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ANALYSIS OF THE RELATIONSHIP BETWEEN FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN KAZAKHSTAN

The most important contribution expected from foreign investments for developing countries is that it helps to ensure the commercial balance and economic growth of the country. Empirical studies investigating the relationship between foreign investments and economic growth have shown that capital movements have led to a high rate of economic growth in some developing countries, and also paved the way for economic crises in some countries. In this study, the effects of foreign direct investments on economic growth in Kazakhstan are tried to be revealed. For this purpose, the relationship between international foreign investments and economic growth in Kazakhstan has been tested by using quarterly data on GDP, gross fixed capital formation, public expenditures, openness and foreign investments between 2005-2020. Beginning with the Augmented Dickey-Fuller (ADF) unit root test, the analysis ended with the Granger causality test, the VAR analysis. According to the results of the Granger causality test, the only reason for the growth of the Kazakhstan economy in the sense of Granger is openness. Examples of foreign investment affecting growth have not been found in the causality test. On the other hand, there was no statistically significant effect of foreign investments on economic growth.

Key words: foreign direct investment, economic growth, Kazakhstan economy, VAR analysis, Granger causality.

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Қазақстанда сыртқы тікелей инвестиция мен экономикалық өсу арасындағы қарым-катынастарды талдау

Дамушы елдер үшін шетелдік инвестициялардан күтілетін ең маңызды үлес – бұл елдің коммерциялық тепе-теңдігі мен экономикалық өсуін қамтамасыз етуге көмектеседі. Шетелдік инвестициялар мен экономикалық өсу арасындағы байланысты зерттейтін эмпирикалық зерттеулер капиталдың қозғалысы кейбір дамушы елдерде экономикалық өсудің жоғары қарқынына әкелгенін, сонымен қатар кейбір елдерде экономикалық дағдарыстарға жол ашқанын көрсетті. Қазақстан тәуелсіздігін жариялағаннан кейін, экономикалық өсу үшін сырттан инвестиция тартуға міндетті болды. Осы зерттеулер арқылы Қазақстанның экономикалық өсуіне тікелей шетелдік инвестициялардың әсерін анықтауға оны зерделеу жұмыстары жасалды. Осы мақсатта 2005-2020 жылдар кезеңінде ЖІӨ, негізгі капиталдың жалпы жинақталуы, мемлекеттік шығыстар, ашықтық және шетелдік инвестициялар бойынша тоқсан сайынғы деректер негізінде халықаралық шетелдік инвестициялар мен Қазақстандағы экономикалық өсу арасындағы өзара байланыс сипатталды. Толықтырылған Дикки-Фуллер (ADF) бірлік түбірлік тесті, Грейнджердің себептілік тестімен талдау, VAR талдау сияқты әдістер қолданылды. Грейнджердің себеп-салдарлық сынағының нәтижелеріне сәйкес, Грейнджер мағынасында Қазақстан экономикасының өсуіне оң ықпал ететін бағыт ашықтық болып табылады. Сонымен қатар, шетелдік инвестициялардың экономикалық өсуге әсер ету мысалдары себеп-салдар тестінде табылған жоқ. Екінші жағынан, шетелдік инвестициялардың экономикалық өсуге статистикалық маңызды әсері байқалмады.

Түйін сөздер: тікелей шетелдік инвестициялар, экономикалық өсу, Қазақстан экономикасы, VAR-талдау, Грейнджердің себеп-салдарлық байланысы.

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Анализ взаимоотношения между прямыми иностранными инвестициями и экономическим ростом в Казахстане

Для развивающихся стран наиболее важным вкладом, ожидаемым от иностранных инвестиций, является то, что он помогает обеспечить коммерческий баланс и экономический рост страны. Эмпирические исследования, изучающие связь между иностранными инвестициями и экономическим ростом, показали, что движение капитала привело к высоким темпам экономического роста в некоторых развивающихся странах, а также открыло путь к экономическим кризисам в некоторых странах. После провозглашения независимости Казахстан был обязан привлекать внешние инвестиции для экономического роста. Этими исследованиями была проведена работа по его изучению для выявления влияния прямых иностранных инвестиций на экономический рост Казахстана. С этой целью на основе ежеквартальных данных по ВВП, валовому накоплению основного капитала, государственным расходам, прозрачности и иностранным инвестициям за период 2005-2020 годы была описана взаимосвязь между международными иностранными инвестициями и экономическим ростом в Казахстане. Использовались такие методы, как расширенный тест Дикки Фуллера (ADF) на стационарность, анализ с помощью теста причинности Грейнджера, анализ VAR. Согласно результатам причинно-следственных испытаний Грейнджера, позитивным направлением роста экономики Казахстана в понимании Грейнджера является открытость. Кроме того, примеры влияния иностранных инвестиций на экономический рост не были найдены в тесте причинно-следственных связей. С другой стороны, статистически значимого влияния иностранных инвестиций на экономический рост не наблюдалось.

К**лючевые слова:** прямые иностранные инвестиции, экономический рост, казахстанская экономика, VAR-анализ, причинно-следственная связь Грейнджера.

Introduction

Direct investments are made through purchasing a firm in any country, providing founding capital for a newly established company or increasing the capital of any firm; also they bring about the technological and administrative knowledge and control ability along with the capital. Direct foreign capital investments have taken a significant role in the development of developing countries and enabled the production process to become international in these countries. Considering the comparison of the global countries, it can be seen that there are several differences between the economic growth performances of the countries in the long term. The differences between the long term growth rates can be explained by the determiners of the economic growth. In the applied studies, it is taken as a goal to define the economic growth determiners and how they influence the growth in different countries or different country groups. Macroeconomic stability, capital stock, foreign trade improvements and structural transformation reforms for market economy can be listed under the title of economic determiners of the growth. Direct foreign capital investment leads to economic growth by contributing to the capital stock or the solution to the disposal insufficiency problem of the related country. Direct foreign capital investment provides great opportunities related to finance, technology, know-how, education and marketing, along with the capital in cash transfer for developing countries. On the other hand, the foreign capital brings an advanced level of administrative information and manufacturing technology to the country where it makes the investment. Due to the fact that they do not create any liability and they are long term, international direct investment is significant finance resources for the global economies and especially the capital transfers of a multinational companies have become the key element which finances the economic growth for developing countries. Especially for the economies of the developing countries which have restricted local capital stock and greater need for finance, direct international investment has a great deal of importance in terms of stable economic growth. Today the majority of the developing countries accept direct international investment as an important source for reaching the funds which are required for creating the economic growth.

Examining the influence of foreign investment on the economic growth is also important in terms of political assumptions. In other words, if direct foreign investment has a positive influence on the economic growth of the host country, then the arguments of the researchers and politicians who would like to restrict the foreign investments would be invalid. On the contrary, if direct foreign investment

does not have a positive influence on the economic growth, it would be necessary to revise the tax incentives, infrastructure subventions, tax exemptions for importation and other incentive applications which the countries apply in order to attract direct foreign investments yet which cause additional costs for the economies of those countries.

In this study, it is taken as a goal to reveal the influences of direct foreign investment on the economic growth in Kazakhstan. With this purpose, the relationship between international direct investment and economic growth in Kazakhstan is tested by using the third month data related to GDP, gross fixed capital formation, public expenditures, openness and direct foreign investment. Before performing the analysis a related literature review is made.

Kazakhstan economy and foreign direct investment**.** Kazakhstan has a significant place among the CIS countries (Commonwealth of Independent States) with its population over 18,7 million and its surface area of 2 million 717 kilometer square. In terms of surface area, it takes second place among CIS after The Russian Federation. Kazakhstan economy is characterized by its rich natural resources. The wide agricultural fields, petroleum, natural gas and the existence of other mines comprise of the most important resources of competition for Kazakhstan to open up to global markets (Kim, 2017: 5-6).

Kazakhstan is the most important oil-energy region in the entire world. In terms of the petroleum resources that it has, Kazakhstan is ahead of most countries where oil is drilled. The country still has 172 oil resources, 42 coal resources and 94 gas resources and the drilled oil and coal amount is 2.8 billion tones; the gas production is 1.9 trillion cubic meter. Therefore, Kazakhstan has a very significant place among the global energy markets. After the independency period, there has been a transformation process from a central planned economy to a market economy. In this transformation period, Kazakhstan has made progress in terms of applying complex political, economic and social reforms for establishing a stable market economy.

Kazakhstan is a country which has the highest economic performance among CIS countries in recent years and it is regarded as the free economy of the Middle East. Considering the total production – in other words the GDP – of the Turkic-Speaking republics (Kazakhstan, Azerbaijan, Uzbekistan, Turkmenistan and Kyrgyzstan) which take place in the Commonwealth of Independent States), it can be seen that the share of Kazakhstan among the total displayed a significant increase within the period of 2000-2019. The GDP share of Kazakhstan was 42% in 2000 among the total GDP of these five countries; this rate increased to 56% in 2019. Until the middle of 1990s, there was an economic regression in Kazakhstan rather than increase. Two years after the independence, the hyperinflation period in Kazakhstan (1660%) has begun, but since 1996, it has achieved a steady growth trend, albeit at a low level (Syzdykova et al., 2019). However, the Kazakhstan economy started to grow in 2000 and except for the crisis in 2008-2009, the economy has continued to grow each year at a rate of over 9%. The GDP of Kazakhstan which decreased at an average rate of 3,4% annually in the time period 1991-2000 displayed an average growth of 8,3% in the period of 2001-2018. As a result of this rapid growth, Kazakhstan reached an income per capita of 11512 dollars and a GDP of 170 billion dollars in 2019.

Kazakhstan developed the "Kazakhstan – 2030" strategy for the sake of long term development and determined policies for attracting direct foreign investment within the frame of this development strategy. This strategy aims at diversifying the economy and empowering the economic growth trend and the competitive ability of the country. Therefore Kazakhstan requires both local and foreign capital. In the "Kazakhstan – 2030" strategy, it is anticipated that joint ventures and other foreign investment in Kazakhstan would not only be allowed but also primarily encouraged. By this means, Kazakhstan is considered as the most demanding country in terms of foreign investment among all the other Eastern Europe and former Soviet Union countries. According to the foreign investment potential and performance index which was published by UNCTAD most recently in 2018, Kazakhstan takes the 33rd place in the world.

Gaining important successes related to attracting direct foreign investments since independency, Kazakhstan has attracted more than 80% of the direct foreign investments made to the Central Asia. The increase in direct foreign investment occurred thanks to the improvements in the field of hydrocarbon especially in the Kashagan field. According to the UNCTAD, the total volume of direct foreign investment in the country in 2019 accounted for around 3,6 billion dollars.

As can be seen from Figure 2, there has been a remarkable increase in direct foreign investment in the country since independence. The total foreign investment stock in Kazakhstan is about 150 billion dollars (Kazakhstan National Bank, 2019). This direct investment stock of Kazakhstan into the first 40 countries in the world. Considering the fact that the country became independent in December 1991, this can be defined as a very significant development.

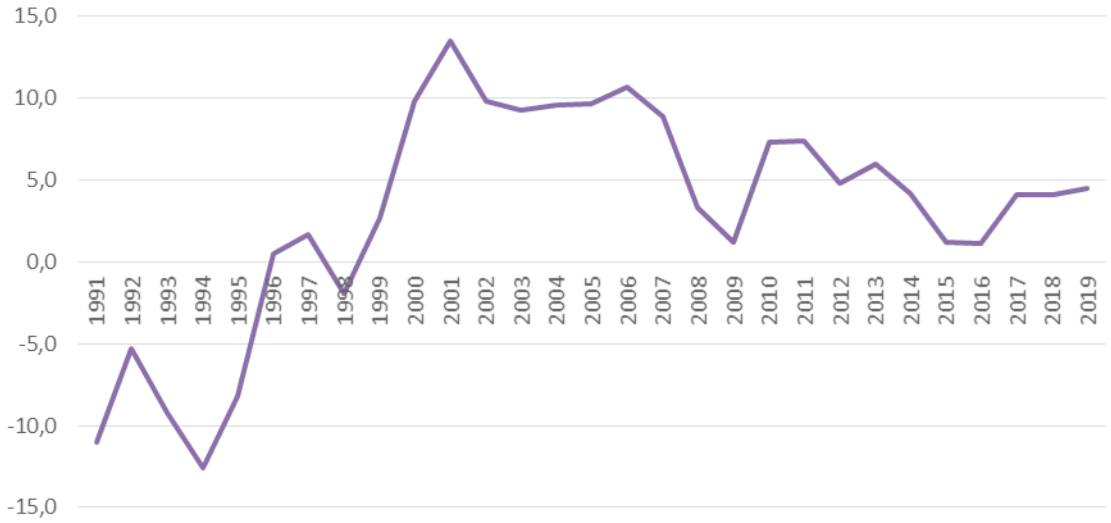

Figure 1 – Development of growth rate (%) in Kazakhstan, 1991-2019
Source: World Bank data

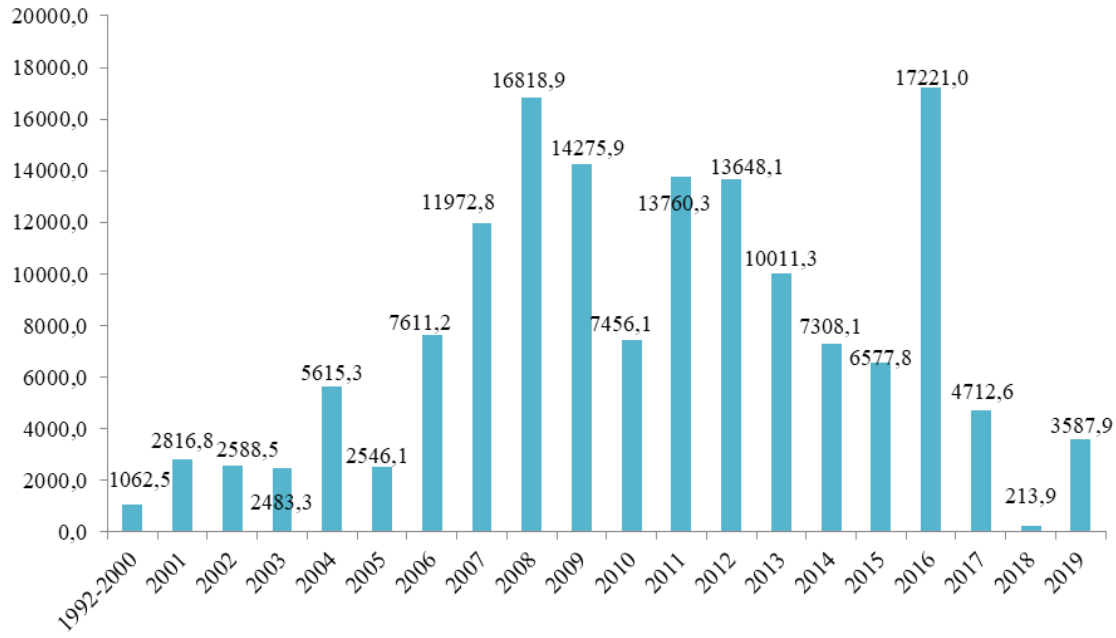

Figure 2 – Net inflow of international foreign direct investments in Kazakhstan (million dollars)
Source: World Bank data

Literature review

In the literature, it is accepted that direct foreign investment affects economic growth and economic growth affects foreign direct investment (Jiménez, 2011). The effect of economic growth on foreign direct investments emerges through market size. Market size, usually represented by per capita real gross domestic product; it enables the investor to benefit from economies of scale and enable production and reduce costs such as transportation and marketing by producing relevant goods and services and selling them on-site (Iamsiraroj and Doucouliagos, 2015). The studies which examine the relationship between direct foreign capital investment and economic growth display differences in accordance

with the countries studied, the method used and the outcomes. While the majority is comprised of studies dealing with country groups, there are also studies which examine single countries. In the following section, you will find an examination of some related studies, the methods used intentionally and the results achieved by the study.

Apergis et al. (2008) analyzed the relationship between foreign direct investment and economic growth by using panel data method in their studies covering 27 transition economies between 1991-2004. According to panel cointegration and causality test results, no significant relationship was found between foreign direct investment and economic growth in the countries discussed.

In study Altıntas et al. (2008) used the data for the time period of 1995-2004 and tested the relationship between direct foreign investments and economic growth for Tajikistan, Kyrgyzstan, Uzbekistan, Kazakhstan and Azerbaijan by using an econometric methodology. The achieved correlation coefficient indicated that except for Azerbaijan there was a negative relationship between the foreign capital and growth. In a study which was conducted assuming that all countries have a homogenous structure since they emerge from the same economic structure, Granger and Sims used Causality tests and concluded that there was no causality in either way between foreign capital and growth.

Nath (2009) in his study on 13 transition economies, the findings obtained in the study differ from other studies in the literature. In transition economies, it is stated that there is no significant effect of direct foreign investment on economic growth, while it is stated that the effect of domestic investments and trade on foreign direct investments is controlled.

Considering the economy of Kazakhstan, Lee, et al. (2010) in their study examined the relationships among the variables; direct foreign capital inflow, exchange rate and economic growth for Kazakhstan through the usage of the annual data of 1997-2006, Multiple Regression analysis and LSM method. Furthermore, the employment rate, fixed capital stock, retail trade endorsement and industrial production were examined as additional variables and the dollar exchange rate was tested as the control variable. As a result of the study, it was seen that there was no statistically significant influence of the direct foreign investments on the economic growth.

The work of Melnyk et al. (2014) examines the impact of foreign direct investment on economic growth. As a result of the study covering transition economies after communism and covering 26 countries for the years 1998-2010, it was concluded that foreign direct investments had a significant effect on the economic growth of the host country. Yingxi and Hung (2018) explored the factor that made their input more beneficial to economic growth in China than most other developing countries. The study focused on comparing FDI's estimated impact on growth in China and growth in China. Their literature review indicates FDI inflows have positively affected economic growth in both China and India, but that this positive impact was larger in China than in India. Analysis suggests that there are two key reasons for this difference. First, China has better transportation and communication infrastructure, therefore better business efficiency. Second, China's higher level of human capital means Chinese employees learn new technology and managerial know-how brought in by FDI more quickly, speeding up the spillover of technology and improving productivity rapidly in China.

Chanegriha et al. (2018) In their study investigate the causal relationship between the ratio of FDI to GDP (FDIG) and economic growth (GDPG). They use innovative econometric methods which are based on the heterogeneous panel test of the Granger non-causality hypothesis based on the works of Hurlin (2004a), Fisher (1932, 1948) and Hanck (2013), using data from 136 developed and developing countries over the 1970-2006 period. According to the Hurlin and Fisher panel tests FDIG unambiguously Granger-causes GDPG for at least one country. However, the results from these tests are ambiguous regarding whether GDPG Granger-causes FDIG for at least one country. Using Hanck's panel test we are able to determine whether and for which countries there is Granger-causality. This test suggests that at most there are three countries (Estonia, Guyana and Poland) where FDIG Granger-causes GDPG and no countries where GDPG Granger-causes FDIG.

Ahmad et al. (2018) analyze the causal relationships between exports, FDI and economic growth among the ASEAN5 countries. We have used a three-stage procedure based on unit root, co-integration and causality tests applied to the panel data from 1981 to 2013. The results reveal that there is a bi-directional causal relationship between FDI and growth in the long run, while there is a unidirectional causal relationship from FDI to exports in the short run. Their results also confirm that the export-led growth (ELG) and FDI-led growth hypotheses hold true in the long and short run. To reinforce the FDI inflows, authorities should continue the progressive reduction of barriers, and increase the sophistication of quality exports to compete in the global market. This paper is the first of its kind to analyze the role

of both FDI and exports in the ASEAN5 economies using panel analysis.

Syzdykova (2019) Analyzed the effects of foreign direct investments coming to Central Asian countries on the economic growth of these countries with the data of 1995-2017 with the help of Panel ARDL test. According to the results of the study, 1% increase in FDI in Central Asian countries increases GDP by 0,9%. In addition, the variables of export and industry have a positive effect on economic growth. Rakhmatullayeva et al. (2020) investigated the effect of foreign investments directly on economic growth in Kazakhstan using the Multiple regression model for 2000-2017. The simulation results didn't reveal the negative impact of FDI on economic growth, but the analysis revealed that the presence of a positive relationship is not essential for assessing the growth of the national economy.

To sum up, the empirical studies which search for the relationship between the foreign investments and economic growth show differences in terms of the method, model and outcomes. We summarize the country-specific and multi-country studies in Table 1. Overall, our literature review suggests that the empirical results of the previous studies are contradictory.

Table 1 – Summary of existing empirical studies

Author (s)	Countries	Econometric techniques	Results
Al-Iriani (2006)	6 Gulf countries	Granger causality test	FDI → GDP
Rudra and Pradhan (2009)	5 ASEAN countries	Cointegration and causality test	FDI → GDP
Moudatsou and Kyrkilis (2011)	26 countries	Causality based on an error correction model	FDI → GDP
Azlina and Mustapha (2012)	Malaysia	Johansen cointegration test and Granger causality based on VECM	FDI → GDP
Lee (2013)	BRIC countries	Panel cointegration	FDI → GDP
Aga (2014)	Turkey	Vector Auto regression (VAR)	FDI $\neq$ GDP
Omri et al. (2014)	54 countries	Dynamic simultaneous-equation	FDI ↔ GDP
Azatbek and Ramazanov (2016)	Kazakhstan	method of regression analysis	FDI → GDP
Hakimi and Hamdi (2017)	MENA countries	panel cointegration analysis and Granger causality	FDI $\neq$ GDP
Asamoah et al. (2019)	sub-Saharan Africa	Structural Equation Modelling (SEM) technique	FDI → GDP
Rao et al. (2020)	South-East Asia and South Asia	system-GMM	FDI → GDP
Raza et al. (2020)	OECD countries.	GMM estimator	FDI ↔ GDP
Rakhmatullayeva et al. (2020)	Kazakhstan	multiple regression model	FDI $\neq$ GDP

Notes: 1) →, ↔, and $\neq$ indicate the unidirectional causality hypothesis, Bidirectional hypothesis, and neutral hypothesis, respectively;
2) compiled by authors.

Methodology

The following econometric model is formed in this study with the purpose of examining the relationships between gross domestic product–as we describe as economic growth–and gross fixed capital formation (domestic investment), public expenditure–government final consumption expenditure–foreign trade and direct foreign investments:

$$gdp_t = \alpha_0 + \alpha_1 gfce_t + \alpha_2 gfcf_t + \\ +\alpha_3 open_t + \alpha_4 fdi_t + u_t \quad (1)$$

where, gdp_t is gross domestic product, $gfce_t$ is government final consumption expenditure (public spending), $gfcf_t$ is gross fixed capital formation, $open_t$ is opening ratio, fdi_t is foreign direct investment. u_t refers to the term stochastic error and t is time (2005-2020).

GDP, gross fixed capital formation, government final consumption expenditures are collected from Kazakhstan Statistics Institute data; the data related to foreign investments from "Kazakhstan Republic Central Bank, Payments Balance", the total import and export values in order to create the *open* variable from "Kazakhstan statistics institute foreign trade statistics". All the data related to the foreign investments are collected from the "net obligation formation" unit of the Central Bank, Payments Balance Analytic Presentation.

Unit Root Test. While developing any time series model, it should be known whether the achieved stochastic period changes depending on time, or not. Because the relationships among the variables are important for the sake of interpretation of financial variables and a non-existent relation among these does not meet the requirements; so it can be seen as if there is a relation (Syzdykova et al., 2019). The stability of the time series can be determined in accordance with the results of auto-correlation or unit root tests. The stability of the series used in the study will be tested with the unit root test. The Augmented Dickey-Fuller (ADF) unit root test is the most common model (which is) used for determining if the time series include unit roots, or not. The most common model for the ADF unit root test (stable and including trend) can be performed with the help of equation numbered (2). It is based on the assumption that error terms have a stable variant.

$$\Delta Y_t = \alpha + \gamma t + \rho Y_{t-1} + \sum_{i=1}^{n} \phi_i Y_{t-i} + \varepsilon_t \quad (2)$$

In the equation stated above (2), the macroeconomic variable Y displays the series by which the difference is calculated; $\Delta Y = Y_t - Y_{t-1}$, t shows the trend variable, n shows the optimal delay length and e displays the error term; white noise. In the unit root (stability) test, $H_0 = \rho = 0$ hypothesis is tested in order to determine if the Y series is stable or not.

$H_0 = \rho = 0$ The series is not stable, there is unit root in the series.

$H_1 = \rho < 0$ The series is stable, there is not any unit root.

After the hypothesis stated above, according to the test results it can be said that the series is not stable if H_0 is not rejected. The first difference of the non-stable series is calculated and the operation continues (Enders, 2004: 182).

Vector Autoregressive Regression (VAR) Model. VAR model is an econometric model that gives development and interdependence between multiple time series that have generalized single variable AR models. VAR models were developed by Christopher Sims and have become a popular method in econometrics. Since VAR models can reveal dynamic relationships without any restrictions on the structural model, time series are frequently preferred in analysis methods. The model differs from systems of simultaneous equations in this respect since it does not require the internal and external separation of variables based on any economic theory (Kilian and Chang, 1998). In addition, the delayed values of dependent variables in VAR models make it possible to make strong predictions for the future. The VAR model is based on the model of the Granger causality test, and as mentioned earlier, there is no internal-external distinction. Accordingly, considering the two series Y_t and X_t with the VAR model, the classical equation system of the model is defined as follows.

$$Y_t = \sum_{j=1}^{m} \beta_j Y_{t-j} + \sum_{j=1}^{m} \delta_j X_{t-j} + \varepsilon_{1t} \\ X_t = \propto + \sum_{j=1}^{m} \theta_j Y_{t-j} + \sum_{j=1}^{m} \vartheta_j X_{t-j} + \varepsilon_{2t} \quad (3)$$

In the equation system above, ε_1 and ε_2 refer to the error terms. Also, as can be seen in both equation systems, the lagged values of the X variable have an effect on the Y variable and the lagged values of the Y variable on the X variable. In this model, the error terms and the lagged values of the variables are on

the right side of the equation. However, error terms are not related to these variables. Since only the lagged values of the variables are on the right side of the model, no concurrency problem arises.

VAR models can be used with the purpose of making predictions. However, Sims (1980) in his study used VAR models for the first time to research the mutual dynamic relationships among the variables. There are two approaches that he used in these analysis. These are: impulse- response functions and variance decomposition for prediction error. The impulse-response functions achieved from VAR models are utilized in order to examine the influence of a shock coming to one of the system variables on the other variables within the system. In other words, the impulse-response functions show the dynamic reaction of each variable in the VAR model towards these shocks when the structural shocks emerge. Since the impulse-responses are not the linear function of the VAR coefficients, it is impossible to learn their actual values. In order to decrease the statistical uncertainty of the impulse-response coefficients, it is a common method to apply the confidence intervals. Variance research shows the sources of changes in variables and other variables as a percentage. In other words, it is stated how much of the change that will occur in the examined variable is due to itself or other variables. If the change occurring in a variable is caused by shocks in a high rate, it indicates that this variable acts externally. At the same time, variance research gives an idea about the degree of causality relationship between variables.

Results and Discussion

The analysis starts with the testing of stability and continues with the Granger causality test, VAR method, impulse-response functions, and variance research and is finalized with the LSM with the purpose of testing the compliance of the parameters with the theoretical expectations and their significance levels. The data related to the stability test of the series in the research is displayed in the Table 2.

Table 2 – ADF unit root test results of the variables

Variables	Level	Lag	p-value	First difference	Lag	p-value	Result
lngdp	-1,4524	0	0,5467	-6,4672	0	0,0000	I(1)
lngcfe	0,2889	4	0,9743	-9,7132	3	0,0000	I(1)
lngcfc	-6,8450	3	0,0000	-9,3593	2	0,0000	I(0)
lnopen	-2,1159	0	0,2397	-5,9908	1	0,0000	I(1)
lnfdi	-5,3781	0	0,0001	-5,3644	2	0,0001	I(0)

Notes: 1) Lag length is selected according to the AIC criteria;
2) *Infdi* Critical Table Values: 1% (-3,61), 5% (-2,93), 10% (-2,60);
3) compiled by authors.

As can be seen from the Table 2, in the stability test; the *lngdp*, *lngcfe* and *lnopen* (used as ratio) variables, the logarithms of which are taken, have become stable when their first rank difference is calculated. Again as can be seen from the table, the other variables are the stable series on the level. For instance, since the t statistics for *Infdi* variable have lower values (-5.37) than the critical 1% and 5% values; it is concluded that it is stable by rejecting the H_0. At the same time, the fact that the probability value is lower than 5% confirms this result. After the variables have become stable, it is necessary to sort the variables from exterior to interior in order to perform VAR analysis. In order to sort them, Granger causality test is utilized. Before the Granger causality test, it was necessary to determine the delay belonging to the model. The most important methods used for determination of the delay values are the Akaike Information Criterion and Schwarz Information Criterion methods. The method preferred in this analysis is AIC. The proper delay length maximum delay for VAR model is considered as 4, and the delay lengths within the frame of AIC are presented in Table 3. The results of the Granger Causality test are listed in Table 4.

In the table shown above, you will find the test results of the Granger Causality test. When the results of the Granger Causality test are evaluated on the 5% level of significance, it can be seen that there is a causality relation between gross fixed capital in-

vestments and economic growth, and between the growth and OPEN variable. No other statistically significant relationship is found on the 5% significance level. There is no causality found in terms of Granger between foreign investment and GDP variables.

Due to the fact that the confidence interval for the impulse-response coefficients include zero for all conditions, except for the coefficient of the investment variable, there is no statistically significant variable coefficient. The response of the economic growth to a "one standard deviation shock" in the investment variable is statistically significant in the first quarter of the related year. The response of the growth to a "one standard deviation shock" in the investment variable is being positive for the first period of the related year. Considering the response of the growth to the shock coming to the other variables, it generally includes zero, therefore we can comment that it is not significant (Figure 1). The variation research belonging to the growth variable is shown in the Table 5.

Table 3 – The determination of the proper delay length for VAR model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	148,3727	NA	1,90e-10	-8,192726	-7,970534	-8,116026
1	230,0889	135,4153	7,58e-12	-11,43365	-10,10049	-10,97344
2	274,0549	60,29630	2,81e-12	-12,51742	-10,07331	-11,67371
3	333,5871	64,63498	5,05e-13	-14,49069	-10,93561	-13,26348
4	390,5438	45,56532*	1,43e-13*	-16,31679*	-11,65074*	-14,70607*
Note – compiled by authors						

Table 4 – Test Results of Granger Causality among the Variables

Causality Aspects of Variable	Lags	F statistic	Probability
Gross fixed capital formation does not Granger Cause of the growth.	4	3,13549	0,0313
Growth does not Granger Cause of gross fixed investment.		1,97122	0,1286
Public spending does not Granger Cause of the growth.	4	1,91218	0,1384
Growth does not Granger Cause of public spending		2,33654	0,0819
Openness ratio does not Granger Cause of the growth.	2	0,53640	0,5900
Growth does not Granger Cause of the openness ratio		9,91110	0,0004
Foreign direct investment does not Granger Cause of the growth.	1	0,03318	0,8565
Growth does not Granger Cause of the foreign direct investment		0,89908	0,3495
Note – compiled by authors			

Table 5 – Variance decomposition of the growth variable

Period	S.E.	d(lngcfe)	d(lnopen)	lngcfc	d(lngdp)	lnfdi
1	0,051200	0,045023	0,052870	0,140874	99,76123	0,000000
2	0,054274	0,297052	4,461854	4,550335	88,83427	1,856486
3	0,054997	1,713488	4,615616	4,445620	87,19882	2,026457
4	0,055547	2,348123	4,529498	4,567815	85,49891	3,055656
5	0,057331	6,700887	5,029855	4,603554	80,71336	2,952342
6	0,057557	6,979937	5,001391	4,575020	80,25529	3,188365
7	0,058283	8,117585	5,205286	4,684913	78,26771	3,724510

Continuation of table 5

Period	S.E.	d(lngcfe)	d(lnopen)	lngcfc	d(lngdp)	lnfdi
8	0,058306	8,112947	5,211792	4,698921	78,21463	3,761713
9	0,058477	8,234219	5,255235	4,727359	77,76452	4,018664
10	0,058527	8,309491	5,260573	4,750246	77,64026	4,039426
11	0,058561	8,326318	5,264122	4,760441	77,56540	4,083720
12	0,058596	8,384321	5,274791	4,780433	77,47675	4,083703
Note – compiled by authors						

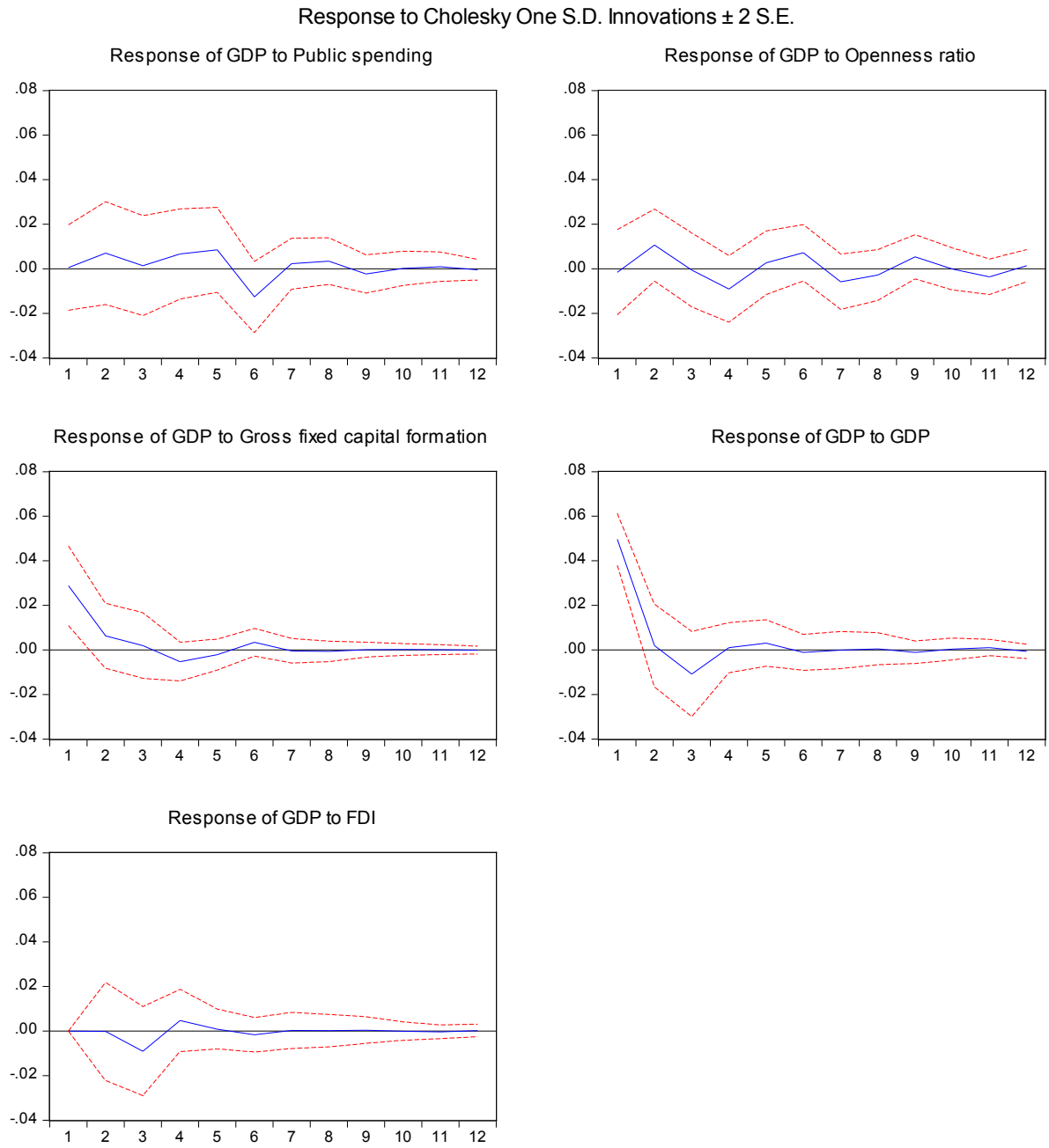

Figure 3 – Impulse response function results
Note – compiled by authors

While looking at Table 5, it can be seen that GDP has a very high self-explanation rate – 85% on average – within the first periods. At the same time, the domestic investment in the first periods explain approximately 4% of the growth. For the following periods, nearly 13% of the growth can be explained through public expenditure and OPEN variables. Public expenditure and OPEN variables explain successively 8% and 5% of the growth. While examining the foreign investment's explanation rate for economic growth, it can be seen that totally 4% of the growth can be explained through this variable.

The linear regression equation performed with the stable time series, the parameters in the model which includes economic growth as the dependent variable and the prediction results with LSM are summarized in Table 6.

The determination coefficient which displays the model's power of explanation for the model in growth equation is determined on a sufficient level with a value of 65.12%. It is concluded that the model which is established with F statistics and probability value is significant. Error terms have a normally-distributed structure which does not include auto-correlation. Considering the significance of the coefficients, it can be seen that all the variables except for the investment and public expenditure variables–having a 5% significance level–are insignificant. This fact is also confirmed by the probability value and it can be seen that the increase in domestic investment and public expenditure has a positive influence on GDP in compliance with the theoretical expectations. The coefficient belonging to the foreign investment is not significant.

Table 6 – Growth Variable Prediction Results with LSM

Variable	Coefficient	Std.error	t-Statistic	p-value
C	24,91358	36,39474	0,684538	0,4987
D(LNGFCE)	0,541836	0,203430	2,663508	0,0122
D(OPEN)	0,030258	0,529092	0,057188	0,9548
LNGCFC	0,967332	0,131475	7,357543	0,0000
LNFDI	-0,103326	0,113324	-0,911779	0,3689
R-squared			0,651271	
Adjusted R-squared			0,572526	
Durbin Watson stat.			1,08118	
F-statistic			8,270612	
Prob.(F-statistic)			0,000011	
Note – compiled by authors				

Conclusion

Theoretically it is expected that the direct foreign capital investment would lead to economic growth by contributing to the capital stock or the solution to the disposal insufficiency problem of the related country. On the other hand, the direction of the direct foreign capital inflows would be towards to the countries which have a high growth performance and a high level of economic and political stability. Most of the studies conducted related to the relationship between foreign capital investment and economic growth have yielded different consequences. While some of the theoretical and empirical studies reveal the consequences which support that direct foreign investment has a positive influence on economic growth, though not all of it achieves significant outcomes.

In this study, the relationship between direct foreign capital investment and economic growth in Kazakhstan is analyzed with the usage of the three-month data in 2005-2020 periods. The analysis is performed with the research of unit roots, the Granger causality test, VAR method and related impulse-response functions, variance decomposition and LSM. The Granger causality test indicates that there is no significant interaction among the variables within the examined time period. According to the impulse-response analysis, it is seen that there is no significant influence of an exterior chock to emerge in FDI on the economic growth. According to the results of the variant decomposition, nearly 4% of the economic growth can be explained by direct foreign investment; however, the LSM results show that the foreign investment is insignificant in terms of explaining the economic growth.

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