automotive sector, EU countries, OECD member countries

1. INTRODUCTION

Global financial crisis in 2009 significantly affected the biggest automotive manufacturing countries with an unprecedented scale of market crash, rendering the automotive industry the hardest hit along with the powerful banking sector. The fall in vehicle sales in recent years and the possibility of delocalization of multinational companies made it necessary to find new development strategies that could guarantee the survival manufacturers. Furthermore, there was optimistic premise that the automotive industry crash is a temporary problem that can be prevailed through bailing out domestic companies and blocking foreign car brands. Instead, the automotive industry crisis has revealed several long-term and deeply rooted structural problems in industrialized countries.

From the supply perspective, automotive manufacturers have suffered from overproduction since the early 2000s, followed by decreasing relative productivity and lower returns from innovation. From the demand perspective, the declining sales reflect structural market situations such as a high level of car ownership and demography in developed economies compared to that in the emerging economies. The 2008 credit crunch brought these problems to the surface by breaking the model of pumping up sales through easy consumer credit with zero-down payments and zero-interest financing (Oh, 2014).

The recovery in the EU car market was recored in January 2015, as a result of an improvement in consumer confidence, retail incentives and new product launches boosted demand for majority of car brands. In addition, new passenger car registrations in the European Union and European Free Trade Association trading block rose 6.2 percent during the month to 1.03 million vehicles from 968,451 in the same month last year (ACEA, 2015).

Considering the EU automotive industry, it has to be stressed out that vehicle manufacturing is a strategic industry in the EU, where 16.2 million cars, vans, trucks and buses are manufactured. Automobile manufacturers operate some 290 vehicle assembly and production plants in 25 countries across Europe. The turnover generated by the automotive sector represents 6.9% of EU GDP. Furthermore, the automobile industry has ripple effects throughout the economy, supporting a vast supply chain and generating an array of business services. 12.9 million people - or 5.3% of the EU workforce - are employed in the EU automotive sector. The 3 million high-skilled jobs in automotive manufacturing represent 10% of the EU's manufacturing employment (ACEA, 2015).

Within the framework of the defined research problem, the scientific hypothesis of the paper is set up, namely, that it is possible to project state of international trade performance of the automotive sector within 21 OECD and EU Member countries by implementation of various international trade and competitiveness indicators.

In this relation, the basic objective of the research is to measure international competitiveness, objectively estimate international trade of the

automotive industry of 21 OECD and EU Member countries, and to propose measures and activities for their improvement of international trade competitiveness in accordance with the results.

The paper consists of five systematically interrelated parts. After the Introduction, the second part of the paper presents research methodology. The third part includes analytical framework and results of international trade competitiveness based on the analysis of foreign trade activity and international competitiveness of the automotive sector of EU and OECD Member states. The final part comprises proposals, recommendations and conclusions.

2. METHODOLOGY

Analytical approach is based on scientific results of several indicators that measure the level of international trade competitiveness of the automotive industry of the 21 EU and OECD countries. The above-mentioned indicators have been frequently used in contemporary economic research, which evaluate economy's structural strengths and weaknesses *via* the composition of international trade flows (Bezić and Galović, 2013). In another words, these indicators address the question of trade specialization and performance in international markets. The aim of implemented methodology also shows the importance of the foreign market for automotive sector in a country and what degree of domestic demand is satisfied by imports. Moreover, the most commonly used indicators, indices, and ratios that are to assess trade patterns and characteristics, and changes in them. Besides elementary and well-known indicators, this research uses basic indicators that are suggested by OECD Statistical Database (2014) and World Bank (2014). These indicators were used in previous studies (Bezić and Galović, 2013; Kandžija et.al, 2014, Bezić and Galović, 2014) of other European manufacturing sectors which have provided realistic, objective results of international trade performance.

Definitions of competitiveness provided by the Organisation for Economic Cooperation and Development (OECD) and the Department of Trade and Industry (DTI) indicate the importance of technological factors in achieving competitiveness. The Department of Trade and Industry (DTI, 1994) defines a company's competitiveness as an ability to produce certain goods and services, at the right time and price. The definition of the Organisation for Economic Cooperation and Development (OECD, 1992), from the micro aspect, includes competitiveness that refers to the company's ability to compete, maximize the profit and to achieve growth based on costs and prices by using technology, quality improvement and efficiency maximization of its products.

There are many scientists who research the relation between competitiveness and technological abilities. Scientists like Lall (2001) and Wignaraja (2003) and institutions like the Organisation for Economic Cooperation and Development (OECD) have confronted attitudes of other scientists

who are trying to define competitiveness only from the aspect of price factors by emphasising non-price factors, like technology. The discussion has led towards revision of traditional theories in the framework of the problematic of competitiveness.

There are two different aspects that define the term competitiveness more closely. The general macroeconomic aspect shows international competitiveness in frameworks of price factors. The microeconomic aspect, on the other side, is trying to define competitiveness at company level with non-price factors with an emphasis on the research of rivalry between companies.

The macroeconomic aspect is accompanied by internal and external economic balance where a special focus is put on the effects of non-price factors on competition. The microeconomic aspect considers the internal company dynamics which has an impact on the company's strength.

The microeconomic aspect refers to competitiveness at company level. The perspective as such includes rivalry between companies and its strategies. In the last few years the microeconomic aspect has implied influence of technology and innovation as new dimensions. Lall (2001) criticizes the neoclassical theory whose assumptions are based on the thesis that technology is accessible to all companies that have the ability to use technology at a technically "high" level. However, it is a long-term learning process which starts with export of technology and proceeds to innovations.

Some analyses of factors influencing the success or failure of efforts to promote industrialization and growth conclude that a growing level of intraindustry trade (plays an important positive role (World Bank, 2013). Intraindustry exchange produces extra gains from international trade over and above those associated with comparative advantage because it allows a country to take advantage of larger markets.

Intra-industry trade (IITR) represents the value of total trade remaining after subtraction of the absolute value of net exports or imports of automotive sector. For comparison between countries and industries, the measures are expressed as a percentage of each industry's combined exports and imports. According to OECD Statistical Database (2013), intra-industry trade of automotive sector is calculated as follows:

$$IITR_i = \left(1 - \frac{|expo_i - impo_i|}{expo_i + impo_i} \right) \times 100 \quad (1)$$

where in:

$expo_i$ - export activity of sector "i"

$impo_i$ - import activity of sector "i"

This index varies between 0 and 100. If a country exports and imports roughly equal quantities of a certain product, the index value is high. Whereas if trade is mainly one-way (whether exporting or importing), the index value is low.

The "contribution to the trade balance" or „CMTB“ makes it possible to identify an economy's structural strengths and weaknesses *via* the composition of international trade flows (OECD Statistical Database, 2013). It takes into account not only exports, but also imports, and tries to eliminate business cycle variations by comparing an industry's trade balance with the overall trade balance. It can be interpreted as an indicator of "revealed comparative advantage" (Balassa, 1965:93; Balassa, 1978:203) as it indicates whether an industry performs relatively better or worse than the manufacturing total, no matter whether the manufacturing total itself is in deficit or surplus. If there were no comparative advantage or disadvantage for any industry *i*, a country's total trade balance (surplus or deficit) should be distributed across industries according to their share in total trade. The "contribution to the manufacturing trade balance" is the difference between the actual and this theoretical balance:

$$\text{CMTB}_i = \left[\frac{(expo_i - impo_i) - (expo_{manuf} - impo_{manuf}) \frac{expo_i + impo_i}{expo_{manuf} + impo_{manuf}}}{expo_{manuf} + impo_{manuf}} \right] \times 100 \quad (2)$$

where in:

$expo_i$ - export activity of sector "i"

$impo_i$ - import activity of sector "i"

$expo_{manuf}$ - export activity of total manufacturing sectors

$impo_{manuf}$ - import activity of total manufacturing sectors

A positive value for an industry indicates a structural surplus and a negative one a structural deficit. The indicator is additive and individual industries can be grouped together by summing their respective values: by construction, the sum over all industries is zero.

Next indicator called "Export import ratio" shows exports as a percentage of imports. EXIM ratio can be calculated as follows:

$$\text{EXIM}_i = \frac{expo_i}{impo_i} \times 100 \quad (3)$$

where in:

$expo_i$ - export activity of sector "i"

$impo_i$ - import activity of sector "i"

Another simple indicator is used within this paper. Hence, this indicator (TBAL) is calculated in real numbers of national currencies and highlights the trade pattern of each industry. It can be seen in the following formula:

$$TBAL_i = expo_i - impo_i \quad (4)$$

Trade balance is one of the macroeconomic indicators which are used to gauge the competitiveness of a sector at national level. When exports exceed imports, the balance is in surplus, and when imports exceed exports, the balance is in deficit.

Furthermore, composition of manufacturing exports of goods indicator (XSHM) shows the exports in a given manufacturing industry (in this case EU and OECD automotive sector) as a percentage of total manufacturing exports. XSHM indicator is calculated as follows:

$$XSHM_i = \frac{expo_i}{expo_{manuf}} \times 100 \quad (5)$$

where in:

$expo_i$ - export activity of sector "i"

$expo_{manuf}$ - export activity of total manufacturing sectors

Finally, import penetration (MPEN) indicator can be calculated as a ratio of imports to the sector's production adjusted for the foreign trade balance (difference between exports and imports) according to the following formula:

$$MPEN_i = \frac{impo_i}{prod_i - expo_i + impo_i} \times 100 \quad (6)$$

For a given country, a value close to 100 in a certain industry, implies that domestic demand is mainly fulfilled by imports and domestic production tends to be exported (OECD Statistical Database, 2013). A value close to 0 means self-sufficient, i.e. domestic demand is mainly satisfied by domestic production. A value above 100 illustrates measurement problems which may occur when combining production and trade data. It is important to bear in mind that exports can exceed production.

3. RESULTS

In the analysis of the outlined problem, the starting point is identification of international trade performance of the automotive sector of 21 EU member countries and OECD countries in the period between 2004 and 2009. In order to analyze automotive sector, it is important to study ongoing trade within examined countries. Several indicators, which are based on export and import, can be used to measure the performance and competitiveness of a certain sector for each country. In a given year, the values of an indicator can differ between countries, which allow an international comparison. The value of an indicator may also

differ between different years, within a different country. When evaluating at Germany for example, one can examine the evolution of these values over recent history.

Before the initial phase of structural analysis of the implemented indicators, short overview of global vehicle production of passenger cars and commercial vehicle production is provided within Figure 1.

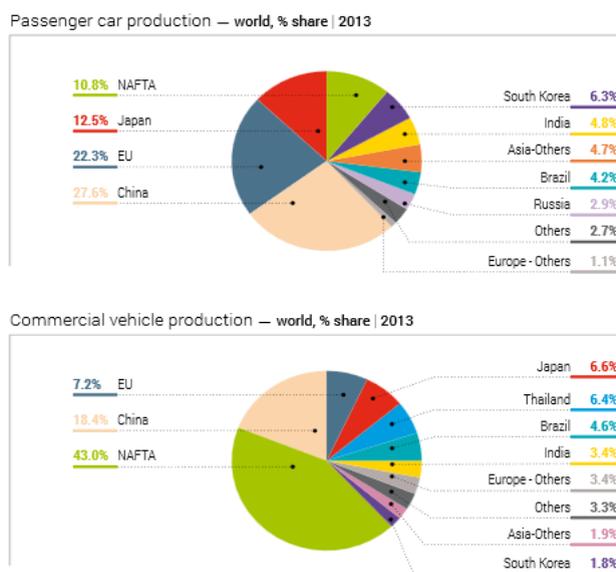


Figure 1 Global vehicle production in 2013

Source: ACEA, 2014

It is obvious that EU has one of the most favorable positions in terms of global car production in 2013. China as a world biggest exporter whose values shows bigger share in global passenger car production. It has to be noted that EU car industry has higher level of international competitiveness than Japan, South Korea and NAFTA. The contrast between the economic woes in NAFTA and EU and the relatively thriving performance in emerging economies reflect two major trends in the automotive sector that have developed over the past decade. Firstly, the past decade witnessed a rapid growth in terms of the global supply chain and overall outsourcing of manufacturing industries. Secondly, selling autos through easy consumer credit has become a widely used business strategy for the past decade. By nature, auto sales are extremely responsive to economic cycles of boom and bust since purchasing a vehicle reflects discretionary spending (Oh, 2014). Regarding commercial vehicle production, EU indicates weaker performance but indicates bigger share than Japan, Brazil and India.

In this particular study, six indicators will be calculated for the 21 EU and OECD member countries: IITR, CMTB, EXIM, TBAL, XSHM and MPEN. The data is extracted from OECD Database. Due to the unavailability of the data, some of the used indicators include shorter observed period.

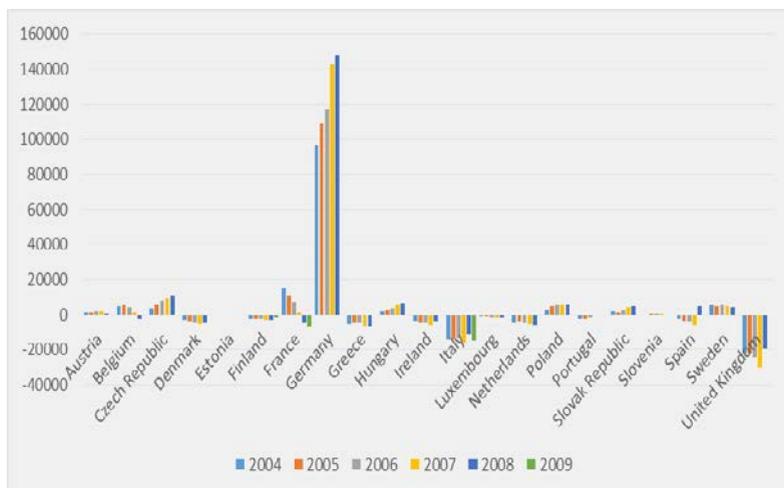


Figure 2: Trade balance (TBAL) indicator from 2004 to 2009

Source: OECD Database, STAN indicators, 2014

The trade balance is the difference between exports and imports in the specified sector. This indicator shows the competitiveness of a certain sector at the national level. It is shown in real number and in national currencies, so when comparing the countries the size of the company is important. From 2001 until 2012 the European Union's trade balance has multiplied because a lot of new Member States joined during this observed period. This integration of new Member States made free international trade possible between EU-countries and exports increased. In 2009, lower export values and import values caused a fall in trade balance due to the global economic crisis, but there was still a surplus in some countries like Germany, France, Czech Republic, Poland and Sweden. Of course, Germany represents a country that has recorded the biggest positive surplus in automotive industry. This country runs regular trade surpluses primarily due to its strong export activity of cars and other vehicles. It can be also concluded that some countries are characterized by high trade deficit which implies a dominant position of import activity with regard to export activity for these countries. One of the reasons could be smaller amount of production than production of bigger and resistant countries. The biggest trade deficit of the United Kingdom, Greece, Spain and also Denmark. Furthermore, the results of the export import ratio are presented in Figure 3.

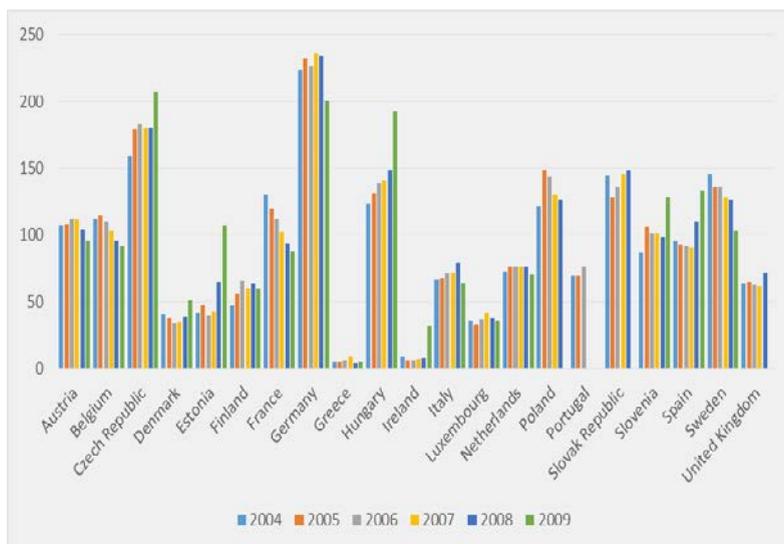


Figure 3: Export import ratio indicator from 2004 to 2009 (EXIM)

Source: OECD Database, STAN indicators, 2014

The export-import ratio identifies the exports as a percentage of imports. A percentage higher than one hundred means that exports are higher than imports and will consequently create a surplus on the national trade balance. As shown in the graph above most countries in the EU have an export-import ratio approximately between 10% and 240%. The EU exports as a share of imports has increased over the past 12 years. The proof can be also found in partially positive trend of increased value of export import ratio. From these calculations, it can be concluded that the export of automotive industry is generally higher than the import in the EU countries.

The exemptions are recorded in the case of Greece and Ireland. The reason for this situation can be found in the fact that Greek economy is still wounded by the consequences of global financial crisis. Another reason lies in the fact that Greece is more characterized as a service sector (for an example tourist sector) than real production sector. Ireland as a country is more orientated towards ICT and pharmaceutical industry. Greece and Ireland have a low intra-industry trade as well. The low ratio implies that these countries have higher import of automotive industry than export. The excessive amount of imports has always been a cause of worry for Greece economy. Even though imports decreased during recession, the volume remained a lot higher than exports. Thus, the economy had to rely on tourism and loans for filling the gap. On the other side, the highest values of EXIM indicator are recorded within the automotive sector of Germany, Hungary Czech Republic, Slovakia and Netherlands.

In addition, Figure 4 presents intra-industry trade of the automotive

sector of 21 EU member countries and OECD countries in the period between 2004 and 2009.

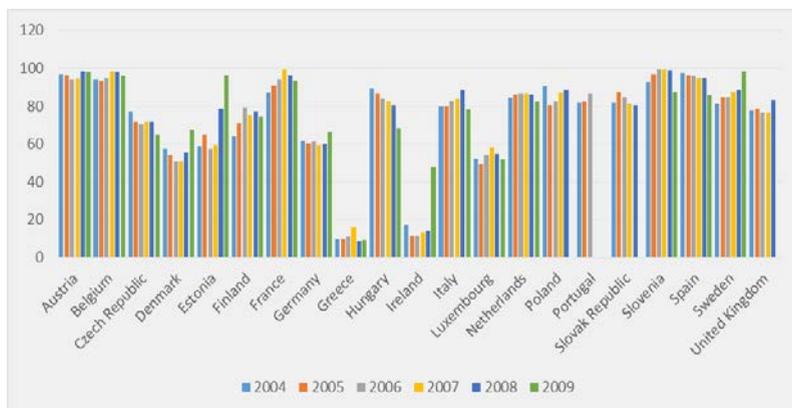


Figure 4: Intra-industry trade indicator (IITR) from 2004 to 2009

Source: OECD Database, STAN indicators, 2014

This indicator represents to what extent the export and import of a certain country are similar to each other. It can be stressed out that most countries in the EU or OECD Member states have a value between 10% and 100%. These high values mean that these countries have no major difference between the volume of export and imports.

In general, an intra-industry trade of the European Union was mostly decreasing during 2001 until 2012. However, there are some exceptions like Estonia, Ireland or Sweden especially in the observed period from 2004 to 2009. Most of the countries have high values of intra-industry trade indicator, this means they export and import roughly equal quantities in products of automotive industry. Interesting is that Greece and Ireland have significantly lower values for the intra-industry indicator. This means that there is more 'one-way traffic' considering the openness of these countries in the automotive industry. It is evident that they import more vehicles and cars than they are exporting, meaning their domestic production is not large enough to be able to export more than they are importing.

In 2008 and 2009, their exports have increased which indicate a positive sign of IITR indicator's growth. It can be noted that Ireland had a low index value in 2000 until 2006 but it started growing fast after this period and in the 2009 is Ireland's value index is four times higher. Belgium, Germany, France, Netherlands, represent a group of a few countries that remain stable at a high level of IITR indicator.

It is more suitable for a country to have a surplus on the trade balance and the preferred direction in this industry would be to export more cars and

vehicles than is imported. This could be easily seen in previous showed trade balance indicator.

Figure 5 represents the composition of manufacturing exports of automotive sector of 21 EU member countries and OECD countries in the period between 2002 and 2007.

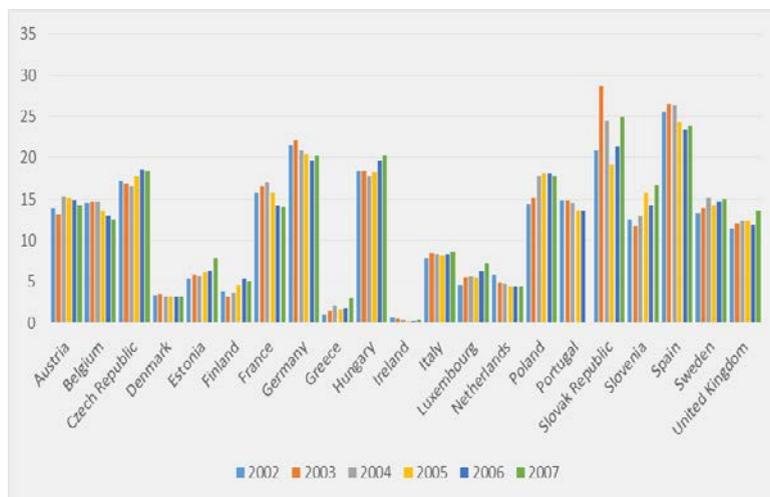


Figure 5: Composition of manufacturing exports of goods indicator (XSHM) from 2002 to 2007

Source: OECD Database, STAN indicators, 2014

This indicator shows the proportion of export for a specific sector compared to the total export of the manufacturing sector. This will thus identify how important this sector is in the outflow of manufactured products to other countries.

A positive trend is visible in case of Czech Republic, Sweden, Luxemburg and Estonia. Rapid growth of manufacturing exports of goods in Slovakian automotive industry can be clearly seen. One of the reasons could lie in establishment of PSA Peugeot Citroën Slovakia in Trnava and Kia Motors Slovakia in Žilina. Czech Republic, Germany, Hungary and Slovakia represent the group of countries with remarkably high exports in 2012. On the other side, production of cars and vehicles in Ireland is very limited and close to non-existent. The bottom of the chart belongs to automotive industries of Denmark and Greece which have recorded low values of implemented XSHM indicator.

Furthermore, the final results of import penetration indicator are presented in Figure 6.

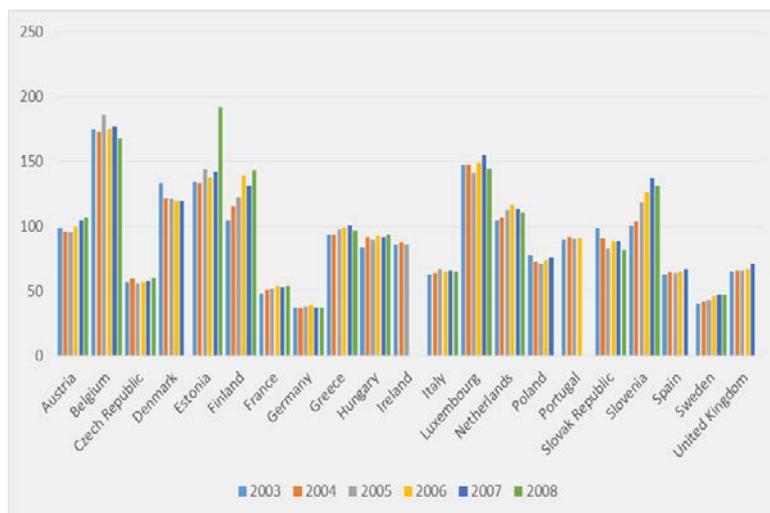


Figure 6: Import penetration of from 2003 to 2008 (MPEN)

Source: OECD Database, STAN indicators, 2014

Import penetration shows how dependant domestic demand in a certain sector is relying on foreign producers rather than on domestic production. It is defined as the ratio between the values of imports as a percentage to domestic demand for this specific sector. Smaller countries usually have higher ratios as they have smaller economies and will rely more heavily on foreign producers. For example, Belgium has an import penetration ratio close to value of 200 as it is a very open economy and exports a lot of domestic production while relying on foreign suppliers to fulfil a large share of its domestic demand.

Germany and Czech Republic, the countries that were important in the previous sections now have a low value of this ratio. This means that they do not rely a lot on foreign supply and that domestic demand is completed mostly by domestic production. Furthermore, high values of MPEN indicator High values of MPEN shows that automotive industry are depended countries like Belgium, Estonia, Luxembourg, Slovenia. Luxembourg is perfect example for import oriented country whose economy lies on the performance of service sector. Thus, Luxembourg is considered as high-income country that definitely shows perspective market for automotive industry as well.

Respective values of import penetration indicators is confirmed undoubtedly with exceptionally high export-import ratios and trade balance figures. As these countries have such high efficiency, in domestic production they create the possibility to have higher exports and lower imports which in turns ameliorate the trade balance. Finally, the results of the contribution to the trade balance are presented within Figure 7.

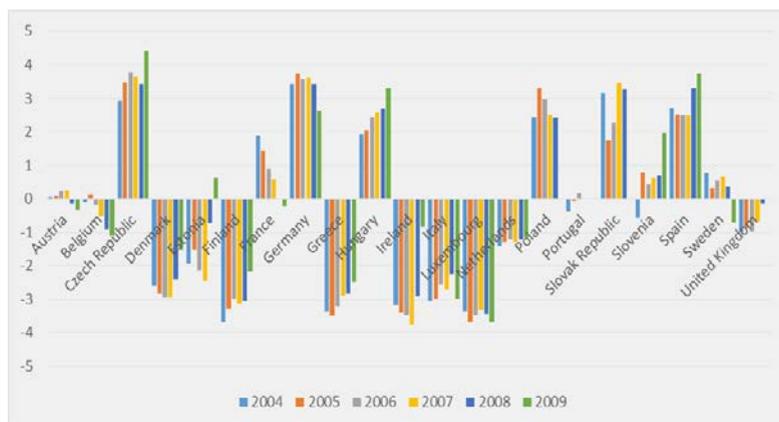


Figure 7: Contribution to the trade balance indicator from 2004 to 2009 (CMTB)

Source: OECD Database, STAN indicators, 2014

The contribution to the trade balance identifies the competitive advantage of a country in the specified sector. As it is compared to total manufacturing in this country, the indicator will then show how important the specific sector is for the country. The higher the value of this indicator the more important this sector is for the manufacturing sector as a whole. Eleven of the countries of the chosen EU countries had a structural surplus in automotive industry during the observed period. The other countries are characterized by structural deficit. Analysing the EU countries it can be concluded that Germany, Hungary, Poland, Spain and Slovakia have a value that is obviously higher than the other countries. This means that these countries actually have some kind of competitive advantage in the automotive sector. Weak performance of automotive industry can be found in case of Luxembourg, Netherlands, Ireland and Greece.

4. CONCLUSION REMARKS

The 2008 global economic crisis significantly influenced the biggest automotive manufacturing countries accompanied with scale of market crash while rendering the automotive sector the most intensive hit along with the banking sector. With the obligation to maintain stable level of employment and enhance industrial capacity, key automotive manufacturing countries intervened in the market through bailouts and subsidies for both producers and consumers at an unprecedented scale.

Germany is positioned as one of the European countries with the best performance of automotive industry. It is characterised by a small intra industry indicator compared to the other countries in the European Union. This means that these countries are relying more on one-way traffic in terms of import and export considering their openness in trade. In the case of Germany, this means they

export more than they are importing. This clearly comes forward in various ratios.

Firstly, the results of CMTB indicator are significantly higher in Germany, Czech Republic and Slovakia in comparison with other EU and OECD countries. These “extreme” values indicate the competitive advantage of these countries in the discussed sector. These countries equally have much higher export-import ratios, which indicates their advantage in international trade in this sector. EXIM indicator is the highest in case of Czech Republic, Germany, Italy, Hungary and Slovakia. Germany is the world's biggest EU and OECD cars and vehicles exporter. The trade balance indicator shows structural deficit or surplus. According to trade balance indicator, Germany stands out as a country that has the biggest positive difference between export and import activity. In addition, Germany runs regular trade surpluses primarily due to its strong export of cars and other vehicles. Its strength comes from its long and unwavering tradition and leading position in world automotive industry.

The XSHM indicator shows the exports in automotive industry sector as a percentage of total manufacturing exports or we can use other words and say that this indicator reflects the importance of this sector for manufacturing but also for whole economy. This indicator is remarkably high in case of Germany, Slovakia and Czech Republic. The import penetration indicator showed the lowest values for German automotive industry, due to its self-sufficiency in this sector. In another words, its production is efficient enough and limits the volume of imports. Smaller economies like Belgium recorded low values of import penetration within group of observed EU and OECD countries.

Last but not the least, it can be added that Germany, Czech Republic, Slovakia and Poland clearly show competitive strength in international trade of cars and vehicles are almost dominating the market in the European Union by having the highest efficiency leading to significantly better trade balances. On the other hand, countries like Italy, Luxembourg, Netherlands, and United Kingdom recorded less significant performance in automotive industry. Those countries seem as import dependable within the automotive industry. Several indicators showed that developed countries like Spain, Finland, and Denmark are also import reliable as well.

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