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DETERMINANTS OF FOREIGN DIRECT INVESTMENTS IN CENTRAL ASIAN COUNTRIES

Abstract

The main purpose of this study is to examine the factors that determine FDI inflows to five countries in Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan). An empirical analysis covering the period of 1995–2021 was made in the study. Dynamic panel data analysis methods were used in the empirical analysis. The model was created by using five different variables (FDI in the previous period, economic growth, real effective exchange rate, macroeconomic stability and infrastructure) that are thought to affect FDI in Central Asian countries that are close to each other in economic terms. The created model was analyzed with the Generalized Moments Method (GMM) proposed by Arellano and Bond [1]. According to the results of the GMM estimation method, it is seen that the lagged value of FDI, economic growth, real effective exchange rate, macroeconomic stability variables are statistically significant and explain the dependent variable to a large extent. On the other hand, the infrastructure variable does not affect foreign direct investments. This study explores developing Central Asian countries, including Kazakhstan. The results of this study are important in knowing the factors that determine foreign direct investments in Central Asian countries. As a result, it can be thought that the success of the investments in the past period will encourage more foreign investment inflows in the following years. Economic growth of Central Asian countries is an important factor in influencing FDI. Fast-growing economies attract more FDI. Therefore, Central Asian countries need to take steps to create a suitable investment climate by eliminating macroeconomic problems such as inflation, insufficient infrastructure, and exchange rate instability in order to increase the amount of FDI.

Key words: infrastructure, developing countries, foreign investment, direct investment, economic growth, dynamic panel.

Introduction

After Central Asian countries (Kazakhstan, Kyrgyz Republic, Turkmenistan, Tajikistan and Uzbekistan) gained their independence, their reorganized economic structures and insufficient investment capabilities during the transition to market economy pushed these countries to provide foreign capital and they made various reforms to get a share of the pie shared by the developed

countries in the world. They have implemented. Depending on the policies implemented and the natural resource richness of the countries, the economic growth performances of Central Asian countries follow a different course from each other [2]. On the other hand, there are significant differences in the amount of FDI coming to these countries.

In the first part of the study, which examines the determinants of foreign direct investments in Central Asian countries, an evaluation of the macroeconomic indicators of Central Asian countries is made. In the second part, the development and current situation of foreign direct investments coming to Central Asian countries are given. In the third chapter, the empirical literature on the subject is explained. Then, after the data set and methodology were explained, the analysis findings were evaluated. The study ended with the conclusion part.

Materials and methods

Currently, due to COVID-19, global FDI has decreased by 35 percent in 2020. But despite this, investments in the Central Asian region have increased relatively. In 2021, the volume of direct foreign investment in Asian countries increased by 19% and totaled 619 billion dollars. The pace of direct investment in developing countries in Asia has shown its stability during the pandemic. After COVID-19, in 2021, the amount of investment in many countries of Asia increased.

Kazakhstan accounts for the majority of Central Asia's GDP. Today, Kazakhstan is the largest economy in Central Asia, both in absolute terms and per capita. The country, whose area is equivalent to the territory of Western Europe, provided approximately 60% of the region's GDP in 2020.

Economic growth and growth in Central Asia over the last 30 years, and the scale and scale of recent economic changes have contributed to the growth of Central Asian economies. The states that were formerly under the USSR, after the collapse of the Soviet system, all countries of Central Asia, including the republics of Kazakhstan, Uzbekistan, Tajikistan and Turkmenistan, after a serious transformation, Central Asia became a large, important and rapidly growing region. The world still has to understand this transformation. In 2019, the GDP of Central Asia reached 300 billion dollars. In 2020, the total GDP of Central Asia amounted to 285 billion dollars, having increased by 42 billion dollars compared to 2000. At the end of 2021, this indicator is pre-pandemic. The economic level of the Central Asian countries grew by an average of 6.7% per year over the last twenty years.

This dynamic economic growth contributed to the convergence of incomes in Central Asia and in developed countries. If in 2000 The total GDP per capita in Central Asia was less than one-sixth of the GDP of developed countries in 2020 the gap decreased to 2.6 times.

The growing population of the countries of Central Asia provides a significant market and creates an expanding reserve of labor resources. In 2020, the total population of the countries of Central Asia exceeded 74 million people. Over the past 20 years, the population of the Central Asian countries has increased by an average of 1.5% per year. According to UN estimates, in 2040, the average annual growth rate of the population in the region is predicted at the level of 1.1%. The demographic situation in Central Asia will remain favorable in the next 20 years, which will lead to a model of age distribution that will moderate rapid growth. Demography definitely contributes to economic growth in Central Asia.

In Central Asia, Kazakhstan has the largest economy by GDP. This is, perhaps, the biggest economic success in the entire post-Soviet space for the entire 30 years since the collapse of the USSR. Kazakhstan accounts for 60% of the GDP of Central Asia, while only 25% of its population. In 2021, its economy will grow by 4%, and we predict that in 2022–2026, the average growth rate will be more than 4%. Political instability under the name "January incident" in January 2022 will negatively affect the results of Kazakhstan in 2022, but what will hinder its long-term prospects.

The main goal of the economic policy of the government of Kazakhstan is to transition from the current strategy of growth, based on the export of oil and metals, to a policy based on structural economic reforms. Maintaining stability in the economy and thereby ensuring sustainable development, increasing the country's investment attractiveness and improving its business environment. In Kazakhstan, several state programs are implemented aimed at diversifying the country's economy and improving the well-being of its population. The transition to inflation targeting and the regime of a freely floating exchange rate gave the authorities additional tools to mitigate the negative impact of external shocks and allowed them to conduct a balanced macroeconomic policy. Kazakhstan's

financial reserves help the government maintain a stable external position and give it additional maneuverability during serious shocks. For example, the government responded to the negative impact of the COVID-19 pandemic by applying a complex of anti-crisis measures with a total cost of 8.3% of GDP. As a result, by the end of the II quarter of 2021, the economy of Kazakhstan has recovered to the pre-pandemic level.

Since 2017, the economy of Uzbekistan has been opened to the world with changes in the politics of the state. Uzbekistan is the largest country in Central Asia and produces 20% of Central Asia's GDP, and 45% of the total population lives there. The country is very rich in natural resources. In 2017, the structural transformation initiated by the government of Uzbekistan significantly improved its investment climate and created new opportunities for attracting external financing to finance the country's future economic growth. Inflow of investments began to flow to Uzbekistan. For example, Russian investments for the last four years Russian investments have doubled due to good relations between the countries of Uzbekistan and Russia. (EDB "Monitoring of Mutual Investments"). data). At the moment, the potential of Central Asia as a whole is also increasing, as the government of Uzbekistan has been reviewing its foreign policy to ensure greater openness in the world. First of all, this concerns the implementation of logistics, cross-border transport and energy projects in the region, which in the future will open new corridors to rapidly developing Asian markets. creation of a balanced macroeconomic policy framework in Uzbekistan, the transformation of fiscal and monetary policy was designed to be able to respond flexibly to any challenges and shocks. According to EDB estimates presented in the report "Uzbekistan and the EAEU: Prospects and Potential Impact of Economic Integration", the potential GDP growth rate in Uzbekistan is about 5.5% per year.

Table 1 – Foreign Direct Investments to Central Asian Countries (2022)

Country	Period	meaning Prev.	Fact meaning
Kazakhstan	2 sq./22	7.583 billion USD	6.877
Kyrgyzstan	2 sq./22	0.16 billion USD	-0.018
Tajikistan	2 sq./22	1.17 billion. USD	1.017
Uzbekistan	2 sq./22	7.241 billion. USD	6.712
Turkmenistan	2 sq./22	6.819 billion. USD	5.875
Note: Compiled by the authors based on the source [3].			

In the second quarter of 2022, Kazakhstan was 7.583 billion USD, its Fact meaning was 6.877, Kyrgyzstan was 0.16 billion USD in the second quarter, and the Fact meaning degree was -0.018.

Table 2 – Foreign direct investment in Kazakhstan

7583	2 sq./22	08.10.2022
6889	1 sq./22	02.07.2022
4981	4 sq./21	02.04.2022
0	3 sq./21	09.10.2021
4442	1 sq./21	10.07.2021
4446	4 sq./20	10.04.2021
4088	3 sq./20	02.01.2021
4498	2 sq./20	10.10.2020
Note: Compiled by the authors based on the source [3].		

Foreign Direct Investment in Kazakhstan increased by 7583 USD Million (7.583 B USD) in the second quarter of 2022. The maximum growth was 8206 USD Million and minimum was 864 USD Million.

Macroeconomic indicators of Central Asian countries. Central Asian countries were governed by a central planning economy for about 70 years during the USSR period. After independence, each country has moved to a new economic system – free market economy. All Central Asian countries declared their economic and political independence between 1993–1995 by issuing their national currencies,

establishing their financial systems and being members of leading international organizations. Central Asian countries, which have significant oil and natural gas deposits with their strategic location in the middle of Europe and Asia, and rich underground resources, are becoming the focus of international attention day by day.

In the first years of independence of all Central Asian countries, macroeconomic instability such as major declines and hyperinflation occurred in their economies. Two years after independence, the period of hyperinflation in Central Asian countries (1660% in Kazakhstan in 1993, 1210% in Kyrgyzstan, 2195% in Tajikistan, 1630% in Turkmenistan and 1230% in Uzbekistan) started. However, since 1996, they have caught the trend of increasing growth rate from positive growth, albeit at a low level. Indicators of Central Asian Countries (Figure 1).

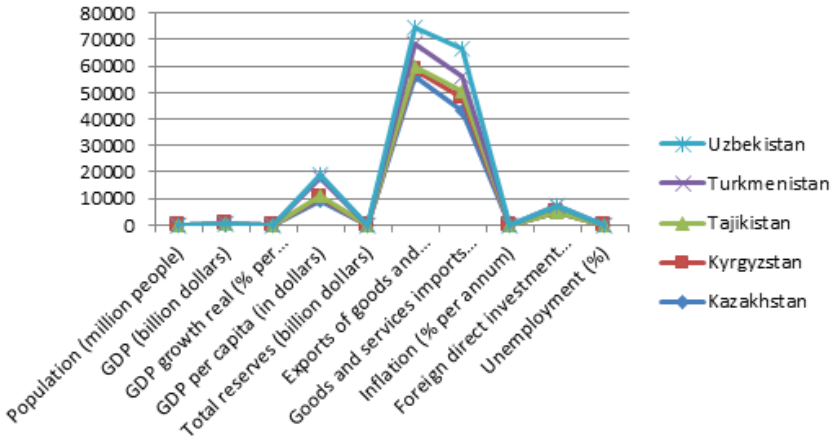

Figure 1 – Indicators of Central Asian Countries (2021)

Note: Compiled by the authors based on the source [3].

Looking at Figure 1, average growth rates in all Central Asian economies, except Uzbekistan, took negative values in the first 10 years of independence. Table 1 below contains information on the main macroeconomic indicators of Central Asian countries.

Table 3 – Main Macro Economic Indicators of Central Asian Countries (2021)

	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
Population (million people)	18,1	6,2	8,9	5,8	32,4
GDP (billion dollars)	162,9	75,7	71,5	37,9	59,93
GDP growth real (% per annum)	4.39	3.21	4.00	2.30	5.30
GDP per capita (in dollars)	9030,3	1220,4	801,0	6586,6	1533,8
Total reserves (billion dollars)	30,7	21,7	12,9	-	26,8
Exports of goods and services (million dollars)	55907,2	2570,1	1129,2	8940,8	5850,8
Goods and services imports (million dollars)	42942,0	5079,2	2764,8	5543,1	10170,8
Inflation (% per annum)	6.70	3.18	8.6	7.60	8.8
Foreign direct investment (million dollars)	4634,9	94,7	141,3	2314,3	96,1
Unemployment (%)	4.90	6.89	10.74	3.69	4.97
Note: Compiled by the authors based on the source [3].					

Uzbekistan is the most populous country among the Central Asian countries in terms of population, and the total population of this country is 32.4 million. It is seen that the country with the highest GDP is Kazakhstan with 162.9 billion dollars. Considering the average of national income per capita;

Again, Kazakhstan is the country with the highest per capita income of 9030 dollars. This country is followed by Turkmenistan, Uzbekistan and Kyrgyzstan, respectively. Tajikistan ranks last with a national income of 801 dollars per capita.

Method of research. Foreign direct investments to Central Asian countries. In Table 4 below, FDI to Central Asian countries is shown by years.

Table 4 – Foreign Direct Investments to Central Asian Countries (million dollars)

Years	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
1993	1271.4	10.0	9.0	79.0	48.0
1994	659.7	38.2	12.0	103.0	73.0
1995	964.2	96.1	10.0	233.0	-24.0
1996	1137.0	47.2	18.0	108.1	90.0
1997	1321.4	83.8	18.0	107.9	166.8
1998	1151.4	109.2	29.9	62.3	139.6
1999	1587.0	44.4	6.7	125.0	121.2
2000	1370.5	-2.4	23.5	131.0	74.7
2001	2816.8	5.0	9.5	170.0	82.8
2002	2588.5	4.7	36.1	276.0	65.3
2003	2483.3	45.5	31.6	226.0	82.6
2004	5615.3	175.5	272.0	353.7	176.6
2005	2546.1	42.6	54.5	418.2	191.6
2006	7611.2	182.0	338.6	730.9	173.8
2007	11972.8	207.9	360.0	856.0	705.2
2008	16818.9	377.0	486.6	1277.0	711.3
2009	14275.9	189.4	149.1	4553.0	842.0
2010	7456.1	472.8	93.9	3632.3	1636.4
2011	13760.3	685.8	145.9	3391.1	1635.1
2012	13648.1	260.9	241.7	3129.6	563.0
2013	10011.3	612.0	283.1	2861.4	634.7
2014	7308.1	343.0	326.6	3830.1	808.7
2015	6577.8	1144.1	454.0	3043.0	1041.2
2016	17221.0	619.2	241.6	2243.2	1662.6
2017	4712.6	-107.2	185.8	2085.9	1797.3
2018	83.4	144.2	220.9	1985.1	624.7
2019	3369.9	278.9	212.8	2165.9	2317.2
2020	3370.1	279.5	213.4	2167.2	2319.1
2021	3374.2	280.2	214.1	2168.9	2321.1
Note: Compiled by the authors based on the source [3].					

As can be seen from Table 2, Kazakhstan is the country that attracts the most FDI among Central Asian countries over the years. In 2019, Kazakhstan's total FDI stocks are 147 billion dollars. FDIs, which reach a significant size of 5–6% of GDP in Kazakhstan, are generally concentrated in the oil and natural gas sector. The share of 50–70% of the total foreign investments coming to Kazakhstan comes to the energy sector.

Total investment inflows in Kyrgyzstan show an uneven trend. Looking at the last five years, it is seen that foreign investment inflows were the highest in 2015. The amount of FDI coming to Kyrgyzstan in 2015 is approximately 1.2 billion dollars. This situation was realized as a result of the entry of Kazakh investors, who had significant capital accumulation due to the high oil prices

until 2014, to the Kyrgyzstan market. Apart from this, foreign investment inflows are provided to Kyrgyzstan from Canada and China. Foreign investments from Canada generally invest in the mining sector in the country, while investments from China are involved in small and medium-sized projects.

The Republic of Tajikistan is the only Central Asian country where the transition to independence has not been peacefully lived. The civil war continued in the country until 1997 and the long-lasting political instability became a major obstacle for foreign investments to come to the country. One of the areas where Tajikistan can gain a relatively significant advantage can be shown as hydroelectricity. It ranks 8th in the world in terms of the most cost-effective potential for hydroelectricity generation, which is well above the country's domestic demand. Thanks to this, it is in a position to meet the demand of East Asia and China, which lack energy. Apart from this, besides coal and dried fruits and grains in agriculture, there is an undeniable share of aluminum (5%) and cotton (4%) in the world. From Table 2, it is seen that Tajikistan is the country that attracts the least foreign investment among the Central Asian countries.

Although the energy sector in Turkmenistan offers an important potential for foreign investors, foreign capital entering the country in this sector has been quite limited. It is possible to evaluate the areas where foreigners can invest in the country in two ways. The first is the investments made in the field of oil and natural gas, in which Malaysia originating Petronas, United Arab Emirates originating Dragon Oil and Russia originating Itera companies come to the fore. They operate within the framework of agreements with these companies that include special provisions on revenue and product sharing [4]. Secondly, since Turkmenistan has to develop its industry in these areas in order to be able to meet all or some of the chicken products, sugar, milk, fruit, flour, meat, leather, cigarettes, textile products, clothing, shoes, coats and furniture products from the domestic market. These areas are seen as important investment areas of the country. Especially cotton, woolen and silk weaving industry and various food industries have the opportunity to develop [5].

Main provisions

At this moment, difficult times have come in the world. At this moment, there is an energy war in the world. In this study, we considered direct investment in the developing countries of Central Asia, among which Kazakhstan takes a special place. Kazakhstan is very rich in energy and natural resources. The results of this study are very important for understanding the factors that determine direct foreign investment in the countries of Central Asia. In the study, the results of the states of Central Asia are compared. Our obtained results can be established that the success of investments in the past period will contribute to an increase in the inflow of foreign investments in the future. The stability of the state greatly affects direct investment. Direct investments start the economic growth of the countries of Central Asia. In this direction, direct investment becomes an important factor. Fast-growing economies attract more direct foreign investment. Therefore, it is necessary for the countries of Central Asia to take steps to create a suitable investment climate by eliminating macroeconomic problems in these countries in order to increase the volume of foreign direct investment.

Looking at the situation of Uzbekistan, the inflow of foreign direct investments was very low in the 2000s and the total volume could not exceed 1 billion dollars in 2004. The share of foreign direct investment accounts for only 10% of the general capital investments and did not have a great impact on the structural change of the economy, the development of the industry and the increase in the foreign trade volume. After the years of 2006–2009, the demand for investment resources started to expand and a rapid increase was observed in the investments coming to the economy of Uzbekistan in the years 2010–2012. The total foreign investment stock in the country's economy exceeded 5.3 billion dollars in 2010. The increase in foreign investments in the country in recent years is a sign of the improvement in the country's economy and instilling confidence. As of 2019, approximately 60% of the FDIs coming to Uzbekistan belong to Russia and South Korea. While 50% of foreign investments come to the oil and natural gas processing and extraction sector, 27% of them come to the energy transportation sector.

Literature review

Numerous researchers have attempted to empirically investigate the economic and institutional determinants of FDI. There is a great deal of literature on the main determinants of FDI in developing economies, according to the results of these studies, government efficiency, regulatory quality, exchange rate, GDP, market size, labor cost, trade openness, financial and institutional factors, R&D and positive FDI policy is some of the important determinants of FDI (Ashurov S., Paul J., Jadhav P., Adhikary B.K., Ullah I., Khan M.A. [6, 7, 8, 9]. Some of these factors are country specific, for example Bolwijn R., Casella B., Rigo D. [10] also noted that different types of FDI are driven by different factors.

In his study covering the period 1996–2010, Tuncay O., Kaparova E. [11] used the LS method and SUR models to address the factors that determine FDI inflows in the transition countries in the case of Kazakhstan and Uzbekistan. According to the results of the empirical analysis, it has been emphasized that market size, economic stability and political security are important factors in providing FDI inflows to both Kazakhstan and Uzbekistan. In addition, it has been determined that there is a positive relationship between foreign trade openness and FDI to Uzbekistan.

In their study Hakan et al., [12] investigated the relationship between FDI and economic growth in Central Asian countries using data between 2001–2016. In this framework, they used the Panel VAR model and the Granger causality test to find the causality relationship between the variables. According to the results obtained from this test, there is bilateral causality between GDP and FDI as the P value is below 5% in both cases. In addition, the Variance Decomposition test was applied to indicate how much the variables would affect each other. According to the results, the GDP is 90% and FDI is 10% and FDI is 84% and GDP is 16% from itself in 10 periods. According to the results of the LS model applied to determine whether FDI has an effect on GDP, the effect of FDI on GDP is positive. In other words, a 1% increase in FDI increases GDP by 0.78%, which supports his work [13].

Data set and method. Data set and model. In this study, it has been tried to determine the factors affecting FDI in five countries in Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan). Variables in the literature were selected in terms of accessibility. An empirical analysis covering the period of 1995–2021 was made in the study. In the empirical study, the annual values of net FDI flows into the five countries in the relevant period in US dollars were used as the FDI variable. The independent variables that are thought to affect FDI are foreign direct investments in the previous period, GDP as an indicator of economic development, inflation rate as an indicator of macroeconomic stability, the number of fixed telephone lines per 100 people indicating the telecommunication infrastructure, and the real effective exchange rate representing the uncertainty in the exchange rate variable was used (Table 3).

All data used are annual; data on real exchange rates were obtained from the World Bank database, and data on the real exchange rate were obtained from the Bank for International Settlements database.

The system GMM model, in which FDI flows are the dependent variable, is determined as follows:

$$FDI_t = \alpha FDI_{t-1} + \beta REER_t + \delta GDP_t + \mu INF_t + \pi TEL_t + \varepsilon_t \qquad 1)$$

where, FDI – Foreign direct investments;

FDI_{t-1} – Foreign direct investments in the previous period;

REER – Real effective exchange rate index;

GDP – GDP as an indicator of economic growth;

INF – Inflation rate (%) as an indicator of macroeconomic stability;

TEL – Number of fixed telephone lines per 100 inhabitants as an indicator of infrastructure.

Results and discussion

In the study, dynamic panel data model was used to estimate the factors affecting FDI for the Central Asian countries for the years 1995–2019. In the current period, it is important to consider the lagged values of variables as explanatory factors in the analysis of economic relations, as an economic

event is affected by past experience and old behavior patterns. Two basic econometric methods can be used to estimate dynamic panels. First it is a Least Squares (Least Squares) estimator. However, in the presence of lagged endogenous variables in the model, the LS estimator does not allow efficient estimations [14,15]. The poor efficiency of the LCC estimator led to the development of a second estimation method known as the Generalized Method of Moments (GMM). The GMM estimator for dynamic panel data has recently been widely used, especially in economic growth regressions. GMM is generally a semi-parametric efficient estimation method.

Within the framework of our FDI model, a dynamic panel regression equation as suggested by Arellano and Bond [1] can be considered:

$$fdi_{it} = afdi_{i,t-1} + \beta' X_{it} + \mu_i + \varepsilon_{it}\ i = 1, \dots\dots, N\ t = 1, \dots\dots, T_i \qquad 2)$$

Where fdi_{it} is foreign direct investment of country *i* at time *t*, $fdi_{i,t-1}$ ise foreign direct investment of country *i* at time *t–1*; X_{it} represents the set of variables containing the arguments, and is the error term. Another feature of the dynamic regression equation is that the lagged version of the dependent variable is included in the equation. On the other hand, α and β denote the parameter of the lagged value of the dependent variable and the vector of parameters consisting of the parameters of the independent variables, respectively.

An important difficulty in estimating this dynamic model with the LS estimator is the following. Even if the fixed and random effects model is in question, the LS estimates will be inconsistent since $fdi_{i,t-1}$ will be associated with the error terms. By taking the first difference of equation (4), it is possible to eliminate individual, that is, country-specific effects (ηi) and to eliminate the problem of obtaining biased results:

$$fdi_{it} - fdi_{i,t-1} = \alpha\left(fdi_{i,t-1} - fdi_{i,t-2}\right) + \beta'\left(X_{it} - X_{i,t-1}\right) + \left(\varepsilon_{it} - \varepsilon_{i,t-1}\right) \qquad 3)$$
$$i = 1, \dots\dots, N\ t = 1, \dots\dots, T_i$$

Here, the internality of the regressors and the correlation between the new error terms ($\varepsilon_{it} - \varepsilon_{i,t-1}$) and the lagged dependent variable ($fdi_{i,t-1} - fdi_{i,t-2}$). In order to handle the situation and find solutions to these problems, instrumental variables are needed. The first difference is that the GMM estimator uses lagged explanatory variables as instrumental variables under the assumption that: (a) there is no serial correlation between error terms; (b) Variables contained in X_{it} are weakly exogenous. The first difference GMM estimator uses the following moment conditions:

$$E\left[gdp_{i,t-s}\left(\varepsilon_{it} - \varepsilon_{i,t-1}\right)\right] = 0\ , s \geq 2; t = 3, \dots\dots, T$$
$$E\left[X_{i,t-s}\left(\varepsilon_{it} - \varepsilon_{i,t-1}\right)\right] = 0, s \geq 2; t = 3, \dots\dots, T \qquad 4)$$

As Arellano and Bover [1] and Pesaran M.H. [16] pointed out, suitable instrument variables for the first difference equation will be poor instruments when the explanatory variables are continuous over time. Weak instruments can cause finite sample deviations in the series. In this case, the variances of the coefficients get larger asymptotically. In order to overcome these potential deviations and the weakness of the first difference GMM estimator, additional moment conditions have been proposed to the regression equation expressed as level values. When the equation expressed with first differences and the equation expressed with level values are brought together as a system, this estimator system incorporates moment conditions, which are called GMM estimators. Here, the instrumental variables for the equation expressed with level values are the lagged differences of the explanatory variables. In addition, an additional assumption must be made to ensure the validity of additional instrumental variables. The first differences of the independent variables in equation (4) should be unrelated to country-specific effects (ηi). In this case, the following moment conditions exist for the equation expressed with level values:

$$E\left[\left(fdi_{i,t-s} - fdi_{t-s-1}\right)\left(\mu_i - \varepsilon_{it}\right)\right] = 0, s = 1; t = 3, \dots\dots, T$$
$$E\left[\left(X_{i,t-s} - X_{t-s-1}\right)\left(\mu_i - \varepsilon_{it}\right)\right] = 0, s = 1; t = 3, \dots\dots, T \qquad 5)$$

The consistency of the GMM estimator depends on the realization of the assumption that the error terms do not carry serial correlation (autocorrelation) and the validity of the instrumental variables. Making appropriate estimations with the GMM estimator requires testing these two assumptions. The first can be tested with the Arellano-Bond AR(1) and AR(2) tests, and the second with the Sargan test, which exhibits an asymptotically χ2 distribution. All analyzes in the study were made with the Eviews 10 package program.

Empirical Findings. Pesaran panel unit root test was used to test the stationarity level of the variables. Table 5 shows the results of the Pesaran [16] panel unit root test. As a result of the unit root test, it can be seen that the level values of the series are not stationary. This means that the shock effects on the series do not disappear over time. When the first difference is taken, the variables become stationary according to all statistical test values, that is, they carry the I (1) process.

Table 5 – Pesaran Unit Root Test Results

Variable	Level			1stdifference		
	$\bar{t}$	$Z[\bar{t}]$	Probability	$\bar{t}$	$Z[\bar{t}]$	Probability
$fdi_{i,t-1}$	-0.879	3.014	1.002	-2.230	-2.805	0.004
gdp_{it}	-1.334	1.291	0.904	-2.095	-1.482	0.076
inf_{it}	-1.982	2.310	0.997	-2.580	-2.209	0.009
$reer_{it}$	-1.012	2.310	0.910	-2.012	-1.209	0.000
tel_{it}	-1.334	1.291	0.194	-2.030	-1.109	0.041
Note: The constant term and trend from the deterministic components are included in the model, eviews 10 outputs.						

According to the results seen in Table 5, tests with original values will not include spurious regression, since the same degree of stationarity was determined for the variables.

Table 6 presents the estimation results of the system GMM technique used to determine the factors affecting foreign direct investment inflows from Central Asian countries.

Table 6 – GMM Application Results

Variables and tests	Coefficients (probability values)
$fdi_{i,t-1}$	0.565514 (0.0000)*
gdp_{it}	0.976944 (0.0000)*
inf_{it}	0.181612 (0.0000)*
$reer_{it}$	-0.105519(0.0011)*
tel_{it}	0.135021 (0.9000)
Wald Test (x^2)	$x^2(6)$ = 1971.80 [0.0001]*
Sargan Test	x^2 (53) = 22.20239 [0.9783]
AR(1) Arellano Bond Autocorrelation Test	-3.9158 [0.0000]*
AR(2) Arellano Bond Autocorrelation Test	-1.1335 [0.2078]
Note: * % 1 and * * % 5 represent significance, eviews 10 outputs.	

According to the results of the GMM estimation method for Central Asian countries in this study, it is seen that the lagged value of FDI, economic growth, real effective exchange rate, macroeconomic stability variables are statistically significant and explain the dependent variable to a large extent.

On the other hand, the infrastructure variable does not affect the foreign direct investments coming to these countries. In addition, Sargan test shows that the instrumental variables do not have an internality problem (they are extrinsic) as desired, so the instrumental variables are valid. In addition, the existence of first-order and second-order autocorrelation was tested in the model, and the AR(1) test statistic was negative and significant as desired; The AR(2) test statistic was obtained as meaningless. Thus, according to the findings obtained, it was concluded that while the existence of first-order autocorrelation was confirmed, there was no second-order autocorrelation.

Conclusion

In the first part of the study, in which the determinants of FDIs for Central Asian countries are investigated, basic information and historical development process about FDI are mentioned. In the empirical analysis part of the study, the analysis was made using the dynamic panel data method for Central Asian countries and the GMM estimation technique of Arellano-Bond [1]. using annual data for the period 1995–2019. Lagged value of FDI, economic growth, real effective exchange rate, macroeconomic stability and infrastructure variables were added to the model as variables that are thought to be the determinants of foreign direct investments.

According to the results of the analysis, it has been seen that FDI inflow in the previous year has a positive and significant effect on the amount of FDI that will be realized in the current year. Accordingly, it can be thought that the success of investments in the past period will encourage more foreign investment inflows in the following years. The economic growth of Central Asian countries is an important factor in influencing the incoming FDI in line with expectations. Fast-growing economies attract more FDI. The reason for this is that the wealth brought by economic growth increases the purchasing power of consumers and the opportunities that the country provides to businesses. However, it has been observed that the real effective exchange rate has a negative coefficient and it is seen that it explains the dependent variable significantly.

Considering the results obtained, it can be said that the deterioration in basic macroeconomic indicators such as economic growth, inflation rate, real effective exchange rate, which are thought to be effective in FDI inflows for Central Asian countries, will prevent FDI inflows. Therefore, in order to increase the amount of FDI to enter these countries, macroeconomic problems such as inflation, insufficient infrastructure, and exchange rate instability should be eliminated and they should take steps to create a suitable investment climate.

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ОРТАЛЫҚ АЗИЯ ЕЛДЕРІНДЕГІ ШЕТЕЛДІК ТІКЕЛЕЙ ИНВЕСТИЦИЯЛАРДЫ АНЫҚТАЙТЫН ФАКТОРЛАР

Аңдатпа

Бұл зерттеудің негізгі мақсаты – Орталық Азияның бес еліне: Қазақстан, Қырғызстан, Тәжікстан, Түркіменстан және Өзбекстанға тікелей шетелдік инвестиция ТШИ ағынын анықтайтын факторларды зерттеу. Мақалада 1995-2021 жж. аралығын қамтитын эмпирикалық талдау жасалды. Эмпирикалық талдауда динамикалық панельдік деректерді талдау әдістері қолданылды. Модель – экономикалық тұрғыдан бір-біріне жақын Орталық Азия елдеріндегі ТШИ-ға әсер етуі ықтимал бес түрлі айнымалыны пайдалану арқылы жасалды. Құрылған модель Ареллано және Бонд [1] ұсынған жалпыланған сәттер әдісімен (Generalized Moments Method-GMM) талданды. GMM бағалау әдісінің нәтижелері бойынша ТШИ-дің артта қалған құны, экономикалық өсім, нақты тиімді айырбас бағамы, макроэкономикалық тұрақтылықтың айнымалылары статистикалық тұрғыдан маңызды және тәуелді айнымалыны түсіндіреді. Екінші жағынан, инфрақұрылымның айнымалысы тікелей шетелдік инвестицияларға әсер етпейді. Зерттеуде Орталық Азияның дамушы елдері, соның ішінде Қазақстан да қарастырылады. Бұл зерттеудің нәтижелері Орталық Азия елдеріне тікелей шетелдік инвестицияларды анықтайтын факторларды түсіну үшін маңызды болып табылады. Өткен кезеңдегі инвестициялардың табысы кейінгі жылдары шетелдік инвестициялар ағынының артуына ықпал ететін болады. Орталық Азия елдерінің экономикалық өсімі ТШИ-ға әсер етудің маңызды факторы болып табылады. Жылдам дамып келе жатқан экономикалар ТШИ-ды көбірек тартады. Сондықтан Орталық Азия елдеріне ТШИ көлемін ұлғайту үшін инфляция, жеткіліксіз инфрақұрылым, валюта бағамының тұрақсыздығы сияқты макроэкономикалық мәселелерді жою арқылы инвестициялық климат құру үшін қолайлы қадамдар жасау қажет.

Тірек сөздер: инфрақұрылым, дамушы елдер, шетелдік инвестициялар, тікелей инвестициялар, экономикалық өсім, динамикалық панель.

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ОПРЕДЕЛЯЮЩИЕ ФАКТОРЫ ПРЯМЫХ ИНОСТРАННЫХ ИНВЕСТИЦИЙ В СТРАНАХ ЦЕНТРАЛЬНОЙ АЗИИ

Аннотация

Основная цель этого исследования – изучить факторы, определяющие приток прямых иностранных инвестиций (ПИИ) в пять стран Центральной Азии: Казахстан, Кыргызстан, Таджикистан, Туркменистан и Узбекистан. В статье проведен эмпирический анализ за период 1995–2021 гг. В эмпирическом анализе использовались методы динамического анализа панельных данных. Модель была создана с использованием пяти различных переменных, которые близки друг к другу с экономической точки зрения. Созданная модель была проанализирована с помощью метода обобщенных моментов (Generalized Moments Method – GMM), предложенного Ареллано и Бондом [1]. По результатам метода оценки GMM видно, что запаздывающая стоимость ПИИ, экономический рост, реальный эффективный обменный курс, переменные макроэкономической стабильности являются статистически значимыми и в значительной степени объясняют зависимую переменную. С другой стороны, переменная инфраструктуры не влияет на прямые иностранные инвестиции. Рассматриваются развивающиеся страны Центральной Азии, включая Казахстан. Результаты исследования важны для понимания факторов, определяющих прямые иностранные инвестиции в страны Центральной Азии. Успех инвестиций в прошлый период будет способствовать увеличению притока иностранных инвестиций в последующие годы. Экономический рост стран Центральной Азии – важный фактор, влияющий на ПИИ. Быстрорастущие экономики привлекают больше прямых иностранных инвестиций. Странам Центральной Азии необходимо предпринять шаги для создания подходящего инвестиционного климата путем устранения макроэкономических проблем, таких как инфляция, недостаточная инфраструктура и нестабильность обменного курса, чтобы увеличить объем прямых иностранных инвестиций.

Ключевые слова: инфраструктура, развивающиеся страны, иностранные инвестиции, прямые инвестиции, экономический рост, динамическая панель.