COMPETITIVENESS OF SLOVAKIA: REVEALED COMPARATIVE ADVANTAGE OF COMMODITY STRUCTURE BASED ON SITC, REV. 4

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ABSTRACT

The paper deals with competitiveness of Slovakia in terms of commodity structure. The aim is to analyze the competitive situation of individual commodity structures (based on SITC, rev. 4) of Slovakia and also to compare our competitiveness indices with the V4 countries. The competitiveness was measured by the trade measures of competitiveness, particularly the revealed comparative advantage and derived indicators. The results reveal a comparative advantage of Slovakia in the area of production of cars and related articles, which proves our tradition in the automobile industry.

KEY WORDS

Competitiveness. Revealed Comparative Advantage. V4 countries.

JEL classification: F19, F29.

INTRODUCTION

The term competitiveness is closely connected to trade, either domestic or international. It has been approached in the economic literature since the 70\textsuperscript{th} years of the last century. The issue of competitiveness has become even more relevant in the 90\textsuperscript{s}, i.e. at the time of the establishment of the European Union (EU) market, which was characterized by the entrance of new countries that were becoming rapidly industrialized. The main purpose of the establishment of a single European market was and still is the effort to ensure an increase in the competitiveness of the European market so that it would be able to break through to the world markets [4].

Slovakia also belongs to the EU and it competes with not only other EU member states but also with other countries of the world. The aim of this paper is to analyze the competitive situation of individual commodity structures (based on SITC, rev. 4) of Slovakia and also compare our competitiveness indices with our neighbor countries, i.e. the Czech Republic, Hungary and Poland, with which we share not only history, but also similar economic development.
In the first part of the paper we bring forward the term competitiveness and its measurement issues. In the part methodology, we provide the data source and explanation of RCA indices, which were used in our calculations. The final part provides the results of RCA indices. In the end, we summarize our findings and provide a conclusion.

**MATERIALS AND METHOD**

1. **Competitiveness**
   According to Porter competitiveness can be understood through its sources [8]. One of the sources of competitiveness is a competitive advantage, which is an alternative term to the comparative advantage. While comparative advantage refers to quantitative understanding of production factors and goods, competitive advantage, applies to the quality of production factors and goods. The core of the theory of competitiveness consists of besides the already mentioned aspects also the intensity of specialization, the development in the area of intra-firm trade of transnational corporations, but also development of joint ventures, employment, legal environment and the service area [11].

   The term *competitiveness* was defined by the European Commission as „a sustained rise in the standards of living of a nation or region and as low a level of involuntary unemployment as possible“ [2, p.15]. On the other hand, OECD defines competitiveness as „a measure of a country's advantage or disadvantage in selling its products in international markets“ [5]. In absolute terms, competitiveness can be understood as the ability to be present at a market and meet the competition. In relative terms, it represents the success of a certain subject in relation to other subjects, which it meets and competes with at the market [4].

   Competitiveness is widely accepted for its importance in terms of economic performance and growth, yet, it is often not well understood. The current literature provides many definitions and measures of competitiveness; however, such a multidimensional concept as competitiveness is results in its ambiguous use and misinterpretations. The dimensions of competitiveness depend on the level of analysis, i.e. economy, industry and firm [7].

1.1. **Measurement of competitiveness**

   Competition can exist within domestic markets as well as within international markets. For this reason we can consider competitiveness a relative measure. However, some consensus exists on which measures can be used for evaluation of competitiveness. Competitiveness can be measured based on two disciplines [3]:

   - *the neoclassical economics* (country-based theories)
The focus of neoclassical economics is trade success, while competitiveness is measured with 
real exchange rate (or purchasing power parity), comparative advantage indices (e.g. RCA and derived indicators, Michaely index) and export or import indices (e.g. export market share, net export index). According to the trade theory, a country’s competitiveness comes out of the term comparative advantage, which was explained by Ricardo and by Heckscher-Ohlin model. A comparative advantage assumes that “trade flows are the result of differences in production costs among countries and that a country will specialize in the production of a good in which it has a cost advantage” [3, p. 7].

- the strategic management school (firm-based theories)

The focus of this school is firm’s structure and strategy, which has been brought about by Porter, who developed the ‘diamond model’ [6]. Here competitiveness is defined as cost leadership and non-price supremacy, which are measured through different cost indicators (e.g. domestic resource costs (DRC) ratio), productivity (e.g. total factor productivity, estimation of production function), profitability (e.g. net sales margin, business assets turnover, value added and other) and efficiency (e.g. Malmquist indices).

2. Methodology

The aim of this paper is to analyze the competitive situation of individual commodity structures (based on SITC, rev. 4) of Slovakia and also compare the competitiveness indices with the remaining V4 countries. Therefore, we will focus on the trade measures of competitiveness, particularly on the revealed comparative advantage and derived indicators.

Revealed comparative advantage (RCA 1) was developed by Balassa and adjusted by Vollrath, so that double counting would be avoided between countries’ pairs [1],[12]. The RCA 1 calculates the ratio of a country’s export share of a commodity in the world market to the country’s export share of all other commodities. If the RCA 1 index is greater than 1, the country has a comparative advantage in the analyzed commodity, thus it displays higher competitiveness. This index helps us identify the industries where the country has an obvious advantage in the world competition [11].
The RCA 1, also known as *index of competitiveness growth*, is calculated as follows [10]:

\[
RCA 1 = \left( \frac{X_{ij}}{X_{it}} \right) \left( \frac{X_{nj}}{X_{nt}} \right)
\]

where

- \(X_{ij}\) – export of country \(i\) in the commodity group \(j\),
- \(X_{it}\) – total export of country \(i\),
- \(X_{nj}\) – world export in the commodity group \(j\),
- \(X_{nt}\) – total world export.

RCA can be written in the following form as well:

\[
RCA 2 = \left( \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}} \right)
\]

where

- \(X_{ij}\) – export of country \(i\) in the commodity group \(j\),
- \(M_{ij}\) – import of country \(i\) in the commodity group \(j\).

This index, however, is used for assessment of the *net trade performance* of a country and it allows for possibilities of simultaneous export and import in a commodity group. The index reaches values between -1 (when export does not exist, \(X_{ij} = 0\)) and +1 (when import does not exist, \(M_{ij} = 0\)). In case the results are negative, up to -1, the country has a comparative disadvantage. On the other hand, if the results are positive, up to +1, the country has a revealed comparative advantage [11].

The last modified index measures the *revealed comparative advantage* and it takes the following form [10]:

\[
RCA = \ln \left[ \left( \frac{X_{ij}}{M_{ij}} \right) / \left( \frac{X_{it}}{M_{it}} \right) \right]
\]

where

- \(X_{ij}\) – export of country \(i\) in the commodity group \(j\),
- \(M_{ij}\) – import of country \(i\) in the commodity group \(j\),
- \(X_{it}\) – total export of country \(i\),
- \(M_{it}\) – total import of country \(i\).

If the RCA is greater than 0, then the country has a comparative advantage, if it is less than 0, then it reaches comparative disadvantage and if the results are equal to 0, then we cannot talk about comparative advantage or disadvantage.
The external trade data used for calculation of the RCA indices comes from the Statistical office of the Republic of Serbia. The commodity structure is based on SITC, rev. 2004.

**RESULTS AND DISCUSSION**

In figure 1 are depicted the results of RCA indices of commodity structure in Slovakia during the period 2004 – 2011. In terms of commodity structure *Food and live animals*, we can see, that based on the RCA index, Slovakia has been competitive throughout the whole analyzed period. However, the RCA 1 does not reach values greater than 1, therefore, based on this index, Slovakia hasn’t been competitive. But we know that RCA 1 assesses the competitiveness growth, which has also according to RCA index a decreasing trend during the period 2004 – 2011. In terms of net trade performance (RCA 2), Slovakia has been competitive in most of the years, except for 2004 and 2010 in the trade with food and live animals.

When looking at the commodity structure *Beverages and tobacco*, we can see a similar development as in the previous case. Slovakia has been competitive based on RCA (all years) and RCA 2 (except for 2005 and 2006). However, based on the RCA 1 index, Slovakia hasn’t been competitive at all. Regarding the commodity structure *Chemicals and related products*, we can see that Slovakia was competitive in the period 2005 – 2007 (RCA, RCA 1). Since then, none of the indicators prove our competitiveness in this field. Based on the RCA 2 Slovakia wasn’t competitive in the analyzed period. The results are negative, therefore, we imported more chemicals and related products than we exported.

When it comes to commodity structure *Crude materials, inedible, except fuels*, based on the RCA 1, Slovakia was competitive in the period 2004 – 2006 and also in 2009. When considering the RCA 2 index, our net trade performance was positive throughout the period 2005 – 2010. The RCA index proves that Slovakia was competitive in this commodity structure in most of the analyzed period, except for 2011. With regards to *Mineral fuels, lubricants and related materials*, all RCA indices prove that Slovakia is not competitive in this commodity structure. When looking at the commodity structure *Animal and vegetable oils, fats and waxes*, we can see, that the RCA 2 index has been reaching values equal to 1, which means, that Slovakia does not import these commodities. Based on RCA 1, Slovakia was competitive in 2005 and it has been competitive since 2009.
Figure 1 Development of RCA, RCA 1 and RCA 2 values of commodity structure according to SITC, rev. 4 in Slovakia

Source: self-processed based on data from the Statistical office of the Republic of Serbia [9]
Slovakia hasn’t been competitive according to the RCA (except in the year 2008) and RCA 2 in the commodity structure *Manufactured goods classified by material*, probably due to higher imports than exports in this category. On the other hand, RCA 1 has been reaching values greater than 1 throughout the whole analyzed period, indicating a comparative advantage and competitiveness growth. In terms of *Machinery and transport equipment*, Slovakia has been competitive since 2007 according to RCA and RCA 1 indices, according to RCA 2 only in 2008 and 2010 – 2011. All indices indicate a comparative advantage of Slovakia in this area, which proves that Slovakia is oriented towards the car production (e.g. Kia, Peugeot, and Volkswagen). Slovakia isn’t competitive in the commodity structure *Miscellaneous manufactured articles* based on the RCA 1 and RCA 2 indices. We are importing more than exporting these types of commodities. In terms of the RCA index, until 2010 Slovakia was competitive in this area, however, each year our comparative advantage has been decreasing until 2011, when Slovakia lost its comparative advantage in this commodity structure.

After detailed analysis of the development of the RCA indices in Slovakia we provide also a comparison of the indices between several countries. In the following figures (2 - 4) are depicted the results of RCA indices (RCA 1, RCA 2 and RCA) calculated for each commodity structure, which is based on the SITC, rev. 4, for the V4 countries, i.e. Slovakia, the Czech Republic, Hungary and Poland.

**Figure 2 RCA 1 values of V4 countries in 2011**

![Chart showing RCA 1 values for V4 countries in 2011](chart.png)

Source: self-processed based on data from the Statistical office of the Republic of Serbia [9]

Figure 2 depicts the values of RCA 1 index in the V4 countries in the year 2011. If the values are greater than 1, the country reaches a comparative advantage. From this figure we can see
that Slovakia reaches a comparative advantage in the commodity groups *Animal and vegetable oils, fats and waxes, Machinery and transport equipment* as well as in *Manufactured goods classified by material*.

The Czech Republic reaches a comparative advantage in 3 commodity groups: *Beverages and tobacco, Chemicals and related products* and *Manufactured goods classified by material*. Hungary has the most diversified commodity structure, having a comparative advantage in *Food and live animals, Crude materials, Mineral fuels and lubricants, Animal and vegetable oils, fats and waxes and Chemicals and related products*.

**Figure 3 RCA 2 values of V4 countries in 2011**

Source: self-processed based on data from the Statistical office of the Republic of Serbia [9]

Figure 3 depicts the values of index RCA 2 for the V 4 countries in the year 2011. All values, which are up to +1 reveal a comparative advantage. Based on this index we can see that Slovakia has a comparative advantage in four commodity groups. Together with the Czech Republic and Hungary, it specializes the most in *Animal and vegetable oils, fats and waxes* and *Beverages and tobacco*. Poland reaches by all commodity groups a comparative disadvantage as the values of RCA 2 index are negative, which means that its imports exceed the exports.
Figure 4 RCA values of V4 countries in 2011

![RCA values of V4 countries in 2011](image)

Source: self-processed based on data from the Statistical office of the Republic of Serbia [9]

Figure 4 depicts the results of RCA index in the V4 countries in the year 2011. All values, which are greater than 0, reveal a comparative advantage. From the figure we can see, that Slovakia has a comparative advantage in three areas, the highest in the production of Beverages and tobacco. A significant comparative disadvantage reaches Slovakia in the commodity group Mineral fuels, lubricants and related materials. The Czech Republic reaches a comparative advantage in four areas, the highest in the commodity group Beverages and tobacco. Regarding Hungary, we can see a more diversified product specialization, as it reaches a comparative advantage in six of nine areas. Hungary reaches the highest comparative advantage in the commodity group Animal and vegetable oils, fats and waxes. Poland reaches a comparative advantage in three commodity groups, the highest in Crude materials.

**CONCLUSION**

Based on the results of the RCA indices we can conclude that Slovakia has a comparative advantage in the following commodity structures:

- **Food and live animals, Beverages and tobacco, Crude materials, inedible, except fuels and Machinery and transport equipment** based on the RCA index, which is the index of comparative advantages,
- **Animal and Vegetable oils, Machinery and transport equipment, Manufactured goods classified by material** based on the RCA 1 index, which is the index of competitiveness growth, and
• Animal and vegetable oils, Beverages and tobacco, Food and live animals, Machinery and transport equipment based on the RCA 2 index, which is the index of net trade performance.

All three indices come across one commodity structure, which is Machinery and transport equipment. Thus, they reveal a comparative advantage of Slovakia in the area of production of cars and related articles, which proves our tradition in the automobile industry.

On the other hand, the remaining V4 countries specialized in 2011 mainly in: Beverages and tobacco (Czech Republic), Manufactured goods classified by material (Czech Republic, Poland), Animals and vegetable oils, fats and waxes (Hungary) and Crude materials, inedible, except fuels (Poland).

The results of RCA indices may vary in different years, because there are many factors, which influence trade (e.g. prices, demand, etc.). However, for Slovakia the results of RCA indices in 2011 and revealed comparative advantages in particular commodity structures were confirmed also by the analysis of the development of RCA indices.

BIBLIOGRAPHY


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