

The Empirical Research on Causal Relationship Between Export and Foreign Investments in the Economy of Uzbekistan Based on Granger Test

Sherzod I. Mustafakulov, Bobir O. Tursunov, Ulugbek A. Tursunov

ABSTRACT---*The relationship between export and foreign investments is becoming more and more relevant topic in the economies of many countries in the world. This relationship, its direction and mechanism are, particularly crucial for emerging markets. This paper investigates the direction of the relationship between the export and foreign investments of Uzbekistan based on the data on previous years. Since the government have been reforming the macroeconomic policy of Uzbekistan gradually towards openness in recent years, it is very important to find the direction of the association before forming national strategy to encourage the export of the country and to attract foreign investments to the country. In this study Granger causality test is used to determine the direction of the relationship using time series data from 2005 to 2017. With respect to the findings of the study, it can be seen that the volume of export has positive impact on the foreign investments. However, there is no sufficient evidence to support the idea that foreign investment has significant impact on the volume of export. The results conclude that in Uzbekistan, export volume is one of the key factors that have been contributing to the attractiveness of investment climate in recent years.*

Key words: *chi-square, export volume, lagged values, foreign investments, macroeconomic analysis, macroeconomic indicators, regression analysis.*

I. INTRODUCTION

In macroeconomic analysis, it is important to study the causal relationships between quantities. Regression and correlation analysis methods quantitatively describe the dependencies between quantities but fail to indicate the direction of dependence. The correlation analysis shows the bond strength between the two quantities. Usually (for example, the Pearson correlation coefficient), the coefficients calculated from the methods used to represent this parameter are between -1 and 1, and if the value of the coefficient is negative, the correlation is negative, and the correlation is positive. When it comes to the correlation analysis, the dependence orientation does not matter.

In most regression analysis methods, it is assumed that the direction of dependence is known and determined. For example, if the link between GDP and state budget revenues

is examined, then state budget revenues are considered to be a dependent variable, and GDP is an independent variable, since essentially, state budget revenues is generated by value added nationally. But, it's not always easy to predict the direction of dependency.

Therefore, there is a need for methods to determine the direction of dependence between quantities. If time series data are used, then special regression analysis methods can be used to determine the dependence of quantities. As economist Gary Koop puts it, "Time does not go back. If event A occurred before event B, event A could cause event B, and event B would not cause event A. In other words, past events may be the cause of what is happening now. And future events may not be the cause of today's events." This statement, presented by Gary Koop, provides a rationale for the Granger causality test, which shows the relationship between the quantities. In this article, using the Granger causality test to determine the relationship between the volume of exports and foreign investment in Uzbekistan. The question is whether the growth of foreign investments in Uzbekistan will affect the volume of exports, or will the growth of exports stimulate further foreign investment?

II. LITERATURE REVIEW

Theoretical and methodological issues of increasing exports have been studied by a number of scientists such as Athukorala P and Menon J [1], Sun H [8], Zhang KH and Song S [10]. Issues of investing in the economy and increasing export potential in the regions of Uzbekistan were studied by academicians I. Iskandarov, scientific work by such economists as Khodiev B.Yu., Mustafakulov Sh.I., Tursunov B.O. and other economists.[12]. Issues of the relationship between primary production and export production in the ocean were investigated by Weijian Du, Mengjie Li [14], Edward A. Laws, Kanchan Maiti [15]. Financial frictions and export dynamics in large devaluations were studied by David Kohn and et al.[16]

The Granger causality test was proposed by economist and statistician Granger in 1980, focusing primarily on the definition of causality. Namely, as described above, event A occurred before event B. If so, event A can cause event B. Based on this description, he developed his own test to determine cause and effect in a series of dynamics. Because this concept was similar to that proposed by N. Viner in 1956, this test is sometimes referred to as the Viner-Granger

Revised Manuscript Received on 14 October, 2019.

Sherzod I. Mustafakulov, D.Sc. professor, department of Industrial Economics, Tashkent State University of Economics, Tashkent – Republic of Uzbekistan.

(Email: sh.mustafakulov@tsue.uz)

Bobir O. Tursunov, Ph.D. student, Department of Management, Tashkent State University of Economics, Tashkent – Republic of Uzbekistan.

(Email: b.tursunov@tsue.uz)

Ulugbek A. Tursunov, Ph.D. student of Tashkent state university of economics, Tashkent – Republic of Uzbekistan.

(Email: ulugbek.tursunov@inbox.ru)

The Empirical Research on Causal Relationship Between Export and Foreign Investments in the Economy of Uzbekistan Based on Granger Test

causality test. Granger causal testing has been used in many scientific fields since its inception. Macroeconomic Research This test is one of the most widely used. As mentioned earlier, this study investigates the relationship between foreign investment and exports using the Granger causality test.

Theoretically, the impact of foreign investment on the export potential is more studied than the impact of export potential on foreign investment. Chandrama and Karuna argue that the impact of foreign investment on export is of two types: direct and indirect [4]. Indirect effect is reflected in the activities of multinational corporations (MNCs), which are major economic entities in attracting foreign investment [2]. The MNCs will establish their activities in partnership with local businesses after investing in a foreign country in which they operate. For example, a car maker, MNCs may help establish local car manufacturing companies or invest and cooperate with existing firms. At the same time, the MNCs will directly assist in the development of export potential of domestic producers both in the formation of their production and export platforms. The indirect effect is reflected in the "spreading effect" of foreign investment. The effect of diffusion is a combination of processes that result from local firms' use of foreign MNC technology, the introduction of new knowledge into these firms through the exchange of qualified personnel, and the increase in the efficiency of local firms as a result of competition.

Empirically, much research has been done on the effect of foreign investment spreading. Studies in China show that foreign investment has had a positive impact on China's industrial production [8,10,11]. However, this economic growth is also due to the export-oriented foreign investment in the Chinese industry. Similar results were obtained by Barry and Bradley for Ireland [3]. Athukorala and Mennon have investigated the relationship between industrial exports and foreign direct investment in Malaysia [1]. According to this study, export-oriented foreign investments have made a significant contribution to the Malaysian economy.

Gorg and Greenaway studied 40 studies on the effects of foreign investment in emerging, developed and transitional economies, and in 19 of these studies, the positive effect of the spread of foreign investment was statistically significant. In six studies, the negative effect of the spread effect on the economy was identified [7].

One can conclude from the aforementioned literature that many foreign publications have a positive impact on export potential.

III. METHODOLOGY & RESULTS

The Granger causality test begins with an evaluation of the following regression equations.

$$EXP_t = \sum_{i=1}^n \alpha_i INV_{t-i} + \sum_{j=1}^n \beta_j EXP_{t-j} + u_{1t} \quad (1) \quad [5]$$

$$INV_t = \sum_{i=1}^n \gamma_i INV_{t-i} + \sum_{j=1}^n \delta_j EXP_{t-j} + u_{2t} \quad (2) \quad [5]$$

Here, EXP_t is export volume in t th period, and INV_t is foreign investment's volume in t th period. α , β , γ , and δ are parameters of regression equation. It is assumed that u_{1t} va u_{2t} are stochastic terms of regression equations and do not have correlation with each other.

By analyzing equations (1) and (2), the following conclusions can be drawn.

1. If the adjusted coefficients of foreign investment in the first equation are statistically together with zero and in the second equation the adjusted coefficients of the export volume are not statistically zero, then the effect of foreign investment on export find.

2. If the adjusted coefficients of the export volume in the second equation are statistically together with zero, and the adjusted coefficients of the foreign investments in the second equation do not differ statistically from zero, then the effect of the export volume on the attraction of foreign investments is proved.

3. If the combined values of foreign investments and exported values in both equations are statistically zero, then it is empirically proven that foreign investments simultaneously affect exports and exports. find.

4. If the combined values of foreign investments and exported values in both equations do not differ statistically from zero, then foreign investments and exports are mutually independent.

IV. ANALYSIS AND RESULTS

Figure 1 illustrates the dynamics of current and 2005 values of foreign investment in fixed assets in 2005-2017. At the same time, the consumer price index was used to convert foreign investments into fixed assets at current prices to 2005 prices. As can be seen from Figure 1, the attraction of foreign investments in Uzbekistan has a relatively stable trend. It was only in 2011 that there was a decline in investment in fixed assets both in current prices and in 2005 prices. At the end of 2017, foreign investment in fixed assets increased more rapidly than in previous years, which may be explained by the active investment policy in 2017. Starting from 2011, we can see an increase in the difference between the value of foreign investment in fixed assets at current prices and the cost of 2005. This indicates the steady rise in prices during this period. During the period under review, foreign investment in fixed assets at current prices increased almost 23.7 times, and foreign investments in fixed assets at comparable prices increased tenfold.

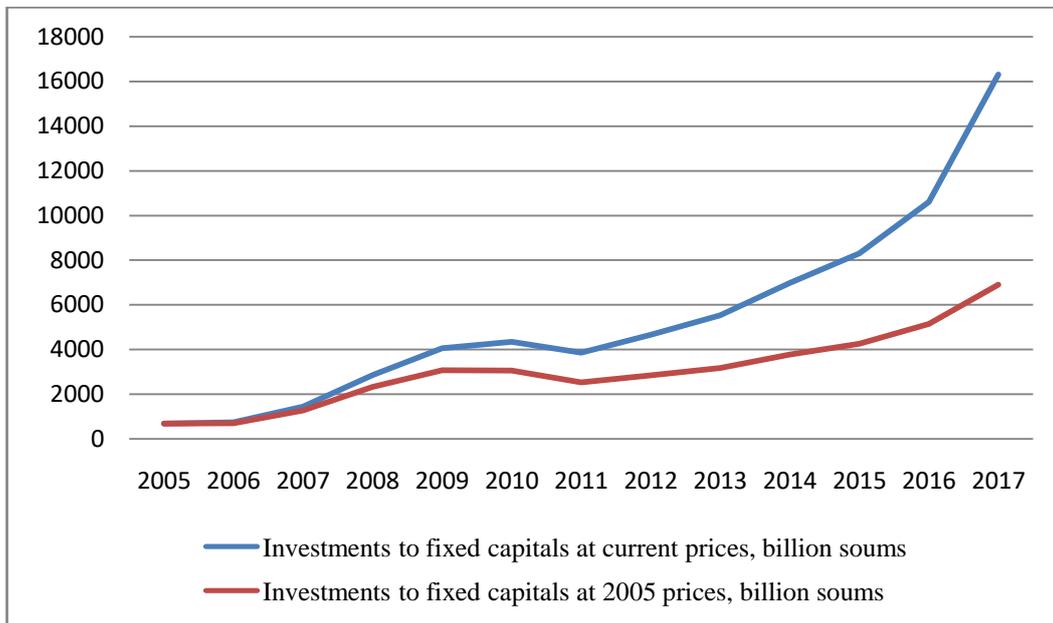


Figure 1. Dynamics of Foreign Investment in Fixed Assets in Current Prices and Prices in 2005, in billion soums [9]

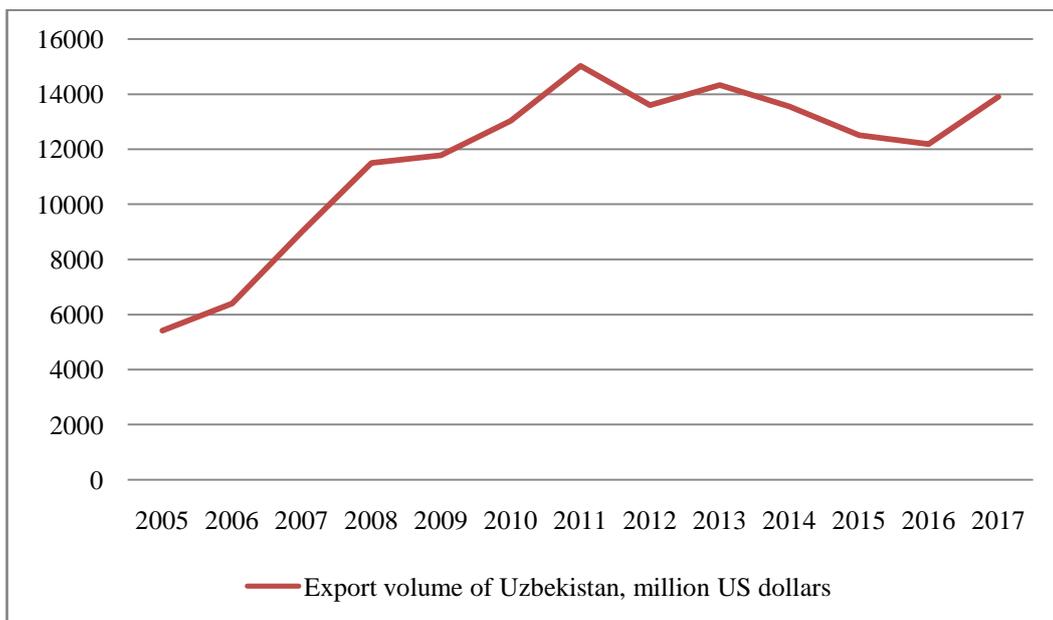


Figure 2. Dynamics of Exports in the Republic of Uzbekistan for 2005-2017, mln. In US dollars [9].

Figure 2 shows the dynamics of exports in Uzbekistan. The general trend can be divided into two periods. The first period is the period from 2005 to 2011, with a steady increase in espresso volume. The second period is from

2011 to 2017. During this period, exports declined, with the exception of 2013 and 2017. From 2005 to 2017, exports in the Republic of Uzbekistan increased by 2.6 times.

The Empirical Research on Causal Relationship Between Export and Foreign Investments in the Economy of Uzbekistan Based on Granger Test

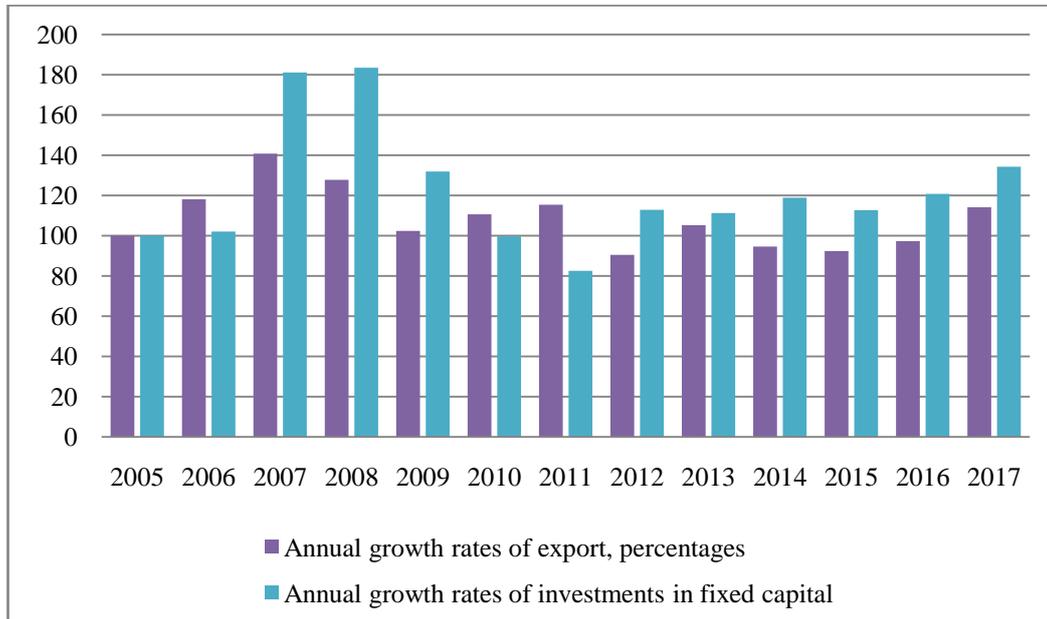


Figure 3. Annual growth rates of exports investment in fixed assets in Uzbekistan in 2005-2017 [9]

Figure 3 shows the growth rates of foreign investment in fixed assets in Uzbekistan in 2005 and exports compared to the previous year. This graph shows that foreign investment in fixed assets has grown more rapidly than exports. In 2007 and 2008 both indicators increased significantly. In general, during the period under review there is a significant correlation between the growth rates of both indicators.

Tables 1 and 2 present the models illustrating the relationship between foreign investment and exports in Uzbekistan, and the Granger causality test evaluating these models and pointing out the causal effects. Export here is the volume of exports in Uzbekistan for a given year, and the value of investment in comparative prices of foreign investments. As can be seen from the results in Table 1, the p-values of both models are statistically significant at 0.05.

Table 1
Vector autoregression model

Vector Autoregression						
Sample: 2007-2017			No. of observations = 11			
Log likelihood = -123.8618			AIC = 24.33851			
FPE = 1.47e+08			HQIC = 24.11049			
Det(Sigma_ml) = 2.07e+07			SBIC = 24.70023			
Equation	Parameters	RMSE	R-sq.	Chi-square	Pr > chi2	
Export	5	1184.91	0.6927	24.80099	0.0001	
Investments	5	7.4196	0.9762	450.4782	0.0000	
	Coefficient	Standard error	Z	p-value	95% Confidence interval	
Export						
Export						
Lag 1	0.5693402	0.2904461	1.96	0.050	0.00000763	1.138604
Lag 2	-0.0374629	0.2642301	-0.14	0.887	-0.5553444	0.4804187
Investments						
Lag 1	8.919969	48.46118	0.18	0.854	-86.06219	103.9021
Lag 2	-4.273335	61.2947	-0.07	0.944	-124.4087	115.8621
Constant	6064.231	1636.784	3.70	0.000	2856.193	9272.269
Investments						
Export						
Lag 1	0.0007365	0.0018187	0.40	0.686	-0.0028281	0.0043011
Lag 2	-0.002927	0.0016545	-1.77	0.077	-0.0061698	0.0003158
Investments						

Lag 1	1.684193	0.3034506	5.55	0.000	1.08944	2.278945
Lag 2	-0.2031051	0.3838107	-0.53	0.597	-0.9553601	0.54915
Constant	13.31337	10.24909	1.30	0.194	-6.774487	33.40122

*Note: The results in the table are derived from STATA 13 by author.

Table 2
Granger causality Wald tests*

Equation	Excluded	Chi-square	Df	Prob>chi2
Export	Investments	0.14792	2	0.929
Export t	All	0.14792	2	0.929
Investments	Export	7.7725	2	0.021
Investments	All	7.7725	2	0.021

* Note: The results in the table are derived from STATA 13 by author.

The model's coefficient of determining the export value of the export factor is 0.693. Therefore, the second model is better than the first one, which is more reliable, reflecting the impact of exports on foreign investment. The results of the Granger Cause Test in Table 2 also show that the causal relationship shown in the second model is more reliable.

V. CONCLUSION AND DISCUSSIONS

Based on the above analysis, the correlation between foreign investment and exports is based on the volume of exports to foreign investments, that is, based on the data from 2005-2017, which shows that the increase in exports during this period is related to the increase in foreign investment. the rock has undergone deformation. With these results, we can draw some important conclusions.

First, Uzbekistan has had a steady growth rate of foreign investment in fixed assets in 2005-2017, while export volumes have been relatively unstable in 2012-2016.

Second, there is a link between exports and foreign investment. That is, economic activities aimed at increasing exports and attracting foreign investment are interdependent and interrelated.

Third, because the dependence is on exports from foreign investments, it is necessary to create favorable conditions for exporters to increase their investment attractiveness for increasing foreign investment. Further, the increase in exports will also lead to an increase in foreign investment.

In addition, although the results of the analysis found that the increase in exports had a statistically significant impact on foreign investment, the increase in sample size, say, the use of quarterly data for the same period, may have an effect on the analysis.

REFERENCES

1. Athukorala P and Menon J (1995) Developing with Foreign Investment Malaysia. Australian Economic Review 28(1) : pages 9-22
2. Banga R (2006) The Export-Diversifying Impact of Japanese and US Foreign Direct Investments in the Indian Manufacturing Sector. Journal of International Business Studies 37(4): 558-568
3. Barry F and Brandley J (1997) FDI and Trade: The Irish Host-Country Experience. The Economic Journal 107: pages 1798-1811
4. Chandrama Goswami, Karuna Kanta Saikia, FDI and its relation with exports in India, status and prospect in north east region, International Conference on Emerging Economies - Prospects and Challenges (ICEE-2012)
5. Damodar N. Gujarati, Dawn C. Porter. (2009) Basic Econometrics 5th edition McGraw-Hill/Irwin p. 653
6. Gary Koop, Analysis of Economic Data, John Wiley & Sons, New York, 2000, p. 175.

7. Gorg H and Greenaway D (2004) Much Ado about Nothing? Do Domestic Firms Benefit from Foreign Direct Investment? The World Bank Research Observer 19(2) : pages 171-197
8. Sun H (2001) Foreign Direct Investment and Regional Export Performance in China. Journal of Regional Science 41:pages 317-336
9. www.stat.uz, Official web site of The State Committee of The Republic of Uzbekistan on Statistics
10. Zhang KH and Song S (2001) Promoting Exports: The Role of Inward FDI in China. China Economic Review 11(4) : pages 385-96.
11. Zhang KH (2005) How does FDI Affect a Host Country's Export Performance? The case of China. Paper presented in International conference of WTO, China, and the Asian Economies, III. In Xi'an, China, June 25-26, 2005: pages 491-498
12. Bakhodir Yu. Khodiev, Sherzod I. Mustafakulov, Bobir O. Tursunov, Yuri I. Sigidov, Kateryna S. Khavrova, Methods for control efficiency evaluation of the production capacities. Astra Salvensis Supplement no. 1, 2019.
13. Tursunov U.A.// An empirical analysis of the link between the volume of exports and foreign investments in Uzbekistan using the Granger Reasoning Test / Scientific Electronic Journal of International Finance and Accounting. No. 4-5, August-October 2018.
14. Weijian Du, Mengjie Li. Influence of environmental regulation on promoting the low-carbon transformation of China's foreign trade: Based on the dual margin of export enterprise. Journal of Cleaner Production, In press, corrected proof, Available online 11 October 2019, Article 118687.
15. Edward A. Laws, Kanchan Maiti. The relationship between primary production and export production in the ocean: Effects of time lags and temporal variability. Deep Sea Research Part I: Oceanographic Research Papers, Volume 148, June 2019, Pages 100-107.
16. David Kohn, Fernando Leibovici, Michal Szkup. Financial frictions and export dynamics in large devaluations. Journal of International Economics, In press, journal pre-proof, Available online 16 September 2019, Article 103257.