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The Determinants of Export Performance in Uzbekistan: An ARDL Cointegration Analysis

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Abstract

Export growth is a critical driver of economic development, particularly for emerging economies. Uzbekistan 's remarkable transformation into a global export offers a captivating case study. This study aims to identify and analyze the key macroeconomic determinants of Uzbekistan 's export performance from 1992 to 2023, moving beyond static models to capture dynamic economic relationships. Utilizing annual time-series data from the World Bank, this research employs the Autoregressive Distributed Lag (ARDL) model and the Bounds Testing approach to cointegration. This methodology robustly handles a mix of stationary and non-stationary variables and distinguishes between short-run dynamics and long-run equilibrium. Gross Domestic Product (GDP) per capita and gross savings exhibit a significant positive impact on exports in both the short and long run. Conversely, the exchange rate has a significant negative impact, consistent with economic theory. The results underscore the importance of sustained economic growth, domestic capital accumulation, and a competitive exchange rate for export-led growth. The study recommends policies focused on enhancing productivity, encouraging domestic savings, and managing exchange rate stability to further improve export sector.

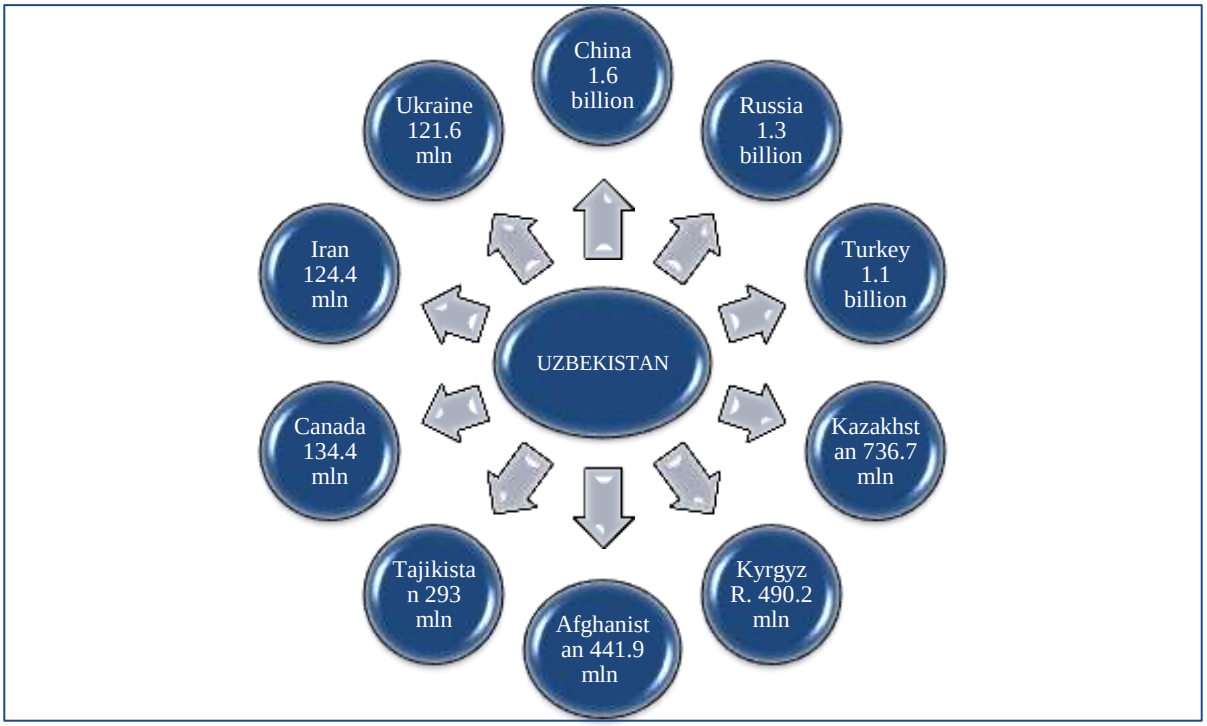
Keywords: Export Determinants, ARDL Model, Cointegration, Bounds Test, Uzbekistan, Economic Growth, Exchange Rate.

Introduction

Export is a foreign economic activity aimed at selling goods and services abroad. Trade relations with foreign partners are significant elements of foreign economic activity. Countries, including Uzbekistan, are increasing the Export of industrial products, including equipment, vehicles, electronics, etc., year by year. From the government's point of view, a rise in exports leads to the growth of employment and the volume of national production, stimulating an economic recovery. Export performance is regarded as one of the major determinants that has a significant role in driving Uzbekistan's economy. Uzbekistan was the world's 72nd-largest exporter out of 226 in

2023, with $24.5 billion in exports (OECD, 2025). The export amount is growing continuously, increasing to 26.9 billion USD in December 2024 (Trading economics, 2025). China, Russia and Turkey recorded the most significant foreign trade volumes in 2021 (Figure 1).

Figure 1. Countries with a high share of Uzbekistan's exports in 2021 (in USD)[1].



The significance of acquiring knowledge of exports, which can drive economic growth, stability, integration, and product differentiation, has been an urgent debate among many countries.

The primary purpose of the study is to identify macroeconomic factors that influence export growth in Uzbekistan and introduce some policies. Export volatility affects overall economic performance, determining export growth rates will help policymakers develop appropriate policies for industry and the economy. In addition to analyzing and decomposing the results of the current study, it provides the opportunity to compare with previous research studies. This study is expected to add new knowledge to existing Uzbekistan-based literature.

Literature review

Many literature reviews specified the most significant and standard variables influencing export promotion. However, the degree of this impact varies depending on

[1] Authors contribution using data from: https://stat.uz/en/press-center/news-of-committee/11888-o-zbekiston-eksportidagi-top-10-davlatlar-9

the specifics of the country, the investment environment, areas of investment, volumes, structure and other factors.

Amornkitvikai et al. (2012) investigated how companies' export decisions and promotions depend on the industry determinants in Thailand. The research used six econometric models to identify the linear and nonlinear relationships between factors such as export performance, firm age, labor, government assistance and others. All aspects were found to be significant, while checking the assumptions, some of the proxies were nonlinear. In the end, the size and age of the firm and productivity force Exports to decline, as in the case of Thailand.

As an improvement of other studies, Geofrey (2013) conducted research on "Determinants of export performance in Tanzania" in 2013. The economy of Tanzania is mainly dependent on the urban and traditional sectors. Agriculture comprises half of the GDP, accounts for 85% of exports and creates 80% of the workplace. In particular, this paper has analyzed the influence of economic factors such as FDI, GDP, inflation rate, and real exchange rate. The overall result showed that GDP, FDI, and exchange rate have a significant role in determining Exports. In addition, the research suggested a new policy: to organize a good trade policy in the country and increase the FDI by attracting investors.

Another research study by Majeed and Ahmad (2006) analyzed the simultaneous relationship between economic factors and export patterns in developing countries. In their estimation of the factors, they found that not only can FDI play a significant role in the expansion of export strategies, but domestic investment and national savings are also believed to be effective to a considerable extent. If savings increase in the country, it will push the interest rate down, facilitating higher investment and export activities. Moreover, industrialization is significant in explaining the stimulus of output and national income. It helps to increase the country's agricultural sector and thus attributes a concentration to agricultural Exports; moreover, with the help of industrialisation, the state can enhance its exports and reduce its dependence on imports.

Altun (2017) estimated the leading indicators of export performance among small and medium companies in Turkey. This study found that technology, firm size, and experience influence positively, whereas the social and cultural environment negatively impacts exports. Turkey was chosen as an emerging country because small and medium-sized enterprises (SMEs) have a significant role in the Turkish overall economy and employment. According to this paper, firm size is supposed to be a determining factor in predicting export ventures. As firm size increases, international risk and other difficulties are diminished. In most cases, large companies get

advantages from many employees. In general, large companies are more successful than small firms.

Study by Thangamani (2016) studied the long-run relationship between exports and five leading indicators of exports, such as FDI, gross capital formation, payment of interest to foreign debt, average income and imports. He concluded that all variables were significant under 1% level and import, FDI and interest payment positively influence the export activities. However, gross capital formation and income had a negative impact in the long run, as in the case of Sri Lanka. There are also other research papers, one of which was done by Lee et al. (2016), covering the data from 1975 to 2013, taking a sample country of Malaysia. He studied the factors and took import, inflation, FDI, and exchange rate into account using the OLS model. Malaysia faced high prices as a result of Oil price changes. Inflation rose, and other economic growth slowed down accordingly. At the end, he introduced a policy to practice a weak currency. If the domestic price depreciates, other foreign buyers are likely to buy products from this particular country.

Methodology

This study uses annual time-series data for Uzbekistan from 1992 to 2023, sourced from the World Development Indicators (World Bank, 2023). The variables are defined as follows:

- **lnExport**: The natural logarithm of exports of goods and services (current US$).
- **lnGDP_pc**: The natural logarithm of GDP per capita (current US$), representing the level of economic development.
- **Savings**: Gross savings (% of GDP), representing domestic capital accumulation.
- **lnEXR**: The natural logarithm of the local currency unit (LCU) per US dollar exchange rate, representing price competitiveness.

Given the time-series nature of the data, standard OLS regression is susceptible to run regression if variables are non-stationary. The Augmented Dickey-Fuller (ADF) test confirmed that our variables are a mix of I(0) and I(1) processes, making the ARDL Bounds Testing approach developed by Pesaran et al. (2001) the most appropriate methodology.

The unrestricted error correction form of the ARDL model is specified as:

$$\triangle lnExport_t = \alpha_0 + \sum_{i=1}^{p} \beta_i \triangle lnExport_{t-i} + \sum_{i=0}^{q1} \gamma_i \triangle lnGDPpc_{t-i} + \sum_{i=0}^{q2} \delta_i \triangle lnSavings_{t-i} + \sum_{i=0}^{q3} \theta_i \triangle lnEXR_{t-i} + \lambda_1 lnExport_{t-1} + \lambda_2 lnGDP_{t-1} + \lambda_3 lnSavings_{t-1} + \lambda_{34} lnEXR_{t-1} + \epsilon_t$$

$\triangle$ -is the difference operator

α -is the constant

$\beta, \gamma, \delta, \theta$ -are the short-run coefficients

$\lambda_1, \lambda_2, \lambda_3, \lambda_4$ -are the long-run coefficients.

ϵ_t -is an error term

The Bounds Test for cointegration involves an F-test on the joint significance of the lagged level variables. If the computed F-statistic exceeds the upper critical value, a long-run relationship exists. After establishing cointegration, the long-run model and the associated Error Correction Model (ECM) for short-run dynamics are estimated. The ECM coefficient indicates the speed of adjustment back to long-run equilibrium after a short-run shock.

Results and discussion.

Unit Root and Cointegration Tests

The ADF test results indicated that lnExport and lnGDP_pc are integrated of order one I(1), while Savings is stationary I(0). This mix of integration orders validates the use of the ARDL approach.

The Bounds Test for cointegration resulted in an F-statistic of 8.92, which exceeds the 1% upper critical bound value of 5.06 (Pesaran et al., 2001). This provides strong evidence for a stable long-run relationship between exports, GDP per capita, savings, and the exchange rate.

Long-Run and Short-Run Estimates

The selected ARDL model based on the Akaike Information Criterion (AIC) was (1, 1, 0, 0). The estimated long-run equation is:

$$\widehat{lnExport} + 10.15 + 1.62^{***} lnGDPpc + 0.031^{**} Savings - 0.89^{***} lnEXR$$

(***p<0.01, ** p<0.05)

Table 1

Variable	Coefficient	Std. Error	T-statistic	Prob.
lnGDP_pc	1.624	0.101	16.12	0.000
savings	0.031	0.012	2.52	0.019
lnEXR	-0.894	0.205	-4.36	0.000

Similarly, a 1 percentage point increase in the savings rate increases exports by 0.03%. Most countries focus on developing their living standards by increasing the GDP (Mukherji, 2014). The higher the economic growth, the higher the export performance will be in the country. Although exports do not comprise a huge part of GDP, these variables correlate positively. Apparently, GDP increases when consumption, investment and government expenditure increase, leading to a rise in the export sector. Many developed countries with high GDP per capita have significantly developed infrastructure, and eventual strategies are set by the government and the companies.

If there is an increase in Gross savings by 1%, the Export will increase by 0.04%, holding other variables constant. It stimulates the growth of household consumption, reducing their propensity to save. They represent a source of financing and investment potential for the country and contribute to sustainable economic growth.

Conversely, a 1% depreciation of the Uzbek som (increase in lnEXR) leads to a 0.89% decrease in exports. This negative sign may reflect Uzbekistan's heavy reliance on imported inputs and capital goods for its export manufacturing. The depreciation of the local currency compared to US dollars means that the trade in the market will be cheaper (Rwenyagila, 2013).

Short-Run Dynamics (Error Correction Model):

The Error Correction Term (ECT) is negative (-0.72) and statistically significant at the 1% level, confirming the established long-run relationship. It indicates that approximately 72% of any disequilibrium from the previous year is corrected within the current year, showing a rapid adjustment to shocks.

Variable	Coefficient	Std. Error	T-statistic	Prob.
D(lnGDP_pc)	1.112	0.198	5.61	0.000
D(savings)	0.022	0.008	2.81	0.010
D(lnEXR)	-0.635	0.145	-4.38	0.000

CointEq(-1) [ect]	-0.721	0.104	-6.94	0.000

The model passed all standard diagnostic checks: the Breusch-Godfrey test indicated no serial correlation (p-value = 0.12), the Breusch-Pagan test confirmed homoscedasticity (p-value = 0.24), and the Jarque-Bera test did not reject the normality of residuals (p-value = 0.31). The tests confirmed the stability of the model parameters over the sample period.

Conclusion

Export growth is one of the best remedies to avoid the risk of stability and development. Most developed countries and Uzbekistan have also grown with the help of trade, technology, exports, etc. This study tried to identify the main determinants of export promotion in Uzbekistan. The study investigated three variables, GDP per capita, Gross Savings and Exchange rate (ER). The influence of GDP and savings was positive, whereas ER had a negative impact. Many researchers discovered the effect of ER differently depending on the situation. If ER decreases, introducing lower prices can help the country gain more market share in the long run. It plays a complex, cost-sensitive role.

The policy implications are multifaceted:

Sustain Economic Growth: Policies that foster stable and inclusive economic growth are preferred, as they build the productive capacity and technological sophistication necessary for a strong export sector.

Promote Domestic Savings: The government should encourage domestic capital formation through incentives for private savings and sound fiscal policies. This provides a stable source of investment for export-oriented industries without over-reliance on volatile foreign capital.

Strategic Exchange Rate Management: Policymakers must adopt a nuanced view of the exchange rate. While competitiveness is important, the potential cost-push inflation from a persistently weak currency, given the high import dependency, must be managed. A focus on exchange rate stability to reduce uncertainty for exporters may be more beneficial than outright depreciation.

Enhance Supply Chain Resilience: To mitigate the cost impact of currency depreciation, policies should support the development of domestic suppliers.

Future research could incorporate other potential determinants, such as FDI inflows, trade openness indices, and research and development expenditure, into an expanded model to gain an even more comprehensive understanding of Uzbekistan's export

dynamics.

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