

EVALUATION OF COMPARATIVE ADVANTAGES AND TRADE BALANCE IN BILATERAL TRADE BETWEEN SERBIA AND CHINA

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Abstract: This paper analyzes the trade relations between the Republic of Serbia and the People's Republic of China in the period from 2021 to 2025, with the aim of providing a detailed overview of the structure, competitiveness, and balance of bilateral trade in goods. The focus of the research is on understanding key trade patterns between the two countries, as well as identifying sectors with the greatest potential for improving economic relations. The study is based on a quantitative, descriptive analytical approach and includes the application of two mutually complementary international trade indicators: the Revealed Comparative Advantage (RCA) index and the Trade Balance Index (TBI). These indicators enable a comprehensive assessment of export specialization, as well as insight into whether specific sectors are predominantly export or import oriented. The data used in the analysis are classified according to the Standard International Trade Classification (SITC), ensuring consistency and facilitating comparison across different sectors. The research results indicate a pronounced structural imbalance in trade relations between Serbia and China, with Serbia continuously recording a significant trade deficit. The combined application of the RCA and TBI indices allows for precise identification of sectors with strong export potential, as well as those that are highly dependent on imports and require structural adjustments. The findings

provide a relevant basis for formulating recommendations aimed at improving export competitiveness, diversifying the production structure, and reducing the trade imbalance between the two countries. In this way, the paper contributes to a better understanding of contemporary trade flows and the potential for further development of economic relations between Serbia and China.

Key words: Trade in goods, RCA index, TBI index, Serbia, China

JEL classification: F10, F14

1. INTRODUCTION

In the context of increasing globalization and the intensification of international trade flows, bilateral trade relations have become a key determinant of economic development and competitiveness. The relationship between the Republic of Serbia and the People's Republic of China has gained particular importance in recent years, driven by China's growing role in the global economy and Serbia's strategic orientation toward expanding international trade partnerships.

China represents one of the most significant trading partners for Serbia, particularly in terms of imports, while Serbian exports to China have shown notable growth, albeit from a relatively low

base. This asymmetry raises important questions regarding the structure, competitiveness, and sustainability of bilateral trade relations.

Understanding the nature of trade between Serbia and China requires a detailed sectoral analysis that goes beyond aggregate indicators. In this regard, the application of standardized classification systems, such as the Standard International Trade Classification (SITC), enables a more precise evaluation of trade patterns and specialization.

The main objective of this study is to assess the competitiveness and structural characteristics of Serbia's trade with China over the period 2021–2025. To achieve this, the analysis employs two widely recognized indicators in international economics: the Revealed Comparative Advantage (RCA) index and the Trade Balance Index (TBI). These indicators provide insights into the sectors in which Serbia demonstrates export strength, as well as those characterized by import dependence.

The significance of this research lies in its contribution to a better understanding of Serbia's position within global trade dynamics, particularly in relation to a major economic power such as China. The findings may serve as a basis for policymakers and economic stakeholders in designing strategies aimed at improving export diversification and strengthening international competitiveness.

2. LITERATURE REVIEW

The analysis of comparative advantages and trade balance represents a central theme in international trade theory and empirical research. In the context of bilateral trade between transition economies and large global economies such as China, the literature consistently emphasizes structural asymmetries, sectoral concentration, and persistent trade imbalances.

The concept of revealed comparative advantage (RCA), introduced by Balassa (1965), remains one of the most widely used indicators for assessing export competitiveness. It measures a country's relative export performance in a given sector compared to the global average. Despite certain limitations, such as sensitivity to trade distortions and exclusion of import dynamics, RCA continues to be a standard tool in empirical trade analysis (Hinloopen & van Marrewijk, 2001). Empirical studies show that transition economies typically exhibit comparative advantages in resource-based and labor-intensive sectors, while remaining less competitive in technology-intensive industries (Ferto & Hubbard, 2003).

In the case of Serbia, research indicates that export specialization is largely concentrated in traditional

sectors, particularly agri-food products and raw materials. Studies by Matkovski, Zekić, Đokić, Jurjević and Đurić (2021) confirm that Serbia's comparative advantages are predominantly found in low value-added sectors, while higher value-added manufacturing sectors show limited competitiveness. This pattern reflects broader structural characteristics of Western Balkan economies, including limited technological capacity and insufficient export diversification.

Complementary to RCA, the Trade Balance Index (TBI), provides insight into trade orientation by incorporating both exports and imports. The TBI allows for distinguishing between export-oriented and import-dependent sectors, offering a more complete picture of trade structure.

The literature on China's role in global trade highlights its position as a dominant exporter of manufactured and high value-added goods. According to Rodrik (2006), China's export structure is characterized by a high level of sophistication relative to its income level, driven by industrial policy and integration into global production networks. As a result, many countries, including those in Central and Eastern Europe, exhibit trade patterns marked by strong import dependence on Chinese goods and limited export penetration into the Chinese market.

In addition to China's increasingly significant role in global trade, recent years have seen a growing intensification of economic and financial relations between Serbia and China, which aligns with China's broader Belt and Road Initiative framework (Cui, 2025). Within this initiative, infrastructure projects, energy investments, and logistical connectivity have been particularly developed, further strengthening the economic interdependence between the two countries.

Empirical research shows that Serbia's exports to China have recorded strong growth since the early 2010s, primarily driven by copper exports and investments by the Chinese company Zijin Mining in the mining sector. At the same time, the rise in imports from China has led to an increase in Serbia's bilateral trade deficit. As a response to strengthening economic ties, Serbia and China signed a Free Trade Agreement in 2023, which entered into force on 1 July 2024. This made Serbia the first Central and Eastern European country, as well as the first EU candidate country, to conclude such an agreement with China. The agreement provides for the gradual liberalization of trade over a period of 15 years and the improvement of the institutional framework for cooperation.

According to available analyses, its implementation is expected to contribute to the

diversification of Serbia's export structure, particularly in the direction of agri food products, the pharmaceutical sector, and components for electric vehicles (Mitić, 2025).

Recent studies emphasize the importance of global value chains (GVCs) and foreign direct investment (FDI) in shaping trade patterns. Gereffi (2018) highlights that participation in GVCs enables countries to upgrade their production structures and improve export competitiveness. However, for many transition economies, including Serbia, integration into these networks remains uneven, limiting the potential for structural transformation and export diversification (Stöllinger, 2021).

Overall, the literature highlights several key points relevant to this study. Serbia's exports remain concentrated in traditional sectors, with limited competitiveness in higher value-added industries, while trade with China is characterized by structural asymmetry and strong import dependence. RCA and TBI are widely accepted and complementary tools for analyzing trade structure and competitiveness. Building on these insights, this paper provides an empirical analysis of Serbia–China trade relations over the period 2021–2025 using these indicators..

3. METHODOLOGY

This study is grounded in a quantitative and descriptive analytical research approach aimed at examining the structure, competitiveness, and trade balance between the Republic of Serbia and the People's Republic of China over the period 2021 to 2025. The analytical framework is designed to provide a comprehensive understanding of bilateral trade relations by focusing on sectoral dynamics and comparative performance. The analysis is conducted at the level of disaggregated product groups using the Standard International Trade Classification, which enables a detailed and systematic insight into the composition and evolution of trade flows.

The empirical analysis relies on secondary data obtained from relevant international and national statistical sources, including global trade databases and official repositories. The dataset comprises annual values of exports and imports between Serbia and China, classified by sectors, as well as total exports of Serbia and total world exports by sector. Such a structured dataset allows for a consistent comparison of Serbia's trade performance both within the bilateral framework and in relation to global trade patterns.

In order to assess export competitiveness, the study employs the Revealed Comparative Advantage index, which measures the relative

export performance of a country in a specific sector compared to the global average. The index is formally defined as:

$$RCA_{ij} = \frac{\left(\frac{X_{ij}}{X_{it}}\right)}{\left(\frac{X_{wj}}{X_{wt}}\right)}$$

where X_{ij} represents Serbia's exports to China in sector j , X_{it} denotes total exports of Serbia, X_{wj} refers to total world exports in sector j , and X_{wt} represents total world exports.

An RCA value greater than one indicates that Serbia has a revealed comparative advantage in the observed sector, suggesting a relatively higher degree of specialization and competitiveness. Conversely, a value below one implies a comparative disadvantage and a weaker export position in that sector.

In addition to competitiveness, the study evaluates the trade orientation of Serbia by applying the Trade Balance Index, which captures whether the country is predominantly an exporter or importer in specific sectors when trading with China. The index is expressed as:

$$TBI_{ij} = \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}}$$

where X_{ij} denotes Serbia's exports to China in sector j , and M_{ij} represents imports from China in the same sector.

The values of this index range from minus one to plus one. Values approaching plus one indicate strong export specialization and a trade surplus, while values approaching minus one reflect a high level of import dependence and a trade deficit. Values around zero suggest a relatively balanced trade position.

By integrating the RCA and TBI indices, the study establishes a comprehensive analytical framework for evaluating Serbia's trade position vis à vis China. The joint interpretation of these indicators enables the classification of sectors into four distinct groups depending on the presence of comparative advantage and the nature of the trade balance. This classification provides deeper insights into the structural characteristics of bilateral trade and allows for the identification of sectors that serve as key drivers of export performance, as well as those that reveal structural weaknesses or untapped potential.

Furthermore, this methodological approach facilitates a more nuanced understanding of the dynamics of international trade specialization, highlighting not only static comparative advantages but also the broader context of trade imbalances and sectoral dependencies. As such, it provides a robust basis for subsequent empirical analysis and discussion of results, contributing to a more informed evaluation of Serbia's position within the global and bilateral trade system.

4. RESULTS OF THE EMPIRICAL ANALYSIS

This section presents the results of the empirical analysis of trade relations between the Republic of Serbia and the People's Republic of China over the observed period. The analysis is based on selected quantitative indicators used to assess trade structure, competitiveness, and balance at the sectoral level

Particular attention is given to the interpretation of the Revealed Comparative Advantage and Trade

Balance Index, which provide insights into Serbia's export performance and trade orientation. The results are used to identify key sectoral patterns, as well as areas of comparative strength and dependence in bilateral trade relations.

4.1. An Overview of Trade Flows Between Serbia and China

Trade relations between the Republic of Serbia and the People's Republic of China during the period 2021–2025 show a continuous expansion and intensification of bilateral exchange, accompanied by a significant increase in total trade volume as well as a persistent and structural trade deficit on the Serbian side.

According to the data presented in Table 1, total trade between the two countries increased from USD 5,103,270 in 2021 to USD 9,367,050 in 2025, representing almost a twofold increase over the observed period and indicating a strengthening of economic relations.

Table 1: Trade exchange between Serbia and China (in USD)

Year	Export (Serbia → China)	Import (China → Serbia)	Total Trade	Trade Balance (Export - Import)	Export/Import Ratio (%)
2021	944,546	4,158,724	5,103,270	-3,214,178	22.7%
2022	1,166,498	4,982,420	6,148,918	-3,815,922	23.4%
2023	1,238,335	4,867,974	6,106,309	-3,629,639	25.4%
2024	1,945,318	5,552,821	7,498,138	-3,607,503	35.0%
2025	2,095,977	7,271,073	9,367,050	-5,175,096	28.8%

Source: Authors, based on data from the Statistical Office of the Republic of Serbia

The structure of trade remains highly asymmetric throughout the entire analysed period.

Imports from China dominate bilateral exchange and increased from USD 4,158,724 in 2021 to USD 7,271,073 in 2025. In contrast, Serbia's exports to China, although showing growth, remain significantly lower, rising from USD 944,546 to USD 2,095,977 over the same period. This gap clearly indicates Serbia's continued dependence on Chinese industrial goods, machinery, and intermediate inputs.

As a consequence of this structure, Serbia recorded a constant trade deficit throughout the observed period.

The negative balance amounted to USD 3,214,178 in 2021, increased to USD 3,815,922 in 2022, and reached USD 5,175,096 in 2025. These figures confirm that the trade imbalance did not decrease in absolute terms, but rather deepened in certain years.

Nevertheless, certain indicators suggest a gradual improvement in Serbia's export performance. The export to import ratio increased from 22.7% in 2021 to 28.8% in 2025, indicating a slight improvement in export coverage of imports. However, these values still confirm a dominant import oriented structure in bilateral trade.

Overall, the observed period is characterized by a significant deepening of trade relations between

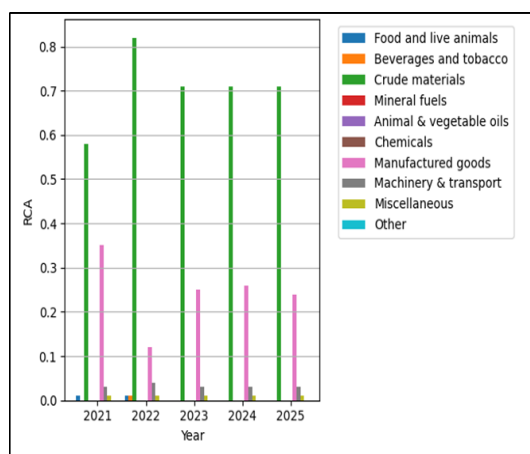
Serbia and China, alongside strong growth in total trade but also a persistent structural imbalance. Although Serbia's exports show gradual growth, they remain insufficient to substantially reduce the trade deficit, confirming that Serbia's trade position vis à vis China is still predominantly import oriented.

4.2. Revealed Comparative Advantage in Trade between the Republic of Serbia and the People's Republic of China

The calculated index of revealed comparative advantage of Serbian exports in relation to the

People's Republic of China is presented in Figure 1. The figure illustrates the evolution of Serbia's export competitiveness in the Chinese market over the observed period, highlighting changes in sectoral advantages and the overall structure of trade performance between the two countries.

Figure 1. RCA Index of Serbia in Trade with China (2021-2025)



Source: Authors' calculations

The analysis of the Revealed Comparative Advantage (RCA) indices for Serbia's trade with China over the period 2021–2025 reveals a structurally weak and narrowly based pattern of export competitiveness. Across all observed SITC sectors, RCA values remain consistently below the critical threshold of unity, indicating that Serbia does not possess a revealed comparative advantage in any product group within the Chinese market. This outcome reflects a limited degree of specialization and an overall lack of competitiveness relative to global export patterns.

Despite the absence of a formal comparative advantage, certain sectors demonstrate relatively stronger performance compared to others. In particular, SITC sector 2 emerges as the most competitive segment of Serbia's exports to China, with RCA values ranging from approximately 0.58 in 2021 to a peak of around 0.82 in 2022, followed

by a stabilization at levels slightly above 0.70 in subsequent years. Although these values remain below unity, the sector consistently outperforms all other categories, indicating a relatively higher degree of export specialization and suggesting the presence of underlying comparative potential. The stability of RCA values in this sector further points to a certain resilience of export capacity, even in the absence of full competitiveness.

A secondary group of sectors with moderate, yet still insufficient, performance includes SITC sector 6. RCA values in this category are notably lower than in sector 2, fluctuating between approximately 0.12 and 0.35 over the observed period. The highest value is recorded in 2021, followed by a noticeable decline in 2022 and partial recovery in later years, although without reaching earlier levels. This pattern suggests that competitiveness in this sector is unstable and likely influenced by short-term factors such as fluctuations in demand or production capacity, rather than sustained structural strength.

All remaining sectors, including SITC 0, 1, 3, 4, 5, 7, 8, and 9, exhibit extremely low RCA values, in many cases approaching zero throughout the entire period. Such results indicate a near absence of export specialization and confirm that Serbia's presence in these segments of the Chinese market is negligible. This lack of competitiveness is particularly evident in technologically intensive sectors, where high entry barriers, capital intensity, and limited domestic capabilities constrain Serbia's export potential.

From a dynamic perspective, the RCA indices do not show significant structural improvement over time. Although minor fluctuations are present across individual years, there is no clear upward trend that would suggest a process of sustained export upgrading or diversification. Instead, the observed stability at low levels reinforces the conclusion that Serbia's export structure toward China remains largely unchanged and concentrated in a narrow range of lower value-added products.

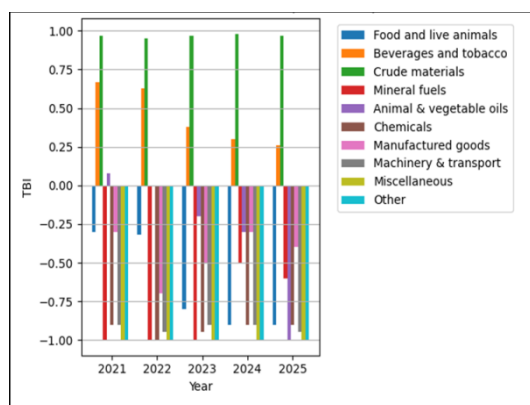
Overall, the RCA analysis highlights a pronounced structural limitation in Serbia's export competitiveness in relation to China. The absence of sectors with RCA values above unity, combined with the concentration of relatively better performance in only one sector, indicates a lack of diversification and insufficient integration into higher value-added segments of international trade. These findings point to the need for strategic improvements in production capacity, technological development, and export orientation

in order to enhance Serbia's long-term competitiveness in the Chinese market.

4.3. Trade Balance Index of the Republic of Serbia's trade with the People's Republic of China

The analysis of the Trade Balance Index (TBI) for Serbia's trade with China over the period 2021–2025 reveals a strongly asymmetric and structurally imbalanced trade pattern, predominantly characterized by import dependence.

Figure 2. TBI Index of Serbia to China



Source: Authors' calculations

The majority of SITC sectors record persistently negative TBI values, indicating that imports from China significantly exceed exports across most product groups. This confirms that Serbia's bilateral trade structure is largely shaped by its reliance on Chinese industrial and manufactured goods.

A clear exception to this general pattern is observed in SITC sector 2, which consistently exhibits strongly positive TBI values, close to 1 throughout the entire period. Such high values indicate a pronounced export specialization, where exports significantly exceed imports. This sector represents Serbia's most stable and dominant export-oriented category in trade with China, reflecting a strong and sustained comparative position in terms of trade balance, even in the absence of full comparative advantage as indicated by RCA results.

SITC sector 1 also shows positive TBI values during the observed period, although with a noticeable declining trend. The index decreases from approximately 0.67 in 2021 to around 0.26 in 2025, indicating that, while exports still exceed imports, the relative strength of this sector is gradually weakening. This suggests a potential erosion of export capacity and a movement toward a more balanced or even deficit position in the future if current trends persist.

In contrast, the majority of sectors, including SITC 3, 4, 5, 6, 7, 8, and 9, are characterized by strongly negative TBI values, often approaching -1 . These values indicate a near-complete dominance of imports over exports, highlighting Serbia's dependence on Chinese products in these sectors. This is particularly evident in manufacturing and technologically intensive industries, where Serbia lacks sufficient domestic production capacity and competitiveness, resulting in a structurally embedded trade deficit.

SITC sector 0 also records negative TBI values, although less extreme compared to other deficit sectors, suggesting a moderate but consistent trade imbalance. The relatively smaller deficit in this sector may reflect a certain degree of two-way trade, but without a clear export advantage.

From a dynamic perspective, the TBI values do not indicate substantial structural improvement over time. While minor fluctuations can be observed across individual years, the overall pattern of strong import dominance remains unchanged. The persistence of deeply negative values across most sectors suggests that Serbia has not significantly reduced its dependence on Chinese imports during the observed period.

Overall, the TBI analysis confirms that Serbia's trade with China is characterized by a high degree of structural asymmetry, where only a limited number of sectors generate trade surpluses, while the majority remain heavily import-dependent. This pattern reflects underlying differences in economic structure, technological development, and industrial capacity, and points to the need for strengthening domestic production and export capabilities in order to achieve a more balanced and sustainable trade relationship.

4.4. Combined Interpretation of RCA and TBI

A joint analysis of the Revealed Comparative Advantage (RCA) and Trade Balance Index (TBI) enables a more comprehensive and nuanced classification of trade sectors in the context of Serbia's trade relations with China. By integrating indicators of export competitiveness and trade balance, it is possible to identify structural patterns across different SITC categories.

Sectors characterized by both comparative advantage and a trade surplus are represented by SITC 2. These sectors reflect Serbia's relatively strongest position in bilateral trade and constitute the primary drivers of its export performance. The simultaneous presence of RCA values above one and positive TBI values indicates both international competitiveness and a favourable trade position in these product groups.

In contrast, sectors without comparative advantage and with a persistent trade deficit include SITC 6, 7, and 8. These sectors demonstrate a structural reliance on imports and a lack of sufficient export competitiveness. The combination of RCA values below one and negative TBI indicators highlights Serbia's weaker position in higher value-added and technologically more complex segments of trade with China.

A third group includes sectors with limited or transitional performance, such as SITC 1. Although this sector still records a trade surplus in certain periods, the indicators suggest a gradual weakening of its competitive position. This implies potential vulnerability and a possible shift towards a less favourable trade balance in the long run.

Overall, this classification confirms that Serbia's trade structure with China exhibits a dual character. Exports are predominantly concentrated in lower value-added goods, while imports are largely composed of technologically intensive and higher value-added products. Such a structure reflects an underlying asymmetry in trade relations and points to persistent challenges in upgrading Serbia's export profile within the bilateral economic framework.

CONCLUSION

The analysis of trade relations between the Republic of Serbia and the People's Republic of China over the period 2021–2025 reveals several important structural characteristics and challenges.

The results of the Revealed Comparative Advantage (RCA) index indicate that Serbia's export competitiveness is highly concentrated in a limited number of sectors, particularly in SITC group 2 (crude materials). This confirms that Serbia's comparative advantages are primarily based on the export of raw materials and low value-added products.

At the same time, the Trade Balance Index (TBI) highlights a persistent trade imbalance across most sectors. While Serbia maintains a trade surplus in a small number of sectors, the majority of industries are characterized by significant import dependence, especially in technologically intensive and higher value-added goods such as machinery and manufactured products.

The combined analysis of RCA and TBI indices suggests that the trade relationship between Serbia and China is structurally asymmetrical. Serbia predominantly exports primary goods, while importing more sophisticated and industrial products from China. Such a pattern reflects underlying differences in economic structure,

technological development, and production capacity.

These findings point to several key challenges for the Serbian economy. First, there is a need to reduce excessive reliance on a narrow range of export sectors. Second, improving competitiveness in higher value-added industries is essential in order to achieve a more balanced and sustainable trade relationship. Third, diversification of export markets and products should be prioritized to mitigate potential external risks.

In the context of the Belt and Road Initiative, Serbia should strategically utilize its comparative advantages in SITC Category 2 not merely through the export of raw materials, but also through the development of domestic processing capacities in sectors such as mining, metallurgy, and agro processing industries. This objective could be achieved through targeted Chinese investments in industrial zones, technology transfer agreements, and joint ventures aimed at increasing the degree of final processing prior to export. Furthermore, the modernization of transport and logistics infrastructure within the framework of China Serbia cooperation could contribute to lowering export costs and strengthening Serbia's integration into regional and global supply chains.

Moreover, Serbia should implement industrial policies oriented toward the promotion of higher value added production through incentives for research and development, workforce specialization, and the adoption of advanced manufacturing technologies. Cooperation in production capacities with Chinese enterprises could additionally facilitate the integration of Serbian companies into broader Belt and Road supply networks, thereby enabling a gradual transition from a resource based export structure toward more technologically intensive and internationally competitive industries.

In conclusion, while trade with China offers significant opportunities for economic growth, it also exposes structural weaknesses that must be addressed through targeted economic policies. Strengthening industrial capacity, encouraging innovation, and enhancing export sophistication represent crucial steps toward improving Serbia's position in international trade.

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