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The Trade Dynamics Between Uzbekistan and Kazakhstan: Analysis of Competitiveness, Product Complexity, and Trade Preference

Abstract. *Uzbekistan and Kazakhstan are the largest economies in Central Asia, and bilateral trade relations between them play a significant role in shaping the region's economic ties. This analysis examines trade relations between Uzbekistan and Kazakhstan from 2017 to 2023, focusing on competitiveness, product complexity, and trade preferences. The study employs the Revealed Comparative Advantage (RCA), the Product Complexity Index (PCI) developed by the Harvard Kennedy School Growth Lab, and the Coefficient of Trade Preference (CTP). These methodologies are used to assess the competitiveness of products in both countries, track changes in the Product Complexity Index over the years, and analyze the degree of trade integration between the two nations.*

Keywords: Revealed Comparative Advantage, RCA, Product Complexity Index, PCI, Coefficient of Trade Preference, CTP, trade integration.

INTRODUCTION

Trade relations between Uzbekistan and Kazakhstan have been improving year by year. In 2017, the total trade volume between the two countries was valued at 2 billion USD, and by 2023, this figure had increased to 4.3 billion USD. The COVID-19 pandemic caused a significant drop in trade turnover in 2020, reducing it from 3.1 billion USD in 2019 to 2.8 billion USD. However, in 2021 and 2022, trade turnover sharply increased, reaching 3.7 billion USD and 4.5 billion USD, respectively. In 2023, the trade volume between the two countries decreased slightly to 4.3 billion USD.

Trade dynamics between Uzbekistan and Kazakhstan



Uzbekistan primarily exports motor vehicles, boilers and machinery, and edible fruit and nuts to Kazakhstan. Kazakhstan's exports to Uzbekistan include cereals, iron and steel, and industrial products such as products of the milling industry. The diversification of product types indicates that bilateral trade is becoming more comprehensive and beneficial, as both countries export products that are not directly competitive with each other.

Literature Review

In analyzing trade relations between Uzbekistan and Kazakhstan, the competitiveness of products, product complexity, and trade preferences are of paramount importance. These factors are key to developing more effective economic relations between the countries. The Revealed Comparative Advantage (RCA) theory, developed by Balassa (1965), serves as a primary tool for evaluating competitiveness and specialization between countries. The RCA index indicates which sectors each country has a comparative advantage in based on export data, and this approach is effectively applied in analyzing the trade dynamics between Uzbekistan and Kazakhstan.

Additionally, the article "Trade Facilitation, Infrastructure, and International Trade in Central Asian Countries" by the Asian Development Bank (2023) sheds light on the economic cooperation and trade dynamics of Central Asian countries. The article analyzes the impact of improving infrastructure and trade facilitation on imports and exports, discussing how border crossing times and freight transportation affect trade

flows within the Central Asia Regional Economic Cooperation (CAREC) program countries. It also recommends diversifying the transport system, strengthening digital infrastructure, improving trade, and collaborating to eliminate non-tariff barriers in the region to improve infrastructure.

A. Yerimpasheva's article "Exploring the Competitiveness of Central Asian Economies: A Comparative Analysis" emphasizes the importance of various economic changes and regional integration processes. The study used competitiveness assessment methods developed by the World Economic Forum and global competitiveness indicators from the World Bank. The results highlighted that countries like Kazakhstan and Uzbekistan showed positive growth in competitiveness due to natural resources, economic reforms, and infrastructure development. Based on this, it was emphasized that for enhancing competitiveness in Central Asia, attention should be paid to diversifying economies, strengthening institutions, and attracting investments in innovative projects.

These studies provide theoretical and practical approaches to analyzing trade relations between Uzbekistan and Kazakhstan. The RCA theory presented by Balassa, along with reports and articles on enhancing economic cooperation in Central Asia, helps better understand the economic impact of trade liberalization, product complexity, and trade preferences. These sources will assist in making strategic decisions to improve trade relations and deepen economic integration between the two countries.

Methodology

1. **Revealed Comparative Advantage (RCA).** The RCA index is a crucial indicator that shows whether a country has a competitive advantage in exporting a particular product¹. The RCA is calculated using the following formula:

$$RCA_{ij} = \frac{(X_{ij}/X_{it})}{(X_{jt}/X_{wt})}$$

¹ <https://onlinelibrary.wiley.com/doi/10.1111/j.1467-9957.1965.tb00050.x>

Where:

- X_{ij} is the export of product j by country i ,
- X_{it} is the total exports of country i ,
- X_{jt} is the total exports of product j by all countries,
- X_{wt} is the total world exports.

According to the RCA index, countries are divided into two groups:

- **RCA < 1:** The country lacks a competitive advantage in exporting the product.
- **RCA > 1:** The country has a competitive advantage in exporting the product.

2. **Product Complexity Index (PCI)** The Product Complexity Index (PCI)², developed by the Harvard Kennedy School Growth Lab³, evaluates the variety and complexity of the knowledge and skills needed to produce a product. Products with a high index value are the most complex products and they can be produced by only a few countries. The most complex products include electronics and chemical products and have higher added value. Products with a relatively lower index value include raw materials and basic agricultural products and they have less added value. These types of products require basic or no processing technics and know-how and they can be produced by almost all countries.

The overall PCI for each year t is calculated using the formula provided:

$$PCI_t^{overall} = \sum_{i=1}^n (PCI_{it} * \frac{E_{it}}{TE_t}) = \sum_{i=1}^n (PCI_{it} * \omega_{it})$$

Where,

- $PCI_t^{overall}$ represents the overall PCI of the exports of goods in period t ;
- PCI_{it} is the PCI of the i -exported product in period t ;
- E_{it} denotes the export volume of product i in period t ;
- TE_t is the volume of the total exports of goods in period t ;

² <https://atlas.cid.harvard.edu/rankings/product>

³ <https://growthlab.hks.harvard.edu/>

- ω_{it} represents the share or weight of the i -exported product in the period t , calculated as $\omega_{it} = \frac{E_{it}}{TE_t}$.

3. **Coefficient of Trade Preference (CTP)** The CTP is an indicator of trade integration between two countries, measuring the importance of one country as a trading partner for another. CTP is calculated by comparing the share of trade with a particular partner to the share of that partner in global trade.

The formula for CTP is:

$$K_1 = \frac{T_i}{T_w}$$

Where:

- T_i is the share of trade with the partner in the total trade of country i ,
- T_w is the share of trade of the partner in global trade.

Interpretation of CTP values:

- **K1 = 1:** Trade relations are at the global average.
- **K1 > 1:** Stronger trade relations than the global average, indicating higher integration.
- **K1 < 1:** Weaker trade relations than the global average, indicating lower integration.

Results

Revealed Comparative Advantage (RCA)

Uzbekistan and Kazakhstan both exhibit comparative advantages in several product categories. Uzbekistan has a higher RCA for 24 types of products⁴, including textile fabric, clothing, and fruits and vegetables. Kazakhstan, on the other hand, has a competitive advantage in 12 product categories⁵, such as inorganic chemicals, cereals, and mineral fuels and oils. By leveraging these comparative advantages, the two countries can enhance bilateral trade by exchanging products in which they do not have competitive edges.

⁴ https://tradecompetitivenessmap.intracen.org/TP_EP_Cl.aspx?RP=004&YR=2022

⁵ https://tradecompetitivenessmap.intracen.org/TP_EP_Cl.aspx?RP=004&YR=2022

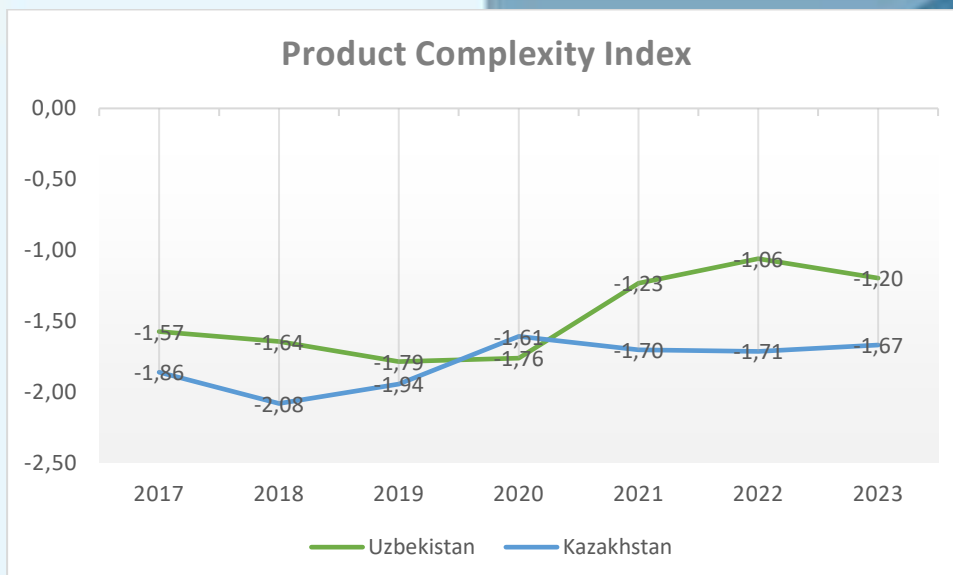
In six product categories where Uzbekistan does not have a comparative advantage, Kazakhstan holds a higher level of competitiveness. The imports of these products to Uzbekistan are significant, amounting to between 124.8 million USD and 2 billion USD in 2022. Specifically, the import of mineral fuels and oils and iron and steel exceeded 1.8 billion USD each. However, Kazakhstan's share in Uzbekistan's imports of these products is only 13.4% and 26.6%, respectively. Additionally, imports of inorganic chemicals from Kazakhstan accounted for 7.1% of total imports. For the remaining three product categories, Kazakhstan's share of imports from Uzbekistan is relatively high, ranging from 62% to 95%.

In Kazakhstan, there is a comparative advantage in 17 product categories where Uzbekistan has a lower level of competitiveness. Of these, only edible vegetables and certain roots have a higher share in imports from Uzbekistan (41.8%). For the other 16 product categories, Uzbekistan's share of imports is less than 30%. Specifically, imports of precious or semi-precious stones, lac, gums, resin and other vegetable saps and products of animal origin not otherwise specified or included, accounted for less than 0.4%. In 2022, Kazakhstan's total imports of these products amounted to 403.2 million USD, 10.3 million USD, and 7.5 million USD, respectively.

Furthermore, both countries have a comparative advantage in six product categories, and through the exchange of resources and the development of joint marketing strategies, cooperation in the export of these products can be established. This would enhance trade integration between the two countries and further increase their export potential.

Product Complexity Index (PCI)

The overall complexity index of products exported from Uzbekistan (PCI) has been improving year by year. The PCI increased by 23.9% between 2017 and 2023, rising from -1.57 in 2017 to -1.2 in 2023. The lowest PCI indicators were recorded in 2019 and 2020 due to the pandemic (-1.79 and -1.76). The share of less processed products (such as gold, cotton, oil, refined copper, and vegetables, which require minimal processing) in Uzbekistan's exports has remained high, causing the PCI remain low.



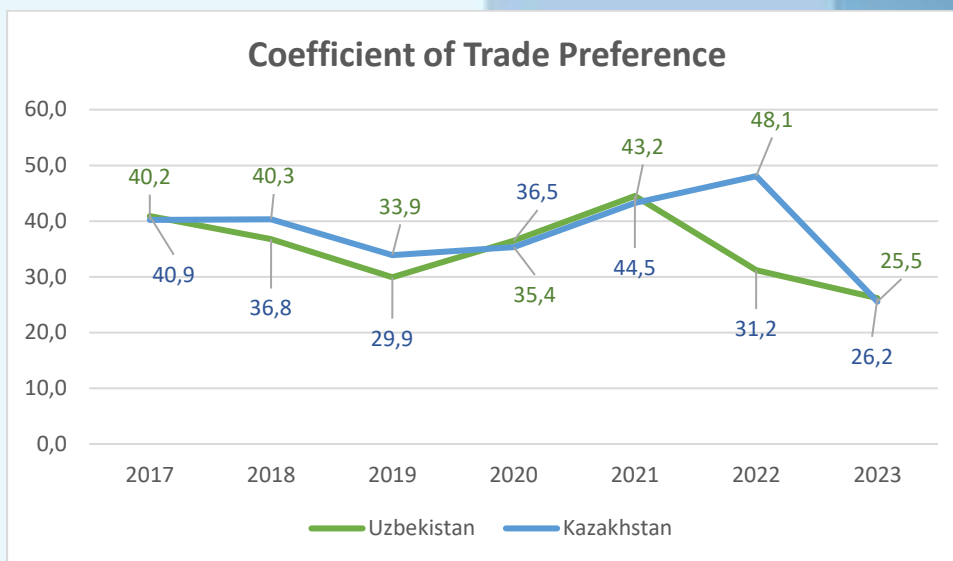
Kazakhstan's PCI also improved year by year, rising from -1.86 in 2017 to -1.67 in 2023. In 2018, the sharp increase in exports of Petroleum oils and oils obtained from bituminous minerals led to a decrease in the PCI, reaching -2.08. However, from 2019 onward, the PCI gradually improved, reaching -1.71 in 2022 and -1.67 in 2023. This improvement was mainly due to the increased share of products with higher added value, such as flat-rolled products of iron or non-alloyed steel and telephone sets. However, Kazakhstan's exports still have a high share of less processed products, limiting the growth of the PCI.

Both countries' PCI indicators reflect the ongoing trend of industrialization and economic diversification, but transitioning from simple products to more complex, value-added products remains challenging.

Coefficient of Trade Preference (CTP)

Between 2017 and 2023, the trade preference coefficient between the two countries fluctuated, but the coefficients changed in proportion to each other. In 2017, the trade preference coefficient for both countries was approximately 40, indicating the high importance of trade relations between the two countries. Starting in 2018, the CTP values for Uzbekistan and Kazakhstan began to decrease, and by 2019, Uzbekistan's coefficient had dropped to 29.9, while Kazakhstan's was 33.9. This decline reflects changes in global trade dynamics, the strengthening of trade relations with other

countries, particularly Uzbekistan's growing integration into the global market, and Kazakhstan's expanded trade relations with other states, including Russia, China, and the European Union.



By 2023, the coefficients had decreased further, with Uzbekistan's coefficient falling to 26.2 and Kazakhstan's to 25.5. This sharp decline indicates a reduction in the importance of bilateral trade between the two countries relative to their global trade portfolios. Although their mutual trade remains significant, these relations are gradually diminishing as global trade connections expand.

Conclusion

The trade dynamics between Uzbekistan and Kazakhstan from 2017 to 2023 illustrate a shift in the relative importance of their bilateral trade, influenced by both internal economic strategies and external global trade trends. The declining trade preference coefficient (CTP) signals a reorientation of priorities as both nations diversify their trade relationships and integrate more fully into global markets. As Uzbekistan and Kazakhstan increase their competitiveness through industrial modernization and product diversification, their trade ties with each other have become less central but still remain essential to regional economic stability and growth.

Despite the decrease in bilateral trade significance, the two countries should continue to foster economic cooperation, especially in areas where they have complementary strengths. Regional collaboration on infrastructure, energy, and environmental initiatives will be critical to maintaining a stable and prosperous Central Asian economy. Further strengthening trade relations, focusing on high-value, complex

products, and boosting intra-regional trade can provide both nations with a competitive edge in the broader global economy.

Both countries should focus on enhancing efforts to diversify export goods, invest in technological advancements, and promote innovation-driven industries. Additionally, increasing the focus on regional trade agreements and fostering cross-border partnerships will help sustain economic growth while improving competitiveness. Both countries should also explore ways to streamline trade facilitation and reduce non-tariff barriers to create a more seamless trading environment. By adopting these strategies, Uzbekistan and Kazakhstan can further solidify their positions in the global marketplace, ensuring long-term economic prosperity and continued regional integration.

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