

Accessing the External Competitiveness: The Case of Slovakia

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Abstract

The paper focus on the external competitiveness of the Slovak Republic and its ability to succeed in the foreign markets. The level of foreign trade specialization in terms of revealed comparative advantage and the type of competitiveness for different technology classes is identified. The analysis for the period 1999-2021 demonstrates trends in the development of Slovak economy's specialization. The findings confirmed that Slovak production is competitive on the European market in several industries, mainly in automotive production, electronics and iron and steel, which competitiveness is based on tradition and low costs resulting in lower prices.

Index Terms: competitiveness, foreign trade, RCA index, technological classes, specialization.

1. Introduction

Slovak Republic is a small and very open economy, whose openness exceeded 190 % in pre-pandemic year 2018. Slovak international trade performance plays a key role, as any change in imports or exports influence the economic growth and per capita income of the country. Foreign trade, but especially exports, is a crucial factor for the Slovak economy, which contributes significantly to the formation of gross domestic product. This is due to the relatively limited scope of the internal market, insufficient raw material resources, little agricultural potential and, at the same time, high dependence on the location of domestic production on foreign markets, since the Slovak market does not provide enough space for the location of domestic production. Increasing external competitiveness thus becomes more important than ever for the country.

Competitiveness can be based on a lower price or higher quality compared to competing goods. Prices play an increasingly minor role in attracting and, in particular, maintaining international competitiveness. In particular, countries that are technologically lagging behind, specialize in sectors where price is the main factor of competitiveness. According to "quality ladder" theory [4], [5], [6] countries at the lower end of the quality spectrum compensate their relative technological backwardness by lower wages or higher usage of energy or environmental resources and their competitiveness is based on lower costs and prices. However, competitiveness built solely on the prices and production of low-technology and labor-intensive products may quickly be lost. This is especially true today, when new competitors are coming to the world market with absolutely lower production costs, primarily due to cheap labor. Once a low wage advantage is exploited, it becomes crucial for a country to move into technology-intensive production. Developed industrialized countries can only compete with countries relatively equipped with cheap labor if they produce sophisticated products and their competitiveness is based on quality. Technological change driven by investments in R&D had a major role to play. Understanding the sources of technological differences now stands at the center of models of international trade as they are one of the main sources of national competitive advantages. Recognizing the sources of competitiveness than allows us to identify possibilities and risks for further economic development.

The aim of this paper is to analyze the competitiveness of the Slovak foreign trade vis-à-vis the EU27 market in the period 1999 – 2021. We identify the competitive industries through calculating the RCA index. The industries with the highest values of this index represent the main source of economic growth and employment in the Slovak Republic. The type of competitiveness is identified through technology classification of industries according the main source of the comparative advantage. The paper is divided into three parts. The first part deals with an overview of literature. The second part approximates the methodology and data used in the analysis. The third part presents empirical results and their description. The last part summarizes the findings.

2. Literature Review

External competitiveness of the economy can be accessed by observable patterns of specialization. Empirical studies use different typologies and classifications of industries according to characteristic factor inputs to identify the type of competitiveness. Wolfmayr-Schnitzer [12] accessed the actual trade specialization in terms of technology classes. She applied the trade classification method introduced by Legler [8] and further improved by Schulmeister and Bösch [10] based on division of industries according to the main inputs (human capital, physical, capital, labor, other resources). The author found that the Central and Eastern European Countries (CEECs) are specialized in trade of labor- and resource-intensive industries.

Peneder [9] set the new taxonomy of manufacturing industries according to their employment of skilled labor and the typical patterns of factor input combination. The concept is based on ideas coming from industrial organization, trade theory and from technological and evolutionary economics.

Lall [7] analyzed the export patterns in developing countries and divided the manufacture exports by technology in five categories: primary products, resource-based manufactures, low technology manufactures, medium and high technology manufactures. The empirical findings are that the low technology producers are likely to grow at lower rate and are more vulnerable in international market. Technology intensive trade tend to grow faster.

Yilmaz and Ergun [13] used RCA and other indices to evaluate trade patterns and specialization of the six former and current EU candidates (Turkey, Bulgaria, Hungary, Romania, Poland and the Czech Republic), divided in five groups: raw-material intensive goods, labor-intensive goods, capital-intensive goods, easily imitable research-oriented goods and difficulty imitable research-oriented goods. The key finding was that all countries need to improve the technology transfer and the source would be foreign direct investment.

From studies related to Slovakia, we can conclude that the Slovak economy has been developing in a similar way to other Central European countries. Vokorokosova, Čarnický [11] based on the RCA index found that in the early 2000s Slovakia was competitive in relatively higher capital, material and labor intensity production. According to Borbély [3] new and cohesion EU countries are competitive in middle- and low-quality products. According to Aiginger [1] Slovakia has got the second largest sector with successful price competition among the transition countries.

3. Methodology

We access the character of the competitiveness of the Slovak trade on the basis of the actually observed trade specialization. That is, instead of looking at inputs directly (i.e. data on R&D expenditures, number and qualification of workers, capital intensity) we look at indicator measuring economic performance of goods of different technological level. We have used the export data from Eurostat database classified by the SITC, Rev. 4 (two-digit classification) for the period 1999 - 2021. The SITC divisions have been classified by factor inputs according to Peneder [9] into five categories (See Appendix 1):

1. *Mainstream manufacturing*: The main part of this group is the machinery sector, but this group also includes articles of paper, plastic products, electronic equipment and other transport equipment.
2. *Labor-intensive industries*: Typical examples of this sector are textiles and clothing, wood processing, construction material and metal processing.
3. *Capital-intensive industries*: In this group we can find production of pulp and paper, refined petroleum, basic chemicals and iron and steel.
4. *Marketing-driven industries*: This group contains the advertising intensive industries, i.e. food sector and goods associated with leisure and entertainment.
5. *Technology-driven industries*: The industries in this group are characterized by particularly high expenditures on R&D and incorporate the chemicals and biotechnology, new information and communication technologies and vehicles for transport.

The level and the development of Slovak foreign trade specialization and the external competitiveness of the particular groups of industries have been analyzed using the RCA (Revealed Comparative Advantage) index, which is the most commonly used tool for analyzing trade data and comparative advantages. Balassa [2] proposed an index (also called the Balassa Index), which is expressed as follows:

$$RCA = (X_{ij}/X_{it}) / (X_{nj}/X_{nt}) = (X_{ij}/X_{nj}) / (X_{it}/X_{nt}) \quad (1)$$

where X represents exports, i is a country, j is a commodity (or industry), t is a group of commodities (or industries) and n is a group of countries.

RCA thus measures the share of commodity (industry) exports in a country's total exports relative to the export ratio of a given commodity in the total exports of a selected group of countries (or worldwide). In other words, it compares a country's share of the world commodity market with that of the world market for all commodities. A comparative advantage is considered to be revealed if $RCA > 1$, i.e. the commodity's share of a country's exports is higher than its share of world exports. If $RCA < 1$, the country has a comparative disadvantage in exporting the commodity(s). For the purposes of our analysis, we have adjusted the index to calculate the share of exports of a certain taxonomic group in the total exports of Slovakia concerned against the share of this group of goods in the total exports of the 27-European Union. Considering that the aim is the position of the Slovak Republic in the conditions of the European market, we used EU27 trade flows instead of the world market for comparison.

4. Results

By dividing the data on Slovakia's exports into five categories and applying them to the RCA index, we obtained several findings. The Slovak patterns of trade has changed over the period 1999-2021. Trade data for Slovakia revealed a specialization in labor- and capital-intensive industries at the beginning of the analyzed period, but they lost their comparative advantages over time. On the other hand, we can see an increase in competitiveness vis-à-vis the EU-27 in mainstream manufacturing and technology-driven industries. Marketing-driven industries have retained their position. The RCA value of marketing-driven industries stayed more or less constant, however it is the group without external competitiveness.

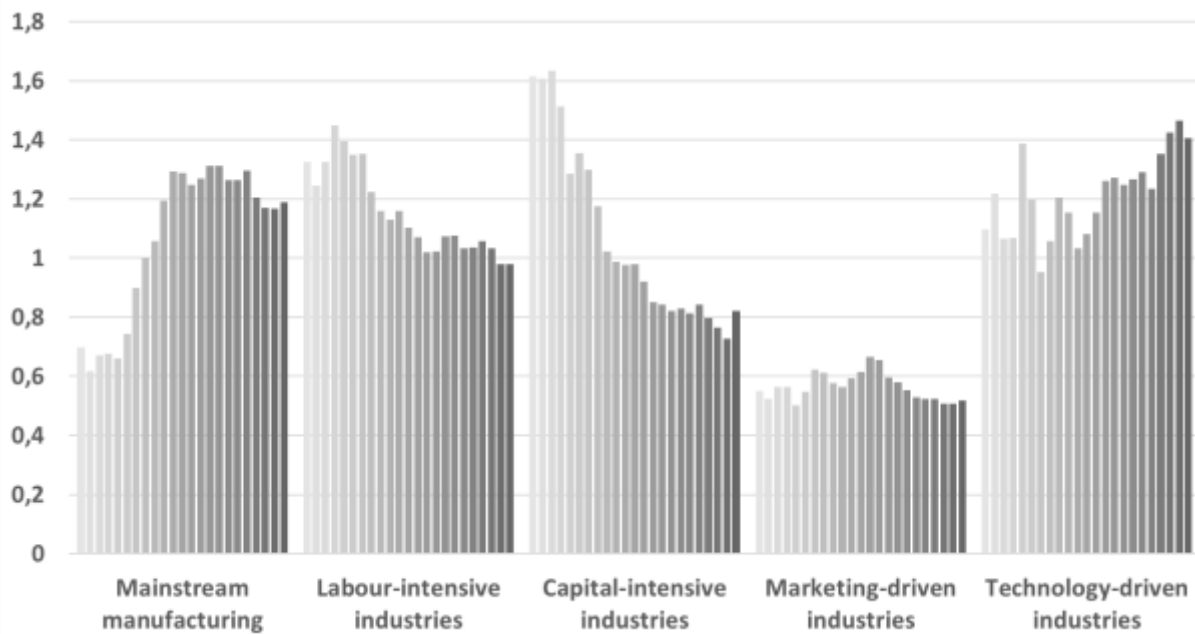


Figure 1: RCA indexes for taxonomic groups (1999-2021)

In the labor-intensive industries group, we saw a slight decrease in competitiveness during the period under review, as well as a decrease in the share of this group in Slovakia's total exports, which decreased from 20.5% to 13%. The most striking loss of comparative advantages can be seen in the sectors apparel and clothing and textile yarn and fabrics. By contrast, in other sectors in this group, such as wood manufactures, furniture or electrical machinery, competitiveness has been maintained, and in the case of

prefabricated buildings and sanitary it has even increased. The competitiveness of these sectors was and is based mainly on low prices resulting from cheap labor. With integration into European structures and gradual, even price, convergence, this comparative advantage disappears.

The biggest decline in competitiveness over the period under review is seen in the capital-intensive industries group, which is also accompanied by a decrease in export share from 28.6% at the beginning of the period to 13.5% in 2020. The decrease occurred in almost all product groups included, with the exception of manufactures of metals, coin and production of iron and steel, in which Slovakia achieves consistently high competitive advantages and RCA index values are around 2. The competitiveness of this sector stems from a long tradition of iron and steel production and high foreign direct investment from abroad.

The mainstream manufacturing was the group with the highest improvement of the RCA values over the period 1999 to 2021. The export share of this group increased from 19.3 % to almost 27 % indicating an enormous restructuring effort. The main drivers of this group are rubber manufacturing which is connected with a strong automotive industry, general industrial machinery and especially telecommunications and sound-recording and reproducing apparatus and equipment, whose RCA index values have risen above 5 in some of the years under review. The production of televisions, screens, printed circuit boards and other electrotechnical components for TV accounts for almost half of the entire electrical industry in Slovakia. After cars, it is the strongest export item. Almost one in five imported TVs in the European Union countries is made by one of the three large companies based in Slovakia.

The highest RCA index values can currently be seen in the technology-driven industries group. However, this fact can be somewhat misleading and requires closer attention. Up to 90% of this group is formed by export of road vehicles, especially cars. The automotive industry is the basic pillar of the Slovak economy and its foreign trade, as confirmed by the values of the RCA index more than 3. In 2021, more than 1 million vehicles were produced in Slovakia and the country is the world leader in the production of cars per capita. There are four automobile companies operating in Slovakia (Volkswagen, Kia Motors, Stellantis, Jaguar Land Rover) and in July 2022 the fifth (Volvo) announced the arrival. The road vehicles' share of exports is more than 30 %. Despite the fact that car production belongs to the group technology-driven industries, the success in quality competition is based on assembling components where the value added is quite low. The high inflow of FDIs into the sector has created the conditions for restructuring and changing the nature of their competitiveness. By importing top technologies from parent companies, they ensure technology transfer. Although the Slovak Republic specializes in the production of technology-driven industry, these technologies are not produced domestically, but imported from abroad. Thus, the basis of the competitiveness of this industry is reprocessing, where a country imports semi-finished product that are further processed or assembled using cheap labor and then exported back. This is confirmed by the high import values in this group (more than 15 % of total imports).

5. Conclusion

The development of the RCA index during the analyzed period confirm a little change in Slovak foreign trade specialization and competitiveness. At the beginning, Slovakia specialized in exports of products at lower ends of the quality spectrum while comparative disadvantages prevail in trade with human capital/technology intensive products. As a transition economy with low costs and prices, its trade was price competitive in the early 2000s and based on the export of labor- and capital-intensive products with low added value. As a result of FDI and changing structure of the economy, the quality of its production grew. Recorded slight shift forwards export of more sophisticated products is beneficial in supporting long-term sustainable development. In recent years, specialization patterns are biased towards mainstream manufacturing and labor-intensive industries. Technologically sophisticated products (with exception of cars) are still under-represented. A look at the more detailed 2-digit level reveals Slovakia's strong specialization in the export of road vehicles, telecommunication equipment and iron and steel. Although we have noticed improvement in technology-driven industries, the technologies are produced abroad and imported through FDI. Production is import intensive with a low value added and price elastic. Sources of competitiveness, mainly based on lower prices, are weak in terms of sustainability. The high energy and raw material dependence of the economy, rising inflation and the associated rising labor

and material costs, an emergent lack of skilled labor and the challenges of the transition to a green economy are the main threats for Slovak future economic development.

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References

- [1] Aiginger, K., "Unit values to signal the quality position of CEECs. The competitiveness of transition economies." OECD proceedings, 1998.
- [2] Balassa, B., "Trade Liberalisation and 'Revealed' Comparative Advantage." The Manchester School of Economics and Social Studies, 33, pp. 99-123, 1965.
- [3] Borbély, D., "Trade Specialisation in the Enlarged European Union." Heidelberg: Physica-Verlag, 215 p. ISBN 978-3-7908-1704-1, 2006.
- [4] Grossman, G.M., Helpman, E., "Innovation and Growth in the Global Economy." MIT Press, Cambridge, Mass, 1991a.
- [5] Grossman, G.M., Helpman, E., "Endogenous Product Cycles." The Economic Journal, 101(408), pp. 1214-1229. 1991b.
- [6] Grossman, G.M., Helpman, E., "Quality Ladders and Product Cycles." Quarterly Journal of Economic, 106(2), pp. 557-586, 1991c.
- [7] Lall, S., "The technological structure and performance of developing country manufactured exports 1985-1998." QEH Working Papers No. 44, 2000.
- [8] Legler, H., "Zur Position der Bundesrepublik Deutschland im internationalen Wettbewerb [On the Position of the Federal Republic of Germany in International Competition]." Forschungsberichte des Niedersächsischen Instituts für Wirtschaftsforschung, Hannover, 1982.
- [9] Peneder, M., "Intangible Investment and Human Resources: The New WIFO Taxonomy of Manufacturing Industry." WIFO Working Papers 114. Vienna, 1999.
- [10] Schulmeister, S., Bösch, G., "Das technologische Profil der österreichischen Wirtschaft im Spiegel des Außenhandels [The Technological Profile of the Austrian Economy in the Mirror of Foreign Trade]." In: Aiginger K (ed) Die internationale Wettbewerbsfähigkeit Österreichs, Österreichische Strukturberichterstattung, Kernbericht 1986, vol I. WIFO, Wien, pp 259-354, 1987.
- [11] Vokorokosová, R., Čarnický, Š., "Komparatívne a konkurenčné výhody Slovenska v globálnom obchodnom prostredí." Ekonomický časopis. Vol. 51, No.9, pp. 1065-1076. ISSN 0013-3035, 2003.
- [12] Wolfmayr-Schnitzer, Y., "Trade performance of CEECs according to technology classes." The Competitiveness of Transition economies, OECD proceedings, 1998.
- [13] Yilmaz, B., Ergun, S.J., "The foreign trade pattern and foreign trade specialization of candidates of the European Union." Ezoneplus Working Paper S. Chen, B. Mulgrew, and P. M. Grant, "A clustering technique for digital communications channel equalization using radial basis function networks," IEEE Trans. on Neural Networks, vol. 4, pp. 570-578, July 1993.

Appendix

Taxonomic group	SITC classification (2-digit)
Mainstream manufacturing	58 Plastics in non-primary forms
	62 Rubber manufactures, n.e.s.
	66 Non-metallic mineral manufactures, n.e.s.
	71 Power-generating machinery and equipment
	72 Machinery specialized for particular industries

	<p>73 Metalworking machinery</p> <p>74 General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.</p> <p>75 Office machines and automatic data-processing machines</p> <p>76 Telecommunications and sound-recording and reproducing apparatus and equipment</p> <p>79 Other transport equipment</p>
Labor-intensive industries	<p>21 Hides, skins and furskins, raw</p> <p>24 Cork and wood</p> <p>61 Leather, leather manufactures, n.e.s., and dressed furskins</p> <p>63 Cork and wood manufactures (excluding furniture)</p> <p>65 Textile yarn, fabrics, made-up articles, n.e.s., and related products</p> <p>77 Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)</p> <p>81 Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.</p> <p>82 Furniture and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings</p> <p>84 Articles of apparel and clothing accessories</p>
Capital-intensive industries	<p>23 Crude rubber (including synthetic and reclaimed)</p> <p>25 Pulp and waste paper</p> <p>26 Textile fibres (other than wool tops and other combed wool) and their wastes (not manufactured into yarn or fabric)</p> <p>28 Metalliferous ores and metal scrap</p> <p>32 Coal, coke and briquettes</p> <p>33 Petroleum, petroleum products and related materials</p> <p>34 Gas, natural and manufactured</p> <p>51 Organic chemicals</p> <p>52 Inorganic chemicals</p> <p>56 Fertilizers (other than those of group 272)</p> <p>57 Plastics in primary forms</p> <p>64 Paper, paperboard and articles of paper pulp, of paper or of paperboard</p> <p>67 Iron and steel</p> <p>68 Non-ferrous metals</p> <p>69 Manufactures of metals, n.e.s.</p> <p>96 Coin (other than gold coin), not being legal tender</p> <p>97 Gold, non-monetary (excluding gold ores and concentrates)</p>
Marketing-driven industries	<p>00 Live animals other than animals of division 03</p> <p>01 Meat and meat preparations</p> <p>02 Dairy products and birds' eggs</p> <p>03 Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof</p> <p>04 Cereals and cereal preparations</p> <p>05 Vegetables and fruit</p> <p>06 Sugars, sugar preparations and honey</p> <p>07 Coffee, tea, cocoa, spices, and manufactures thereof</p> <p>08 Feeding stuff for animals (not including unmilled cereals)</p> <p>09 Miscellaneous edible products and preparations</p> <p>11 Beverages</p> <p>12 Tobacco and tobacco manufactures</p>

	<p>22 Oil-seeds and oleaginous fruits</p> <p>29 Crude animal and vegetable materials, n.e.s.</p> <p>41 Animal oils and fats</p> <p>42 Fixed vegetable fats and oils, crude, refined or fractionated</p> <p>43 Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.</p> <p>55 Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations</p> <p>83 Travel goods, handbags and similar containers</p> <p>85 Footwear</p> <p>89 Miscellaneous manufactured articles, n.e.s.</p>
Technology-driven industries	<p>27 Crude fertilizers, other than those of Division 56, and crude minerals (excluding coal, petroleum and precious stones)</p> <p>35 Electric current</p> <p>53 Dyeing, tanning and colouring materials</p> <p>54 Medicinal and pharmaceutical products</p> <p>59 Chemical materials and products, n.e.s.</p> <p>78 Road vehicles (including air-cushion vehicles)</p> <p>87 Professional, scientific and controlling instruments and apparatus, n.e.s.</p> <p>88 Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks</p>