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Economic Growth Models and FDI in the CIS Countries During the Period of Digitalization

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Abstract
This article explores the interrelation between economic growth and foreign direct investments (FDI) in the countries of the Commonwealth of Independent States (CIS) in 1993–2019. The research focuses on the impact of new FDI inflows per capita, as well as the influence of accumulated foreign capital (FDI stock per capita) on GDP growth per capita. This article has aimed to find the causal link between GDP growth and FDI inflows, as well as between GDP growth and FDI stock per capita in the CIS countries.
The research methods include: *empirical and statistical research, synthesis of practical and theoretical matters, methods of mathematical modelling.*
Discussion. *FDI in the CIS countries are often determined by market size and market growth potential, which ensure a favourable business environment for foreign investors. Data obtained during the analysis suggest that the CIS countries mainly attract market-oriented FDI, which is consistent with the findings of the authors. Thus, the accumulated foreign capital stock has positive impact on economic growth in the CIS countries.*
Results. *Foreign direct investments for economic growth act through such factors as gross domestic product, interest rate, average wages, exchange rate, consumer price index, political stability. The coronavirus pandemic factor is assessed by the authors as negatively affecting the investment attractiveness of countries; the use of digital technologies in handling FDI, according to the authors, is debatable issue.*

Keywords: *economic growth models, foreign direct investments (FDI), Commonwealth of Independent States (CIS) countries, digitalization, trade integration, global integration, financial capital*

JEL: *C23, E27, F43, F47*

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INTRODUCTION

Foreign direct investment (FDI) has long been seen as a catalyst for restructuring, modernization and economic development in the countries of the Commonwealth of Independent States (CIS), the so-called countries in transition. Since FDI includes transactions related to the increase or decrease in equity, reinvestment of income and debt instruments. Due to the fact that in the countries of the former CIS in the last year there has been a recession in the economy, it will be relevant to analyze information on FDI in the CIS countries.

Global digitalization has been increasing over the last century, causing a shift in cross-border business operations and stimulating companies to explore international opportunities in order to exploit and to benefit from the comparative advantages globally. This rise in global markets integration, the increasing inter-industry trade, and the wave of liberalisation of financial capital, as well as the goods markets, have served as a push factor for FDI.

Russia, Kazakhstan and Ukraine are the three country-leaders in terms of FDI inflows and FDI stock (in million dollars), followed by Turkmenistan, Azerbaijan and Belarus. The least attractive countries of the region are Tajikistan and Moldova, which can be explained by the limited investment opportunities in these countries due to the challenging investment climate and the underdevelopment of the financial and energy sectors. However, when the size of the economies is taken into account, the top receivers of FDI are Azerbaijan, Kazakhstan and Turkmenistan (Table 1).

Table 1

Cumulative and Average FDI inflows and FDI stock in CIS countries

Country/ Indicator	Cumulative FDI_{pc} inflows, 1993–2019 (millions dollars)	Average annual FDI inflows as % of GDP_{pc}, 1993–2019	Cumulative FDI_{pc} stock, in/up to 2019 (millions dollars)
Armenia	6,531	4,824	5,831
Azerbaijan	19,871	9,225	18,180
Belarus	19,326	1,915	17,730
Kazakhstan	126,586	6,963	129,244
Kyrgyzstan	3,915	4,303	3,520
Republic of Moldova	3,905	4,694	3,646
Russian Federation	510,325	1,889	378,543
Tajikistan	2,498	3,094	1,885
Turkmenistan	26,202	5,933	26,202
Ukraine	74,472	2,78	63,825
Uzbekistan	9,001	1,309	9,001

Source: World Development Indicator database, UNCTAD statistics database.

According to information presented in the report of the UN Conference on World Investment 2021 (UNCTAD), FDI fell sharply and fell back to 2005 levels. For the CIS countries, UNCAD cites FDI declines of 38 per cent from the recent average. It must be assumed that such a trend has emerged under the influence of two factors — the COVID-19 pandemic, as well as the active introduction of digital technologies into the interaction of investment entities.

Amid the coronavirus pandemic and the accompanying restrictive measures, it significantly reduced the flow of FDI to various sectors of the economy of the CIS countries. The pandemic in this case acts as a factor that entails increased risks for investors due to uncertainty regarding its timing, as well as the scope and nature of restrictive measures that may be applied in a particular state. Accordingly, the largest coronavirus restrictions, which are objectively necessary in themselves, significantly reduce the investment attractiveness of countries.

The impact of digitalization on investment processes, in turn, on the one hand, is expressed in contributing to the creation of a favorable investment climate through the formation of a relatively transparent investment environment through the use of various information technologies, and, on the other hand, has led to a decrease in the interest of foreign investors in the CIS countries. For example, a number of provisions have appeared in Russian legislation that are actually restrictive for subjects of investment activity. These include new rules on operators of investment platforms, the status of which is established by Federal Law No. 39-FZ of 22.04.1996 "On the Securities Market". Under the new rules, such operators are classified as organizations carrying out transactions with funds or other property, which has expanded the scope of their responsibilities regarding customer identification. Also, in the said Federal Law, a novel appeared about the owner of digital rights, in respect of whom liability for losses caused as a result of unlawful disposal of digital rights was established, if losses to the depositor were caused as a result of illegal actions of third parties.

Thus, digitalization is a controversial factor influencing the investment climate. In our opinion, the decisive factor in assessing this factor is the policy of one or another state, which forms the corresponding legal requirements for the conditions of interaction between subjects of investment activity interacting in the conditions of the active use of information and communication technologies.

Transitional economies after 1990s, experiencing transformation from planned to market economies, has opened their markets to foreign investors, with a big proportion of FDI attracted to the countries of the Central and Eastern Europe (CEE) [Li et al., 2005]. For this reason, many research have started to investigate the impact of FDI on economic growth in transition economies [Bevan et al., 2004]. Even though a consensus has not been found, much of the empirical literature shows that FDI to transition economies is important because it fills the big domestic savings and technological gaps. Y. Kinoshita and N.F. Campos, [Kinoshita et al., 2003] have shown that domestic savings gap in transition economies with larger FDI was smaller (0–4%) than in those countries with smaller inward FDI (8–14%). However, the investigation of the impact of FDI on economic growth has been limited to CEECs, leaving the CIS countries unexplored in this perspective. For that reason, this article aims to contribute to the literature by investigating the impact of FDI to the CIS economies.

Compared to the other types of capital flow, FDI is generally considered to be the most stable and reliable one, especially in a time of distress [Kose et al., 2006; Lipsey et al., 1999]. This is particularly applicable to the countries of the CIS, which have been through a difficult transition process following the collapse of the USSR and have experienced several oil and financial crises since 1992. This resulted in low levels of domestic investment, meaning that they had to seek stable investment from foreign economies. This is in line with the findings of Lipsey [Lipsey et al., 1999], who argues that transition countries are dependent on FDI as a source of foreign investment, with it accounting for about 40% of external finance.

The significance of FDI as a way of increasing economic growth has encouraged the development of much theoretical and empirical research into what factors influence the increase in FDI in a national economy. A.A. Bevan and S. Estrin [Bevan et al., 2004] have found that the GDP growth level of an economy is one of the central determinants of foreign investment in transition countries, potentially explaining why the CEECs is the preferred destination for FDI among the transitional economies.

D. Gligorić, Z. Borović, V. Vujanić [Gligorić et al., 2017] investigated the impact of FDI on economic growth in Commonwealth of Independent States (Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan and Ukraine) for the

2000–2015 period using ARDL (Pooled Mean Group/AR Distributed Lag Models) with the assumption of the positive impact on economic growth by FDI inflow increasing. Besides, the model is particularly convenient in a situation where all variables are stationary at different levels. Thus, the results show strong and positive impact of FDI on economic growth. S. Ashurov [Ashurov et al., 2020] has investigated and identified the determinants of FDI in the Central Asian countries, specifically Tajikistan, Kazakhstan, Kyrgyzstan, Turkmenistan and Uzbekistan, between 2000 and 2017.

The relationship between economic growth and FDI is also gradually being reflected in theoretical works on the impact of the pandemic on the investment climate. The result of such studies is an analysis of the provisions of "emergency" legislation, as well as provisions on the encouragement and development of investment, containing special economic measures aimed at mitigating the negative economic consequences of the pandemic [Gutnikov, 2020].

J. Grabara [Grabara et al., 2021] has considered the relationship between foreign direct investment in Kazakhstan and Uzbekistan and economic growth and renewable energy consumption. The study is based on data obtained from 1992 to 2018. The results show that there is a two-way link between foreign direct investment and renewable energy consumption in the considered two countries. The Granger causality test approach is applied to explore the causal relationship between the variables. The Johansen co-integration test approach is also employed to test for a relationship. The empirical results verify the existence of co-integration between the series. The main factors influencing renewable energy are economic growth and electricity consumption. To reduce dependence on fuel-based energy sources, Kazakhstan and Uzbekistan need to attract energy to renewable energy sources and implement energy efficiency based on rapid progress. O. Hrechyshkina, M. Samakhavets [Hrechyshkina et al., 2018] have identified the FDI role and value of innovative development financing of the Republic of Belarus. The carried-out analysis has shown that foreign direct investments inflows differ in considerable fluctuations from year to year. Debt tools prevail in foreign direct investments inflow's structure and the investment climate of the Republic of Belarus needs improvement. The outcome paper suggestion is the offer to concentrate efforts on foreign direct investments attraction to the hi-tech sector development which is based on V and VI technological modes. It will allow not only to improve investment potential of Belarus but to carry out structural economic transformation on the innovative way. Authors connect further research prospects with studying how to activate scientific and technical international cooperation of the Republic of Belarus with foreign countries. D. Burakov [Burakov, 2018] has investigated the casual relationship between energy consumption, trade openness, exchange rate and foreign direct investment in Russia and Belarus for the period from 1997 to 2017. To test the hypothesis and explain the possible casual relations he used the error correction approach. Result of the conducted research show the short run trade openness and exchange rate affect foreign direct investment in positive and significant manner. In the long run, energy consumption, trade openness and exchange rate positively affect foreign direct investment. O. Kurbanov [Kurbanov, 2020] has considered the relationship between FDI, GDP and DI using a vector error-correction model (VECM). The empirical model is based on quarterly data for the period 2010–2019 in Uzbekistan. The result of the Johansen cointegration rank test shows that there exists a long-run relationship among the three variables. The Granger causality test indicates a positive significant bidirectional relationship between GDP and Domestic Investment. GDP Granger causes FDI and a change in the GDP indicates in advance a change in the level of FDI. The variance decomposition indicates that fluctuations in FDI are explained by the shocks in GDP (55.0 per cent) and Uzbekistan's domestic investment has a greater impact on growth than FDI.

DEFINITION OF FDI

Different sources have different definitions of FDI. For example, UNCTAD defines FDI as a combination of the "equity capital, reinvested earning and other capital". According to the IMF [IMF, 1993], FDI refers to "a resident entity in one economy obtaining a lasting interest in an enterprise resident in another economy". Thus, FDI occurs when there is a permanent cooperation between two entities, with the companies, which forge these long-lasting bonds through FDI, being referred to as MNCs. Moreover, the IMF [International Monetary Fund, 1993], and the OECD [OECD, 2008] outline that the ownership share of the foreign company should be no less than 10%, allowing the owner to have a considerable degree of management control and voting power in a foreign-based company. This long-lasting relation between enterprises and the ability to exert influence on the decision making differentiate FDI from portfolio investment, which is characterized by investments in shares without the power to exert control on the business.

FDI in the host country can be divided into FDI flows and FDI stock. The former represents the movements of credits and debits in the balance of payments (BoP), with a net rise in credits indicating FDI inflows and being shown with a positive sign on the host-country's BoP; whilst the latter is the accumulated value of the total capital and reserves of MNCs in the host economy (UNCTAD). Net FDI is the difference between the inflows and outflows of FDI. Furthermore, these foreign investment flows can be of different types, such as horizontal and vertical [Caves, 1971], and of different forms, such as greenfield investment, joint ventures and mergers and acquisitions [Moosa, 2002].

The following models are best suited to analyze the relationship between economic growth and FDI.

Economic growth models and FDI

The World Bank defines economic growth as growth in gross domestic product (GDP), outlining that an economy can grow extensively and intensively. In the former the economy grows due to the higher levels of accumulated capital, while in the latter, the economy grows by means of more efficient production. This can be represented within the frameworks of the neoclassical and endogenous growth models, respectively. Although, both models emphasize the importance of human and physical capital accumulation on economic growth, they represent technological change differently, which has implications on the relationship between FDI and economic growth.

The neoclassical models with exogenous input of technology, presented by Solow [Solow, 1956], relate economic growth to capital (K) and labour (L) as well as the rise in total factor productivity (A). The basic Solow production function is as follows:

$$Y_t = A_t \Phi(K_t, L_t). \quad (1)$$

This model assumes that the production function exhibits constant returns to scale and each production input has diminishing marginal products [Romer, 2012]. Within this model, FDI promotes the productive efficiency of domestic firms and, thus, economic growth, by adding to the existing capital stock, by creating new types of inputs and production techniques, as well as by encouraging technological change. The existing literature often uses an augmented standard growth equation framework to model the impact of FDI [Lipsey, 1999], represented as follows:

$$Y = A\Phi(K, L, F, \Omega), \quad (2)$$

where F and Ω stand for FDI and auxiliary variables, respectively.

The Endogenous Growth Model

In an attempt to overcome the shortcomings of the neoclassical model, new growth theories tried to endogenise technological change and to show that an economy can experience permanent growth [Szkorupová, 2015]. Within the endogenous model, FDI affect output through capital accumulation and technological change, however, unlike the neoclassical growth model, the endogenous one determines the technological change within the model (endogenously), and thus it captures the permanent impact of FDI on growth. The endogenous model also allows for the externalities that arise due to the diffusion of new skills, managerial practices and technological expertise due to FDI [Lipsey, 1999; Ramirez, 2000]. The augmented Cobb-Douglas production function as in M. Ramirez [Ramirez, 2000], and J.W. Fedderke and A.T. Romm [Fedderke et al., 2006] show the external effect of FDI as follows:

$$Y = AF[L,\ K_d,\ E] =\ AL^{\alpha}K_d^{\beta}E^{(1-\alpha-\beta)}, \tag{3}$$

where Y and A represent the output and the total productivity respectively; L is labour, K_d is the domestically owned capital; α and β are the parameters denoting labour and capital stock in the economy respectively. E is the externality presented as a result of FDI.

Following J.W. Fedderke and A.T. Romm, the Cobb-Douglas production function representation of externalities is:

$$E = [L,\ K_d,\ K_f^{\gamma}]^{\theta}, \tag{4}$$

where K_f represents foreign capital (FDI). Substituting (2) into (1) we obtain:

$$Y = AL^{\alpha+\theta(1-\alpha-\beta)}K_d^{\beta+\theta(1-\alpha-\beta)}K_f^{\gamma\theta(1-\alpha-\beta)}. \tag{5}$$

The coefficient γ shows whether foreign capital substitutes for or adds to domestic capital ($\gamma \gtrless 0$ respectively). Thus, if $\gamma > 0$, then FDI crowds out domestic capital. θ shows the spillover effect from FDI on labour and domestic capital, which can be positive or negative, however, its value is independent of the sign of γ. According to J.H. McCulloch [McCulloch, 2016], γ and θ can be interpreted as short-run and long-run substitution effects between the two types of capital.

After taking the logarithms and the time derivatives of (3), the impact of FDI on economic growth is estimated using the following equation:

$$g_y = g_A + [\alpha + \theta(1-\alpha-\beta)]g_L + [\beta + \theta(1-\alpha-\beta)]g_{K_d} + [\gamma\theta(1-\alpha-\beta)]g_{K_f}, \tag{6}$$

where g_A, g_L, g_{K_d}, g_{K_f} are the growth rate of A, L, K_d, K_f respectively.

According to R.E. Lipsey [Lipsey, 1999] and Broadman [Broadman, 2005], FDI has the most potent effect on economic growth through knowledge and technology transfers rather than through capital accumulation. Therefore, the endogenous growth model may be a better representation of the true relationship between FDI and growth than the neoclassical one. The positive effects of technological spillovers from FDI were also emphasised by M. Wang [Wang, 2009] and B. Cambazoglu [Cambazoglu et al., 2014].

Model specification — economic growth

To represent the dependent variable in the growth model, this article uses the logarithm of GDP per capita. Although, empirically, the real GDP per capita growth is commonly used

[Borensztein et al., 1998; Iamsiraroj, 2016], due to the nature of the method of estimation, such as first differencing, which will be discussed below, the log of GDP per capita will be utilised for convenience of economic interpretation. There are different growth models, which outline a range of variables that could facilitate economic growth. However, only the variables, which are empirically proven[1] to have the highest effect on growth in transition countries, are included and the estimated model is as follows:

$$\mathrm{Log}\left(GDP_{pc}\right)_{it} = \beta_{i1} + \beta_2 \mathrm{Log}\left(FDI_{pc}\right)_{it} + \beta_3 \mathrm{Log(Inflation)}_{it} + \beta_4 \mathrm{Log(GCF)}_{it} +$$

$$+ \beta_5 \mathrm{Log(GC)}_{it} + \beta_6 \mathrm{HC}_{it} + \beta_7 \mathrm{Trade}_{it} + u_{it}. \quad (7)$$

Table 2 below provides detailed description of each variable.

Table 2

Variables of Log (GDP_{pc}) regression

Variable	Description	Source
Log (GDP_{pc})	Logarithm of GDP_{pc} (in current US$)	World Development Indicator database
Log (FDI_{pc})	Logarithm of FDI_{pc} inflow and FDI_{pc} stock (in current US$)	UNCTAD statistics database
Inflation	Inflation change as a deflator of GDP_{pc}	World Development Indicator database
Log (GCF)	Logarithm of Gross capital formation (in current US$)	World Development Indicator database
Log (GC)	Logarithm of General government final consumption expenditure (% of GDP)	World Development Indicator database
Human capital (HC)	Secondary school enrolment (% rate)	Central Intelligence Agency
Trade	Exports and imports in goods and services (% of GDP)	World Development Indicator database

Source: compiled by the authors.

Model specification — FDI inflows

In accordance with Y. Kinoshita and N.F. Campos [Kinoshita et al., 2003], FDI inflows/stock per capita is used as the dependent variable. Although, not all of the possible determinants of FDI outlined in the literature are examined, the ones most applicable to the transition economies are included in the analysis. As a consequence, the following equation is used to estimate the effect of growth on FDI:

$$\mathrm{Log}\left(\mathrm{FDI}_{pc}\right)_{\mathrm{it}} = \alpha_{i1} + \alpha_2 \mathrm{Log}\left(GDP_{pc}\right)_{\mathrm{it}} + \alpha_3 \mathrm{Log(Inf)}_{\mathrm{it}} + \alpha_4 \mathrm{HC} + \alpha_5 \mathrm{Log(Tel)}_{\mathrm{it}} +$$

$$+ \alpha_6 \mathrm{Trade}_{\mathrm{it}} + \alpha_7 \mathrm{LSPriv}_{\mathrm{it}} + \alpha_8 \mathrm{Natural\ Resources}_{\mathrm{it}} + \mathrm{v}_{\mathrm{it}}. \quad (8)$$

The variables of the regression are described in Table 3. As shown in the equation above, economic growth is approximated by GDP per capita, which is used for the purposes of interpretation, despite the fact that a significant part of empirical research utilises real GDP_{pc} growth [Bevan et al., 2004]. According to reputable studies, FDI is determined by the comparative advantages of the recipient country [Nair-Reichert et al., 2001]. Therefore, following Li and Liu, telephone lines per 100 people are used as a proxy to represent good infrastructure and secondary school enrolment rate proxies the level of human capital. These variables are considered to be important determinants of FDI to the CIS, according to Y. Kinoshita and N.F. Campos [Kinoshita et al., 2003].

[1] *For example, E. Borensztein [Borensztein et al., 1998]; X. Li and X. Liu [Li et al., 2005].*

Table 3

Variables of Log (FDI_{pc}) regression

Variable	Description	Source
Log (FDI_{pc})	Logarithm of FDI_{pc} inflow (current US$)	UNCTAD statistics database
Log (GDP_{pc})	Logarithm of GDP_{pc} (current US$)	World Development Indicator database
Log (Inflation)	Logarithm of inflation deflator of GDP_{pc}	World Development Indicator database
HC	Secondary school enrolment (% rate)	Central Intelligence Agency
Trade	Exports and imports in goods and services (% of GDP)	World Development Indicator database
Log (Tel)	Logarithm of Fixed Telephone Subscription (per 100 people)	World Development Indicator database
LSPriv	Large-Scale Privatisation; It is scaled from 1 to 4+, where 1 indicates little private ownership; 2 — some privatization; 3, 4 and 4+ indicate for more than 25%, 50% and 75% of privately owned firms, respectively	EBRD transition indicators
Resources (denoted as R)	Total Natural Resources rents (% of GDP)	World Development Indicator database

Source: compiled by the authors.

Tondel and Kudina argue that FDI to the CIS is resource-seeking; therefore, the stock of natural resources is added, which is measured by its rents as a percentage of GDP. Furthermore, according to Y. Kinoshita and N.F. Campos [Kinoshita et al., 2003], transition economies with open markets attract more FDI inflows, hence trade as percentage of GDP in included in the model. Moreover, A.A. Bevan and S. Estrin [Bevan et al., 2004] claim that large-scale privatisation is an essential determinant of FDI to Eastern European countries, leading to the inclusion of this variable in the model.

Endogeneity and Simultaneous equations model

Endogeneity occurs when the independent variables are correlated with the error terms, so that:

$$E\left[\varepsilon_{it} \left| x_{i1}, x_{i2}, .., x_{iT}\right.\right] \neq 0. \quad (9)$$

This problem usually arises because of measurement errors, omitted variables bias and simultaneity or a combination of these factors.

In the estimation of GDP_{pc} and growth, endogeneity arises because of the simultaneity bias. It means that there is a bi-directional relationship between the dependent and explanatory variables; consequently, they are determined simultaneously. A wide range of literature outlines the evidence of reverse causality between FDI_{pc} and GDP_{pc} growth; therefore, FDI_{pc} should not be specified as exogenous. For that reason, a simultaneous equations model (SEM) is estimated, which consists of two structural equations. SEM allows to control for simultaneity between variables and to obtain "more useful estimates for policy analysis". To estimate SEM, the instrumental variables (IVs) estimation method is utilised, solving endogeneity, and thus, making the estimates consistent and unbiased.

In the SEM with panel data variables are defined simultaneously within each time period and the unchanged unobserved heterogeneity of each country is controlled. The simultaneous equations model used consist system of two structural equations:

$$\begin{cases} \mathrm{Log}\left(\mathrm{GDP_{pc}}\right)_{it} = \beta_0 + \beta_i + \beta_2 \mathrm{Log}\left(\mathrm{FDI_{pc}}\right)_{it} + \beta_k Z_{it} + u_{it} \\ \mathrm{Log}\left(\mathrm{FDI_{pc}}\right)_{it} = \alpha_0 + \alpha_i + \alpha_2 \mathrm{Log}\left(\mathrm{GDP_{pc}}\right)_{it} + \alpha_k K_{it} + v_{it} \\ \ldots \end{cases}, \quad (10)$$

where:

$$\beta_k Z_{it} = \beta_3 \text{Log}(\text{Inf})_{it} + \beta_4 \text{Log}(\text{GCF})_{it} + \beta_5 \text{Log}(\text{GC})_{it} + \beta_6 \text{HC}_{it} + \beta_7 \text{Trade}_{it} \quad (11)$$

$$\alpha_k K_{it} = \alpha_3 \text{Log}(\text{Inf})_{it} + \alpha_4 \text{Log}(\text{Tel})_{it} + \alpha_5 \text{HC}_{it} + \alpha_6 \text{Trade}_{it} + \alpha_7 \text{LSPriv}_{it} + \alpha_8 R_{it}.$$

In the model above, the subscripts i and to refer to the cross-section and the time period respectively, $\text{Log}\left(\text{FDI}_{\text{pc}}\right)_{it}$ and $\text{Log}\left(\text{GDP}_{\text{pc}}\right)_{it}$ are endogenous variables, $\beta_k Z_{it}$, $\alpha_k K_{it}$ are the set of all exogenous variables, multiplied by a respective coefficient, and u_{it}, v_{it} are error terms in growth and FDI equation respectively. Under the assumption of exogeneity, Z_{it}, K_{it} and u_{it}, v_{it} in the two equations and across time periods. β_i and α_i are the unobserved effects in panel, and β_m, α_m are coefficients of the parameters (m = 0, 1, … n).

The SEM is suitable for estimation if the endogenous variables are determined simultaneously and if each equation in the system has its own independent economic interpretation. The second condition holds because, empirically, both equations are estimated and interpreted independently. However, the explanations, proving that $\text{Log}(\text{GDP}_{\text{pc}})$ and $\text{Log}(\text{FDI}_{\text{pc}})$ are simultaneously determined are presented below.

The first equation in the system is:

$$\text{Log}\left(\text{GDP}_{\text{pc}}\right)_{it} = \beta_0 + \beta_i + \beta_2 \text{Log}\left(\text{FDI}_{\text{pc}}\right)_{it} + \beta_k Z_{it} + u_{it}. \quad (12)$$

Substituting $\text{Log}\left(\text{FDI}_{\text{pc}}\right)_{it}$ into the first equation obtaining the following:

$$\text{Log}\left(\text{GDP}_{\text{pc}}\right)_{it} = \beta_0 + \beta_i + \beta_2(\alpha_0 + \alpha_i + \alpha_2 \text{Log}\left(\text{GDP}_{\text{pc}}\right)_{it} + \alpha_k K_{it} + v_{it}) + \beta_k Z_{it} + u_{it}$$

$$\text{Log}\left(\text{GDP}_{\text{pc}}\right)_{it} = \beta_0 + \beta_i + \beta_2\alpha_0 + \beta_2\alpha_i + \beta_2\alpha_2 \text{Log}\left(\text{GDP}_{\text{pc}}\right)_{it} + \beta_2\alpha_k K_{it} + \beta_2 v_{it} + \beta_k Z_{it} + u_{it}$$

$$(1 - \beta_2\alpha_2)\ \text{Log}\left(\text{GDP}_{\text{pc}}\right)_{it} = \beta_0 + \beta_i + \beta_2\alpha_0 + \beta_2\alpha_i + \beta_2\alpha_k K_{it} + \beta_2 v_{it} + \beta_k Z_{it} + u_{it}$$

$$\text{Log}\left(\text{GDP}_{\text{pc}}\right)_{it} = [\beta_0 + \beta_i + \beta_2\alpha_0 + \beta_2\alpha_i + \beta_2\alpha_k K_{it} + \beta_2 v_{it} + \beta_k Z_{it} + u_{it}]/(1 - \beta_2\alpha_2). \quad (13)$$

Hence, it can be observed that $\text{Log}\,(\text{GDP})_{it}$ has a direct relationship with v_{it}.
Which leads to:

$$\text{cov}(\text{Log}\left(\text{GDP}_{\text{pc}}\right)_{it}, v_{it}) \neq 0. \quad (14)$$

Indicating that in the second equation:

$$\text{Log}\left(\text{FDI}_{\text{pc}}\right)_{it} = \alpha_0 + \alpha_i + \alpha_2 \text{Log}\left(\text{GDP}_{\text{pc}}\right)_{it} + \alpha_k K_{it} + v_{it}. \quad (15)$$

The Gauss-Markov assumption of exogeneity is not satisfied.
Following the same procedure with the second equation yields:

$$\text{cov}\ (\log(\text{FDI}_{\text{pc}})_{it}, u_{it}) \neq 0. \quad (16)$$

Therefore, it is shown that FDI_{pc} and GDP_{pc} have a causal effect on one another and, thus, the simultaneous equations model should be applied.

In order to obtain efficient estimates using the SEM, each structural equation in the model has to be identified. For that reason, both the order and rank conditions for identification should be satisfied. The order condition requires excluding at least one exogenous variable from the first equation for it to be identified, which is necessary for the rank condition to hold. The rank condition is satisfied when at least one exogenous variable, eliminated from first equation, is included in the second equation with a nonzero population in the reduced form of the second equation. This is called "exclusion restrictions"; so that at least one exogenous variable from the growth equation can be used as the instrumental variable in the reduced form of the FDI equation. The same conditions are applied for the identification of/to identify the second (FDI) equation, where the omitted exogenous variables from the FDI equation are used as the instruments for the estimation of the growth equation.

After ensuring that the order and rank conditions are satisfied, and hence, the structural equations are correctly identified, the SEM is estimated using 2SLS, employing the excluded exogenous variables from each equation as instruments.

Durbin-Wu-Hausman (DWH) test

Before moving to the estimation, the test for the endogeneity of the regressors is estimated. According to Wooldridge, the 2SLS estimator is more efficient than the OLS when the regressors and errors are correlated; otherwise, the "asymptotic variance" of the IVs is bigger, leading to a less accurate estimation of the confidence intervals and t-statistics. According to Davidson and MacKinnon the following steps are pursued to conduct the DWH test.

Firstly, the reduced-form of the second equation of the SEM is run by the OLS:

$$\mathrm{Log}\left(\mathrm{FDI_{pc}}\right)_{\mathrm{it}} = \alpha_0 + \alpha_{\mathrm{i}} + \alpha_1 \mathrm{Z_{it}} + \alpha_2 \mathrm{II_{it}} + \mathrm{v_{it}}. \quad (17)$$

Secondly, the residuals from the equation above are saved ($\hat{\mathrm{v}}_{\mathrm{it}}$).

Then, the first equation with saved residuals is run:

$$\mathrm{Log(GDP_{pc})_{it}} = \beta_0 + \beta_{\mathrm{i}} + \beta_2 \mathrm{Log}\left(\mathrm{FDI}_{pc}\right)_{\mathrm{it}} + \beta_3 \mathrm{Z_{it}} + \mathrm{u_{it}} + \hat{\mathrm{v}}_{\mathrm{it}}. \quad (18)$$

If the $\hat{\mathrm{v}}_{\mathrm{it}}$ is statistically different from zero, there is endogeneity between two variables.

Following the procedure it has been found that $\mathrm{Log\,(GDP_{pc})_{it}}$ and $\mathrm{Log}\left(\mathrm{FDI_{pc}}\right)_{\mathrm{it}}$ are endogenous because the estimated residuals ($\hat{\mathrm{u}}_{\mathrm{it}}$ and $\hat{\mathrm{v}}_{\mathrm{it}}$) are statistically significant at 10% significance level (ρ-values < 0.1).

Autocorrelation test

To obtain unbiased standard errors and efficient estimates the idiosyncratic error terms have to be serially uncorrelated, so that:

$$\mathrm{E}[\,\mathrm{u_{it}}, \mathrm{u_{is}}] = 0 \text{ for all } \mathrm{t} \neq \mathrm{s}. \quad (19)$$

The Wooldridge test for panel data is implemented. The null hypothesis of the test is no first-order autocorrelation in residuals; so that if $\mathrm{u_{it}}$ is serially uncorrelated then $\mathrm{Corr}\,(\Delta \mathrm{u_{it;}}\, \Delta \mathrm{u_{it-1}}) = -0.5$. Under $\mathrm{H_0}$ Wooldridge test follows the F-distribution; the test is verified to have a good power in the case of a small sample size [Drukker, 2003]. Alternatively ρ-value can be used, where the low ρ indicates that $\mathrm{H_o}$ is rejected [Wang, 2009].

Underidentification test

This test checks whether IVs are correlated with the endogenous regressor. Under the conditional i.i.d. standard errors the LM and Wald tests with Kleibergen-Paap rk-statistic are reported, with the null hypothesis that the model is underidentified. Under H_0 Kleibergen-Paap rk-statistic follows χ^2 the distribution with the degrees of freedom of (L1 − K1 + 1), where L1 is the number of excluded instruments and K1 is the number of endogenous variables [Cambazoglu et al., 2014]. The rejection of H_0 means that the model is identified and the IVs are appropriate $\mathrm{Cov}\left(\mathrm{I_{it}}, \mathrm{Log}\left(\mathrm{FDI}_{pc}\right)_{\mathrm{it}}\right) \neq 0$ and $\mathrm{Cov}\left(\mathrm{II_{it}}, \mathrm{Log}\left(\mathrm{GDP}_{pc}\right)_{\mathrm{it}}\right) \neq 0$.

The endogeneity of the variable is tested by C-statistics, which equals to the difference of Sargan and Hansen statistics. Thus, it tests the difference between the two equations; in first one the regressor is treated as endogenous and a small number of IVs are used, and in the second equation the regressor is exogenous and more instruments are included. Under the null hypothesis — that a definite endogenous regressor can be included as exogenous — C-statistics follows the χ^2 distribution, where the degrees of freedom are the number of explanatory variables [Borensztein et al., 1998]. Therefore, when calculated, χ^2 is larger than the critical value (or ρ-value is smaller than 0.1 at 10% significance level), meaning that H_0 is rejected and the endogenous regressors should be treated as exogenous.

The 2SLS standard errors are consistent with the uncorrelated and the homoscedastic residuals. Therefore, each equation was tested for autocorrelation in residuals using Wooldridge test. Conducting the test, H_0, no first-order autocorrelation in residuals, is rejected at 5% significance level (ρ-values < 0.05) in all of the regressions (Table 4). In what follows, ρ-value is used to decide whether the null hypothesis is rejected, where the low ρ indicates that H_o is rejected.

Table 4

Results of Wooldridge test for autocorrelation

SEM of two structural equation of Log (GDP_{pc}) and Log (FDI_{pc} inflow) respectively	
Regression 1. [Log (GDP_{pc}) and Log (FDI_{pc} inflow)]	Regression 2. Log (FDI_{pc} inflow)
F (1, 2) = 140.918 (0.0070)*	F (1, 2) = 44.913 (0.0215)**
SEM of two structural equation of Log (GDP_{pc}) and Log (FDI_{pc} stock) respectively	
Regression 1. [Log (GDP_{pc}) and Log (FDI_{pc} stock)]	Regression 2. FDI_{pc} stock)
F (1, 2) = 70.008 (0.0140)**	F (1, 2) = 33.452 (0.0286)**

Note: p-values are presented in parentheses, which are used in the decision-making about rejection of the null hypothesis.
** Rejection H_0 of at 1% level.*
*** Rejection H_0 of at 5% level.*

Due to the presence of first-order autocorrelation in residuals, a Newey-West [IMF, 1993] correction of standard errors is used to obtain autocorrelation robust standard errors. The Newey-West correction is "the truncated-kernel Heteroscedasticity and Autocorrelation Consistent (HAC) covariance matrix", which also corrects the standard errors of heteroscedasticity and provides consistent estimators in the case of the violation of the 2SLS assumptions [Iamsiraroj, 2016].

C-test

In the C-test of endogeneity, H_0, that the endogenous variables can be treated as exogenous, is rejected confirming that $\mathrm{Log}\ (\mathrm{FDI_{pc}\ inflow})$, $\mathrm{Log}\ (\mathrm{FDI_{pc}\ stock})$ and $\mathrm{Log}\ (\mathrm{GDP_{pc}})$ are indeed endogenous in each regression, thus the 2SLS approach is justified.

INTERPRETATION OF THE MODELS AND DISCUSSION

Using the simultaneous equations models allows to not only analyse the direct effect of $\mathrm{FDI_{pc}}$ on $\mathrm{GDP_{pc}}$ growth, but also to examine the indirect and total ones. The former represents the impact of the other explanatory variables on the growth through $\mathrm{FDI_{pc}}$, while the latter is the sum of the direct and indirect effects, which are shown in Table 5.

Table 5

Direct, indirect and total effects on $\mathrm{GDP_{pc}}$ growth (Specification 1), 1993–2019

	Column 1 (C1)			Column 2 (C2)		
Model	SEM of $\mathrm{GDP_{pc}}$ and $\mathrm{FDI_{pc}}$ inflows			SEM of $\mathrm{GDP_{pc}}$ and $\mathrm{FDI_{pc}}$ stock		
Variables	Direct effects	Indirect effects	Total effects	Direct effects	Indirect effects	Total effects
Log ($\mathrm{FDI_{pc}}$)	0.3914	n/a	0.3914	0.2234	n/a	0.2234
Log (GCF)	0.3566	n/a	0.3566	0.5479	n/a	0.5479
Log (GC)	−0.3486	n/a	−0.3486	−0092	n/a	−0092
HC	0	0	0	0.4051	0	0.4051
Inflation	−0.0002	−0.0003	−0.0005	0	−0.0002	−0.0002
Trade openness	−0.0153	0.016	0.001	−0.0155	0.005	−0.01
Log (Telephone lines)	n/a	0	0	n/a	0.4957	0.4957
Large-Scale Privatisation	n/a	0	0	n/a	0.1599	0.1599
Resources	n/a	−0.0205	−0.0205	n/a	−0007	−0007

Note:
0 means the coefficient of the variables is not statistically different from zero; n/a stands for the variable that is not included in the regression.
C1 shows effects on $\mathrm{GDP_{pc}}$ growth directly and through $\mathrm{FDI_{pc}}$ inflows;
C2 shows effects on $\mathrm{GDP_{pc}}$ growth directly and through $\mathrm{FDI_{pc}}$ stock.
All coefficients are statistically significant at 90% or larger significance level.
Indirect effect is obtained by multiplying the coefficient of the Log ($\mathrm{FDI_{pc}}$) by the coefficient of each explanatory variable.

As shown in Table 5, $\mathrm{FDI_{pc}}$ inflows have a direct positive effect on growth at 1% significance level. In C1 it can be observed that, holding all other variables constant, a 10% growth rate in $\mathrm{FDI_{pc}}$ inflows increases growth rate of $\mathrm{GDP_{pc}}$ by 3.9% per year. Meanwhile, in C2 it is seen that at 1% significance level, $\mathrm{FDI_{pc}}$ stock also has a positive effect on $\mathrm{GDP_{pc}}$ growth[2]. Therefore, new $\mathrm{FDI_{pc}}$ inflows (per year), as well as the accumulated foreign capital stock, have a positive impact on economic growth in the CIS countries. This result is consistent with Kinoshita and Campos [Kinoshita et al., 2003] and M. Neuhaus [Neuhaus, 2006] who conclude, respectively, that $\mathrm{FDI_{pc}}$ inflows and $\mathrm{FDI_{pc}}$ stock positively affect $\mathrm{GDP_{pc}}$ growth in the transition economies. This can be partially explained by the high rate of job creation in the recipient countries. According to the E&Y report, FDI to the CEECs is labour intensive. For instance, in 2010 65,372 new jobs were created by the MNCs, meanwhile, in 2012 the MNCs in Russia accounted for 8% of the total increase in employment. Besides, there are various other potential explanations of the positive effects of $\mathrm{FDI_{pc}}$ on $\mathrm{GDP_{pc}}$ growth, which arise due to positive spillovers associated with FDIpc and these will be discussed below.

[2] *Coefficients of variables in FD equation are interpreted as percentage change, because* $\Delta \mathrm{Log\,(FDI)_{it}} = \mathrm{Log\,(FDI_{it})} - \mathrm{Log\,(FDI_{it-1})} = (\mathrm{FDI_{it}} - \mathrm{FDI_{it-1}})/\mathrm{FDI_{it-1}}$.

However, the interpretation of coefficients form FE cannot be interpreted directly, because $\mathrm{Log\,(FDI_{it})} - \overline{\mathrm{Log\,(FDI_{it})}} = (\mathrm{FDI_{it}})/(\overline{\mathrm{FDI_{it}}})$ *(Wooldridge, 2009). Hence, only sign and magnitude of the coefficients are interpreted.*

From Table 5 it can be seen that trade openness is significant at 1% level in both GDP_{pc} and FDI_{pc} regressions. Although, trade exerts a direct negative impact on economic growth, it enhances growth indirectly through FDI_{pc} inflows and FDI_{pc} stock (+.016 and +.005 respectively). This implies that economies with high levels of trade openness attract more FDI, which consequently furthers economic growth. This result is consistent with B.A. Blonigen [Blonigen, 2005], who suggests that MNCs in transition economies are export-orientated, contributing substantially to the exports. However, looking at the total effects (Table 5), the higher net exports associated with FDI_{pc} are not sufficient to overcome the direct negative impact of trade on GDP_{pc} growth. Furthermore, an increase in foreign capital in the CIS strengthens international trade integration of the post-USSR countries.

Therefore, the conclusion can be drawn that in the CIS countries FDI and trade complement each other, thus increasing the direct positive effect of FDI on economic growth. This result is consistent with the theories in Dunnig and the empirical evidence in Blonigen, who state that trade openness is an important determinant of growth and FDI [Azam et al., 2015].

Moreover, large-scale privatisation and the availability of telephone lines (infrastructure) exert an indirect positive effect on growth through FDI_{pc} stock but not through FDI_{pc} inflows. This result indicates that infrastructure and the scale of privatisation make existing foreign investors willing to stay committed to the CIS countries, thus, furthering their contributions to economic growth.

Given the fact that four CIS countries are big oil and gas exporters, namely, Azerbaijan, Kazakhstan, Russia and Turkmenistan, it is surprising that the higher rents of natural resources (as % of GDP) have a direct negative effect on GDP_{pc} growth. Furthermore, it is also unexpected that the higher rents of natural resources negatively affect both new and existing FDI, and hence have a negative indirect effect on growth. Due to the results of Tondel who found that FDI to the CSI is resource-seeking, it is expected that resources should be a significant determinant of FDI, since a big proportion of FDI to the CIS concentrates in the mining and commodity sectors. Although the obtained result are not in line with this argument, this can potentially be explained by high oil price volatility before 1999 and after mid 2013, when profits from natural resources extraction (of which oil and gas are major parts) declined. Consequently, the sectoral structure of FDI shifted from traditional sectors to “growth sectors” (services and manufacturing), where resources are not the key factor, as argued in Westernhagen. This is also consistent with evidence of the UNCTAD report [UNCTAD, 2015], which suggests that since 2013 the amount of foreign capital directed at the primary sector has been on a decline.

All of the other variables included in the growth regression have expected signs. Domestic capital shows a positive and significant effect on growth at 1% significance level, whilst government consumption affects growth negatively, at 10% significance level, because it is assumed to be less efficient than private investments [Neuhaus, 2006].

Does GDP_{pc} growth attract FDI_{pc}?

Table 6 summarises the direct, indirect and total effects of GDP_{pc} growth on FDI. The estimations show that at 1% significance level, GDP_{pc} growth positively influences both FDI_{pc} inflows and FDI_{pc} stock. This means that FDI to the CIS is mostly determined by the market size and the market growth potential, which provide a profitable business environment for foreign investors. Hence, the results suggest that the CIS mainly attracts market-orientated FDI, which is consistent with the findings in Kudina. Moreover, it is interesting that new FDI is highly determined by the annual change in GDP_{pc} growth, which appears to be the most significant factor stimulating FDI_{pc} inflows (its coefficient has the highest magnitude). Whereas, for the existing foreign capital, GDP_{pc} growth is a necessary but not a fundamental determinant, since it has a relatively high but not the largest magnitude.

Table 6

Direct, indirect and total effects on FDI_{pc} inflows and FDI_{pc} stock

	Column 1 (C1)			Column 2 (C2)		
Model	SEM of FDI_{pc} and GDP_{pc} inflows			SEM of FDI_{pc} and GDP_{pc} stock		
Variables	Direct effects	Indirect effects	Total effects	Direct effects	Indirect effects	Total effects
Log (GDP_{pc})	2.3499	n/a	2.3499	0.8726	n/a	0.8726
Log (GCF)	n/a	0.838	0.838	n/a	0.4781	0.4781
Log (GC)	n/a	−0.819	−0.819	n/a	0	0
HC	0	0	0	0	0.3535	0.3535
Inflation	−0.0007	−0.0006	−0.0013	−0.0008	0	−0.0008
Trade openness	0.0420	−0.036	0.0059	0.0226	−0.0135	0.0009
Log (Telephone lines)	0	n/a	0	2.2193	n/a	2.2193
Large-Scale Privatisation	0	n/a	0	0.7162	n/a	0.7162
Resources	−0.05235	n/a	−0.05235	−0.0336	n/a	−0.0336

Note:
0 means the coefficient of the variables is not statistically different from zero; n/a means the variable is not included in the regression.
C1 shows effects on GDP_{pc} growth directly and through FDI_{pc} inflows;
C2 shows effects on GDP_{pc} growth directly and through FDI_{pc} stock.
Indirect effect is obtained by multiplying the coefficient of the Log (FDI_{pc}) by the coefficient of each explanatory variable.

All of the other significant variables, at 5% significance level, in the FDI_{pc} regressions have the expected signs. As discussed above, FDI_{pc} inflows are attracted to countries with a high degree of trade openness and a low level of inflation, meanwhile, for FDI_{pc} stock, the level of communication (infrastructure) and the level of privately-owned companies are also important. This result indicates that large-scale privatisation and infrastructure are not the primary determinants of new FDI, with them being of greater importance for established foreign companies. This is consistent with B.A. Blonigen [Blonigen, 2005] who states that newly-established MNCs do not extensively cooperate with local suppliers, therefore, the ownership of firms and the level of infrastructure are not the principal factors for FDI inflows to CIS. However, over time, as foreign investors start utilising local sources, more efficient and transparent privately-owned firms, as well as well-developed infrastructure, become significant determinants of FDI. Moreover, this result can be explained by the first difference transformation, which shows the influence of the annual percentage change in large-scale privatisation and infrastructure on the change in FDI_{pc} inflows. Since ownership restructuring and the availability of telephone lines only undergo gradual changes, they are not significant determinant of . Furthermore, the coefficient of the Log (Telephone lines) is of an unexpectedly high magnitude compared to the other coefficients but this result is consistent with the findings of Y. Kinoshita and N.F. Campos [Kinoshita et al., 2003], suggesting that a well-developed communication infrastructure is a significant factor for FDI_{pc} stock.

Surprisingly, secondary school enrolment rate, as a proxy for human capital, is not a statistically significant determinant of FDI. It was expected to be of importance because a big share of foreign capital in the CIS countries, particularly in Russia and Ukraine[3], is invested in the manufacturing sector, where skilled labour is essential. A possible reason for this result can be a market-seeking type of FDI, for which well-educated and highly-skilled labour is not

[3] *In 2018 38.2% and about 30% of FDI to Russia and Ukraine was in manufacturing sector, respectively.*

a primary determinant. Though, this unexpected result could be explained by the small variation in the education level of human capital across the region, since all of the CIS countries have a relatively high secondary school enrolment rate[4].

CONCLUSION

In addition, it was found that the coronavirus pandemic in the context of the issues under study should be interpreted as a factor that increases the risks in the implementation of investment activities carried out with an international element. The pandemic also led to a decrease in the volume of foreign investment relative to the CIS countries, and a decrease in the investment attractiveness of these countries in in general.

In turn, digitalization is assessed by the authors as a factor that has an ambiguous effect on foreign investment in the CIS countries, which is predetermined by various political factors.

This article has aimed to find the causal link between $\mathrm{GDP}_{\mathrm{pc}}$ growth and $\mathrm{FDI}_{\mathrm{pc}}$ inflows, as well as between $\mathrm{GDP}_{\mathrm{pc}}$ growth and $\mathrm{FDI}_{\mathrm{pc}}$ stock in the CIS countries. Following the analysis of the existing literature on FDI and growth, the endogeneity problem, which has often been neglected, has been taken into account, justifying the use of the 2SLS estimation of simultaneous equations models. In line with the existing studies on the subject, a positive causal relationship between $\mathrm{GDP}_{\mathrm{pc}}$ growth and $\mathrm{FDI}_{\mathrm{pc}}$ inflows, as well as between $\mathrm{GDP}_{\mathrm{pc}}$ growth and $\mathrm{FDI}_{\mathrm{pc}}$ stock, was found. Consequently, it can be concluded that both the inflows and stock of FDI have a positive impact on economic growth in the CIS countries.

It should also be noted that the global spread of the pandemic has had a serious impact on the global the economy and foreign direct investment (FDI) have also been significantly affected. According to a study conducted by the United Nations Commission on Trade and Development on 5,000 large multinational companies around the world, almost 80% of companies demonstrated decrease in their profits since the beginning of February 2019, on average by 30%[5]. Decrease corporate profits inevitably put pressure on FDI. Therefore, we can conclude that both capital outflow in the context of a pandemic and negative foreign direct investment negatively affect economic growth in the CIS countries.

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Модели экономического роста и прямые иностранные инвестиции в странах СНГ в условиях цифровизации

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Аннотация
В статье анализируется взаимосвязь между экономическим ростом и прямыми иностранными инвестициями (ПИИ) в странах Содружества Независимых Государств (СНГ) в период 1993–2019 гг. В исследовании ставится задача найти причинно-следственную связь между ростом ВВП и притоком ПИИ, а также между ростом ВВП и объемом ПИИ на душу населения в странах СНГ.
***К методам исследования относятся:** эмпирические и статистические исследования, синтез практических и теоретических материалов, математическое моделирование.*
***Обсуждение.** ПИИ в странах СНГ часто определяются размером рынка и потенциалом роста рынка, которые обеспечивают выгодную деловую среду для иностранных инвесторов. Полученные в ходе исследования данные свидетельствуют о том, что страны СНГ в основном привлекают ПИИ, ориентированные на рынок, что согласуется с выводами авторов. Таким образом, накопленный иностранный капитал оказывает положительное влияние на экономический рост в странах СНГ.*

Результаты. *Прямые иностранные инвестиции воздействуют на экономический рост через такие факторы как валовой внутренний продукт, процентная ставка, средняя заработная плата, обменный курс, индекс потребительских цен, политическая стабильность. Фактор пандемии коронавируса оценивается авторами как негативно влияющий на инвестиционную привлекательность стран. Использование цифровых технологий при осуществлении ПИИ, по мнению авторов, является дискуссионным вопросом.*

Ключевые слова: *модели экономического роста, прямые иностранные инвестиции (ПИИ), Содружество Независимых Государств (СНГ), цифровизация, торговая интеграция, глобальная интеграция, финансовый капитал*

JEL: *C23, E27, F43, F47*

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