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ВЕСТНИК

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NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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ANALYSIS OF INVESTMENTS ROLE IN THE ECONOMIC DEVELOPMENT

Abstract. The impact of investment on a country's economic growth is obvious. For example, the net investment indicator is one of the indicators of the state's economic development. A decrease or increase in investment leads to changes in the level of production and incomes in the country, which, in turn, stimulate or contribute to a decline in economic growth. On this basis, attracting foreign investment is of interest to all countries, and along with the use of domestic investment contributes to the economic development of the state.

In the economic literature presents a lot of studies on the impact of investment on the economic growth of the country. However, mainly in the works the analysis is presented directly on the author's country and the influence of mostly only direct foreign investments on the state's GDP is considered.

However, the authors did not pay attention to the impact of portfolio investment, as well as the primary investment income on the economic growth of the countries of the world in a comparative aspect. In this article, the authors attempted to conduct a comparative analysis of the effects of direct and portfolio investments, as well as of the initial income from investments and net errors on the GDP of some countries of the world, both in the far and near abroad.

Keywords: economic growth, investment, exponential regression, world practice of investment analysis.

Introduction. The increase in investments, as is known, contributes to bringing the economy to a qualitatively new level of development, since investments lead to the development of innovations, modern technologies, and progress. That is why in the economic literature there is such a great interest in the issues of the impact of investments on the economic growth of the state.

Virtually every state uses both foreign and national investment as a source of development for economic development. Investments are the main factor in the development of the national economy and foreign investments in this context are more preferable. However, it is impossible to exclude the importance of portfolio investment, especially in recent decades, when the significance of the financial market, especially the stock market, is only increasing. Many foreign companies and individuals prefer to invest in shares of local companies. For example, the Chinese oil company China National Petroleum Corporation, which is the largest oil and gas company in China (CNPC), acquired a 50% stake in Mangistaununagas JSC [1]. 92.44% of the shares of Rakhat JSC were acquired by LOTTE Confectionery (a confectionery company from South Korea). 100% of Karazhanbasmunai JSC shares were acquired by Canadian company CITIC Canada Petroleum Limited. 50% of the shares of JSC "Turgai-Petroleum" were bought by PetroKazakhstan Inc., registered in Canada, one of the owners of which is the Chinese company CNPC (67%) [2]. The remaining shares were purchased by LUKOIL Overseas Kumkol BV, a subsidiary of the oil and gas company in Russia, LUKOIL. There are many such examples. On the one hand, these investments can be viewed as direct, directly to the development of the industry, but, on the other hand, investments in shares may be possible in the future resale of shares in the future [3]. On this basis, it can

be noted that the impact of portfolio investment on a country's GDP becomes more and more significant and requires research.

Literature review. For the first time, representatives of the classical school showed interest in the question of the relationship between investment and economic growth. So, A. Smith in his work "Study on the nature and causes of the wealth of nations" defines investment as an investment in wages for increasing the number of people employed [4]. A clear interdependence of fixed capital investment and GDP growth can be traced. The starting point is the "stockpiling", leading to an increase in the productive power of labor, which leads to an increase in the annual product. However, for the growth of the productive power of labor, according to A. Smith, "additional capital" is required.

Sargent T.J., Sims C.A. [5] conducted research on the links between economic policies and variables such as GDP, inflation, employment and investment. The authors used the methods of non-structural macroeconomic forecasting, vector autoregression

Borensztein E., De Gregorio J., Lee J.W. [6] analyzed the impact of foreign direct investment on economic growth, using the moving average model for 69 developing countries over a period of 20 years.

Yakita A. investigated the effect of monetary expansion on capital accumulation and economic growth through such factors as inflation, consumption, production, government, equilibrium [7].

Lee and Tcha have shown that foreign direct investment is the most effective way to achieve economic growth in a host country [8].

Yang investigated the relationship between public and private investment and economic growth in the United States and Japan [9]. At the same time, a comparative analysis was carried out.

Har Wai Mun et al. Studied the relationship between foreign direct investment and economic growth in Malaysia and concluded that foreign direct investment is a good source of economic growth, as well as other advantages in the host country, such as employment, management resources, modern technologies and competitive goods [10].

Yu. Yu. Ivanova considered the influence of foreign investments on Russia's economic growth in a regional context [11].

Abu Nurudeen analyzed the relationship between foreign direct investment and economic growth and identified a positive relationship between these indicators in Nigeria [12].

D. Mach [13] analyzed the link between foreign direct investment and Korean economic growth using cointegration for time series data.

Taiwo Muritala conducted an empirical study of the effect of investment and inflation on economic growth using the econometric model using the least squares method [14]. D. Herzer [15] analyzed the impact of foreign direct investment on economic growth for 44 developing countries using cointegration methods. I. Ahmed [16] analyzed the impact of foreign direct investment on the growth of GDP through the factors of human capital development, labor force and the potential to absorb physical capital using traditional regression analysis.

A. A. Kozubekov (2012) for the Kyrgyz economy with a time period of 1990-2011, built the Cobb-Douglas production function in the form of a linear model of multiple regression. The author obtained the result that to a significant extent the economic growth of Kyrgyzstan was achieved through the contribution of labor resources, and only since 2007 a positive contribution from the growth of investment has been noted [17].

S. Smagulova, E. Semikina, N. Radko conducted a study of the influence of such factors as the price of oil, investment in fixed capital, refinancing rate, exchange rate, inflation, labor productivity, average wage per employee on Kazakhstan GDP. The results of the analysis showed a low impact or absence of such factors on the economic growth of the Republic of Kazakhstan [18]. E. I. Markovskaya, E. S. Anoshkina analyzed the impact of foreign direct investment on the economic growth of developed and developing countries, although at the same time, the analyzed countries were not specified. The averaged data for developed and developing countries were taken into account [19]. HELL. Elekulova, M. K. Uandykova, A. V. Slivnev analyzed the relationship between the inflow of foreign direct investment and the rate of economic growth in Kazakhstan. However, the authors did not make a correlation estimate [20].

The Department of Research and Statistics of the NBK has evaluated the contribution of domestic and foreign investment in the economic growth of Kazakhstan, as well as an analysis of the mutual influence of foreign and domestic investment on each other [21]. The results of the study showed that

investments are really significant for the economic growth of Kazakhstan, and the contribution of foreign direct investment is slightly higher than the contribution of fixed capital accumulation. In turn, the inflow of foreign direct investment does not crowd out domestic investment and has a stimulating effect on investment in fixed assets.

L. K. Sanalieva, G. B. Kengzhegalieva, A. S. Idelbayeva, Sh. U. Niyazbekova analyzed the innovative development of the economy through the potential of learning, the potential of generating knowledge, the potential of spreading knowledge and the potential demand for knowledge [22]. Stefan Dyrka and Barkhudar Sh. Gussenov analyzed the main factors of development of foreign economic relations and their impact on the economic growth of the regions and Kazakhstan [23, 24].

Despite the large amount of research on the impact of investment on the economic growth of countries, the majority of authors consider foreign direct investment and their relationship to the level of a country's GDP. At the same time, the majority of authors conduct research in their own countries, without covering others, therefore, without conducting comparative research between countries in different regions of the world.

In our opinion, in view of the increasing role of financial markets, including in developing countries, it is advisable to analyze the impact of portfolio investment on a country's economic growth. In addition, it is necessary to use data on net portfolio investment, reflecting the difference between the inflow and outflow of portfolio investment into the country. Also, in our opinion, it is advisable to analyze not only the inflow of foreign direct investment, but also the primary income from these investments. From our point of view, in the analysis of the impact of investments on economic growth, net errors and omissions, which reflect payments omissions for some reasons not recorded in other items of the balance of payments, and errors that are hidden in the records of individual payments, are of great importance. The error occurs due to a number of circumstances. Among them, you can call the gap in time between the transaction and the receipt of payment. Some streams of economic values may generally remain outside of statistical accounting, especially when it comes to illegal transactions. Net errors and omissions characterize the unaccounted amount of exported (imported) currency. The large negative balance under this article indicates the imperfection of the statistical and information bases, the weak state control over the migration of capital. Also, as an indicator of economic growth, we will use GDP in a real per capita survey.

Unfortunately, global statistics do not provide complete data on investments in many countries, which does not allow for a deep study of the dependence of the economic growth of countries on various investment factors.

Research methods. Since economic processes are by their nature diverse and complex, it is impossible to use only linear regression models when analyzing them. This is due to the fact that many economic dependencies are inherently non-linear. For example, analyzing the dependence of total costs on production volumes the most acceptable is considered to be a polynomial regression analysis model. In the analysis of many production functions, the world famous Cobb-Douglas model, which is also non-linear, is used.

In our case, we will apply non-linear models, assuming the possibility of reducing them to linear ones through the transformation of variables. Within this approach, models that are both non-linear in variables and non-linear in parameters can be used for linearization. In this case, we will use nonlinear relative to the explanatory variables included in the analysis, but linear in the estimated parameters. Consequently, an exponential regression analysis will be conducted [25].

Exponential regression best describes a set of data that does not change proportionally with time.

The exponential regression function is as follows:

$$y_x = e^{a_0 + a_1 x}$$

$$a_0 = \frac{1}{n} \sum \ln y - \frac{1}{n} a_1 \sum x$$

$$a_1 = \frac{n \sum x \ln y - \sum x \sum \ln y}{n \sum x^2 - (\sum x)^2}$$

where x – a variable (factor); a – a regression parameter [26].

To bring nonlinear dependencies to linear use the methods of linearization or smoothing. In our case, we use logarithmic linearization $x' = x$; $y' = lny$.

To determine the dependencies were used data from 2000 to 2017.

Results. The exponential approximation was estimated for each country represented between factors and GDP per capita. The variable factors were foreign direct investment in net inflows at current prices, portfolio investments in net inflows at current prices, primary income from foreign direct investments at current prices, and net errors and omissions in current prices. The calculation results are presented in tables 1–4.

Table 1 – Results of an exponential assessment of the impact of foreign direct investment on the economic growth of countries

Country	Foreign direct investment, inflows/GDP per capita			
	equation	correlation index	elasticity coefficient	mean approximation error, %
Armenia	$y=e^{4.9012+0.0036x}$	0,7842	4,9	2,4781
Hong Kong	$y=e^{10.4127-0.0000x}$	0,1865	10,41	8,5727
Singapore	$y=e^{9.9942+0.0000x}$	0,9056	9,99	2,5814
Georgia	$y=e^{6.8075+0.0000x}$	0,6458	6,8	13,6812
Azerbaijan	$y=e^{6.7750+0.0000x}$	0,1184	6,8	12,5836
Bulgaria	$y=e^{8.3809+0.0000x}$	0,2938	8,38	23,0187
Ukraine	$y=e^{7.0840+0.0000x}$	0,5999	7,08	4,6464
Belarus	$y=e^{7.9015+0.0000x}$	0,2506	7,9	9,7414
Russia	$y=e^{8.1119+0.0000x}$	0,6074	8,11	6,4666
India	$y=e^{6.1819+0.0000x}$	0,8233	6,18	8,3923
China	$y=e^{8.4581-0.0000x}$	0,7325	8,46	4,3676
Turkey	$y=e^{9.2878+0.0000x}$	0,0798	9,29	4,3766
Kyrgyzstan	$y=e^{6.2529+0.0000x}$	0,4307	6,25	5,1433
Kazakhstan	$y=e^{5.7544+0.0000x}$	0,2872	5,75	2,4208

As a result of the calculations, we obtained data reflecting the dependence and significance of factors by countries: correlation index, elasticity coefficient and average approximation error. Since we used nonlinear regression, we calculated the correlation index, not the correlation coefficient, which shows the degree of interdependence of the values under consideration. In linear regression, the correlation index is equal to the correlation coefficient. In nonlinear models, the value of the correlation index in addition to the closeness of the relationship shows the significance of the model according to the Fisher criterion.

The elasticity coefficients are more significant precisely in exponential equations, which is why exponential regressions are very often used in econometric studies. In such regressions, elasticity coefficients have a clear economic interpretation. It shows how much the resulting variable will change when the factor under consideration changes by 1%.

However, it should be noted that sometimes, despite the obtained results of the correlation index and the coefficient of elasticity, there is no sense of their interpretation. Therefore, an average approximation error should be considered, which reflects the quality of the dependency. The qualitative equations have an average approximation error of 5–8%.

First of all, we make the selection of those dependencies, the average approximation of which is within the normal range of 5-8%. They are marked in tables 1-4 in italics. In those countries for which the average approximation error turned out to be above 8%, there is no sense in assessing the dependence as such between foreign direct investment and the country's GDP: Georgia, Azerbaijan, Hong Kong, Belarus, and India. This does not mean that foreign direct investment has no effect on a country's economic growth. Often the problem lies in the policy of attracting foreign investment, which may be excessively beneficial for foreign investors in the infringement of domestic industries. At the same time, foreign investors often attract the most qualified specialists from national companies, as a result of which the level of the latter

falls and does not allow competing with foreign ones. Given the fact that the goal of foreign investors is far from exporting the country's products, but only to conquer local markets and obtain the greatest benefits, national smaller, but possibly promising companies are often forced out of the markets. In addition, foreign investment, as a rule, is directed not to those sectors that require development (agriculture, industry, etc.), but to the most profitable at the moment, most often extractive.

As a result, it is almost impossible to assess the direct dependence of foreign direct investment on the country's economic growth without taking into account political, social, industrial, and even climatic factors. In this regard, we have shown the possible connections between the inflow of investments and the economic growth of countries. It should also be noted that high approximation errors are characteristic of developing countries, where, among other factors, corruption has a great influence. Consequently, designated countries with a high approximation error should investigate the causes that influence the fact that direct injections into the economy do not have the desired effect or do not allow us to speak of any dependence.

In relation to the remaining countries studied, the highest correlation indices can be noted in such countries as Singapore (0.9056), India (0.8233), Armenia (0.7842), China (0.7325). In these countries, GDP is strongly dependent on foreign direct investment. At the same time, according to elasticity coefficients, with the growth of foreign direct investment by 1%, GDP per capita increases by 9.99% in Singapore, by 6.18% in India, by 4.9% in Armenia and by 8.46% in China.

The least weak dependence of GDP on foreign direct investment is in Turkey (0.0798), Hong Kong (0.18) and Azerbaijan (0.118).

Kazakhstan occupies the middle position. The correlation index is 0.2872, reflecting the weak dependence of GDP on foreign direct investment, with an increase of 1%, GDP per capita increases by 5.75%.

Consider the impact of portfolio investment on economic growth.

Table 2 – Results of an exponential assessment of the impact of portfolio investment on the economic growth of countries

Country	Portfolio investment, inflows / GDP per capita			
	equation	correlation index	elasticity coefficient	mean approximation error, %
Armenia	$y=e^{1.2493-0.0000x}$	0,3808	1,25	2,0411
Hong Kong	$y=e^{2.3983-0.0000x}$	0,6231	2,4	2,7984
Singapore	$y=e^{1.7948-0.0000x}$	0,4803	1,8	5,4765
Georgia	$y=e^{3.1813+0.0000x}$	0,3227	3,18	9,529
Azerbaijan	$y=e^{1.4930+0.0000x}$	0,3914	1,49	7,468
Bulgaria	$y=e^{2.8093-0.0000x}$	0,3831	2,8	15,2508
Ukraine	$y=e^{1.5196+0.0000x}$	0,4678	1,52	3,7013
Belarus	$y=e^{1.4645-0.0000x}$	0,3326	1,36	4,51
Russia	$y=e^{2.7963-0.0000x}$	0,4084	2,79	6,22
India	$y=e^{0.2737-0.0000x}$	0,1865	0,27	2,7858
China	$y=e^{1.4237+0.0000x}$	0,3916	1,42	5,1687
Turkey	$y=e^{0.3124+0.0000x}$	0,1539	0,31	4,0746
Kyrgyzstan	$y=e^{2.9634+0.0000x}$	0,1424	2,96	15,1175
Kazakhstan	$y=e^{1.4593-0.0000x}$	0,452	1,46	4,4244

In this case, such countries as Georgia, Bulgaria and Kyrgyzstan fall out, having approximation errors above 8%. If we compare it with the influence of foreign direct investment on the GDP of countries, it can be noted that the degree of influence in this case is lower: both the correlation index and the elasticity coefficients show this. This is mostly due to the short-term nature of most portfolio investments. At the same time, the impact of portfolio investment showed less approximation errors across countries. As a result, portfolio investment has the greatest impact on GDP of such countries as Hong Kong (0.6231),

Singapore (0.4803), Ukraine (0.4678), Kazakhstan, Russia (0.4084), China (0.3916). At the same time, with the growth of portfolio investment inflows by 1%, GDP per capita of Hong Kong grows by an average of 2.4%, Singapore by 1.8%, Ukraine by 1.52%, Russia by 2.79%, China - by 1.42%.

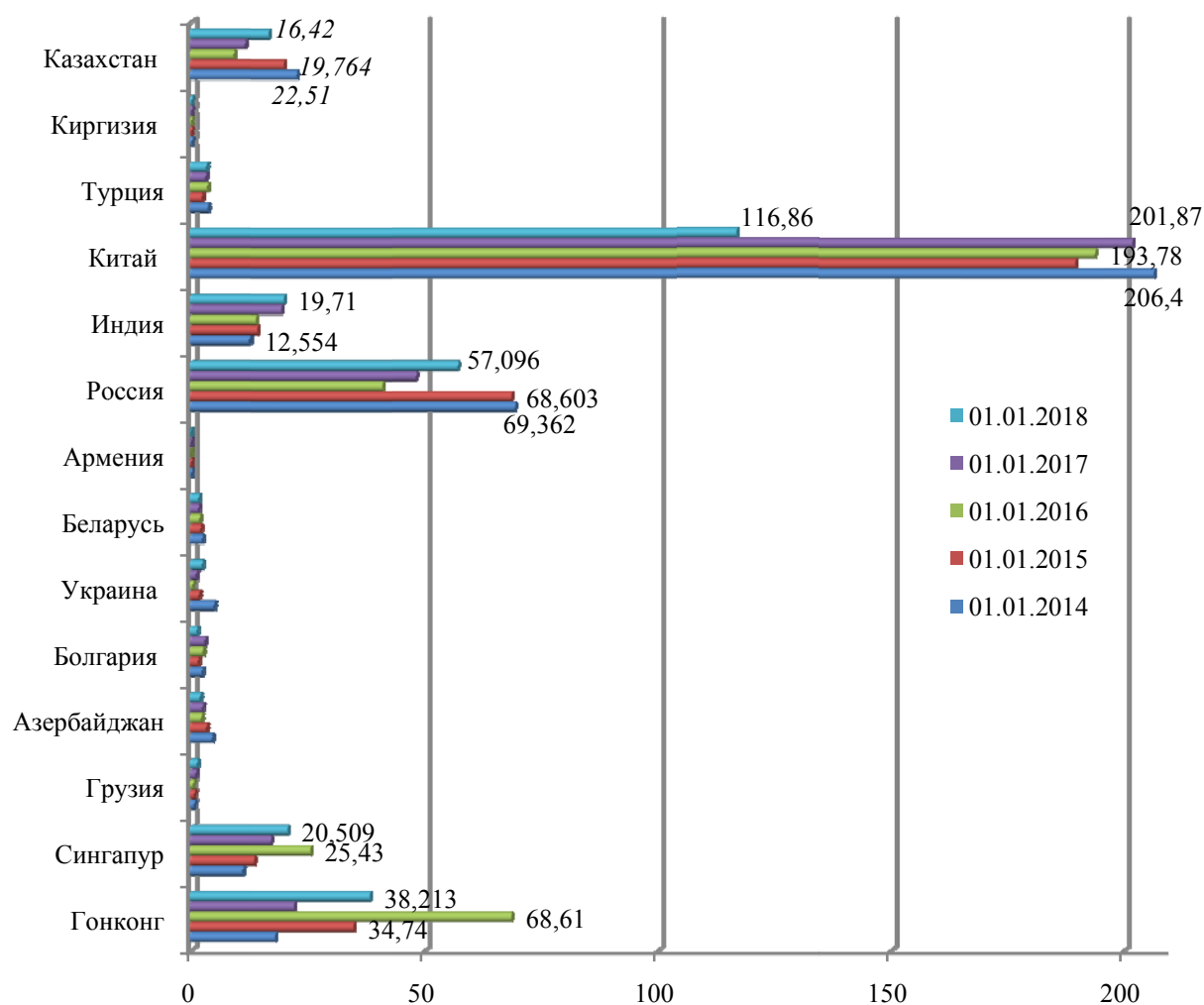
Regarding Kazakhstan, it can be noted that GDP is weakly dependent on the inflow of portfolio investments into the country, although this level is higher than, for example, in Belarus, Russia, and China. However, with the growth of portfolio investment inflows by 1%, GDP per capita in Kazakhstan grows by 1.46%.

Table 3 – Results of an exponential assessment of the impact of primary income from direct investment on the economic growth of countries

Country	Primary income from direct investment / GDP per capita			
	equation	correlation index	elasticity coefficient	mean approximation error, %
Armenia	$y=e^{8.2354+0.1245x}$	0,5685	8,23	2,6782
Hong Kong	$y=e^{10.6112+0.0010x}$	0,5681	10,61	5,6668
Singapore	$y=e^{10.9597-0.0013x}$	0,5857	10,96	1,4824
Georgia	$y=e^{8.2759+0.0255x}$	0,5214	8,28	4,9657
Azerbaijan	$y=e^{7.8261+0.2744x}$	0,8195	7,83	5,5464
Bulgaria	$y=e^{9.0837-0.0674x}$	0,8109	9,08	2,8178
Ukraine	$y=e^{7.6009+0.1499x}$	0,6607	7,6	8,7456
Belarus	$y=e^{7.6307+0.6069x}$	0,8679	7,63	6,9314
Russia	$y=e^{8.2343+0.0196x}$	0,9448	8,23	7,6998
India	$y=e^{7.0139+0.0257x}$	0,8676	7,01	3,3982
China	$y=e^{9.2910-0.0017x}$	0,799	9,29	3,813
Turkey	$y=e^{9.6298-0.1015x}$	0,8919	9,63	2,3385
Kyrgyzstan	$y=e^{6.9525+0.5217x}$	0,4716	6,95	4,2322
Kazakhstan	$y=e^{8.7615+0.0316x}$	0,7731	8,76	4,0559

When analyzing the impact of primary incomes from foreign direct investment on economic growth, it can be noted that only one country fell Ukraine, the approximation error for which was 8.74. At the same time, we can note the greatest closeness of communications in such countries as Russia (0.9448), Turkey (0.8919), Belarus (0.8679), India (0.8676), Azerbaijan (0.8195) and Bulgaria (0, 8109). If you pay attention to previous estimates of the impact of foreign direct investment and portfolio investment on the economic growth of countries, it can be noted that the primary income from foreign direct investment has a much greater impact on GDP per capita. At the same time, the lowest coefficient of elasticity belongs to Kyrgyzstan 6.95. That is, with an increase in primary income from foreign direct investment by 1%, per capita GDP increases by 6.95%. Singapore has the highest figures - 10.96, Hong Kong - 10.61, Turkey - 9.63 and China - 9.29. Kazakhstan again occupies a middle position among the countries in question. In general, the correlation index in the republic is high - 0.7731. At the same time, the growth of primary income from foreign direct investment by 1% contributes to the growth of GDP per capita by 8.76%, rather high rates.

Figure presents data on the volume of primary income from foreign direct investment. As can be seen from the data, the largest volumes of primary income from foreign direct investment, and not comparable with other considered countries, belong to China. These volumes are several times higher than the revenues of Russia, Hong Kong, Singapore, India and Kazakhstan. At the same time, the exponential assessment of the impact of this factor showed that the closeness of the link between the primary income from foreign direct investment from China lags behind Singapore, Hong Kong and even Turkey. This state of affairs can be explained by an indicator of errors and omissions in the balance of payments. Net errors and omissions reflect payments that were not specified for certain reasons, as well as errors in the records of individual payments. One of the reasons may be the fact that some economic values remain generally out of bounds, especially this concerns some illegal actions.



Primary income from foreign direct investment, billion US dollars

Source: <https://data.worldbank.org/indicator>.

Table 4 – Results of an exponential assessment of the impact of net errors and omissions on countries' economic growth

Country	Net errors and omissions / GDP per capita			
	equation	correlation index	elasticity coefficient	mean approximation error, %
Armenia	$y=e^{-5.2506+0.0433x}$	-0,1111	-5,251	4,0525
Hong Kong	$y=e^{-7.0107-0.0129x}$	-0,4558	-7,012	4,8522
Singapore	$y=e^{-0.9388+0.0110x}$	-0,6068	-0,9388	1,2797
Georgia	$y=e^{0.2852-0.5594x}$	0,6214	0,2852	4,1857
Azerbaijan	$y=e^{-0.5837-0.1121x}$	-0,7965	-0,5837	7,1047
Bulgaria	$y=e^{-0.9416-0.0300x}$	-0,9014	-0,9416	2,0672
Ukraine	$y=e^{-7.8103+0.2864x}$	-0,9058	-7,8103	6,0868
Belarus	$y=e^{-4.8014-0.2773x}$	-0,9332	-4,8014	5,1361
Russia	$y=e^{-6.3488-0.0044x}$	-0,1286	-6,3488	2,4465
India	$y=e^{-7.4684+0.0291x}$	-0,3351	-7,4684	6,2831
China	$y=e^{-8.8531-0.0008x}$	-0,8192	-8,8531	3,9272
Turkey	$y=e^{-2.3355-0.0034x}$	-0,3234	-2,3355	3,6979
Kyrgyzstan	$y=e^{-3.0592+0.1062x}$	-0,1909	-3,0592	5,6558
Kazakhstan	$y=e^{-4.0375-0.0552x}$	-0,6839	-4,0375	1,8194

When analyzing the impact of net errors and omissions, it can be noted that no country has dropped out of our list, all the results obtained are significant. The greatest dependence of these indicators is present in such countries as Belarus (0.9332), Ukraine (0.9058), Bulgaria (0.9014) and China (0.8192). At the same time, the greatest elasticity coefficients in the following countries: China - a 1% increase in net errors contributes to a decrease in GDP per capita by 8.85%, India - by 7.47%, Hong Kong - by 7.012%, Ukraine - by 7.81 %, Russia - by 6.35%.

In the Republic of Kazakhstan, the closeness of the connection between net errors and omissions is quite strong. At the same time, an increase of this factor by 1% leads to a decrease in per capita GDP by 4.04%. It should be noted that the net errors and omissions in Kazakhstan are very large, although insignificant in comparison with China and Japan. At the same time, over the past 5 years, they have negative values. According to many analysts, this is due to the hidden, unregistered export of capital from the republic.

Discussion. As the analysis showed, primary income from foreign direct investment and net errors and omissions have the greatest impact on economic growth. At the same time, it should be noted that the apparent dependence of economic growth on foreign direct investment was found only in some countries, such as Singapore, India, China and Armenia, and in portfolio investment - Hong Kong. At the same time, a serious dependence of economic growth on primary income on foreign direct investment of almost all the countries under consideration was noted.

In Kazakhstan, a positive impact on the economy from foreign direct investment is observed in the early periods of infusion. Subsequently, the positions start to deteriorate: due to the return of debts, interest payments, repatriation of profits, the republic incurs large expenses.

Net errors and omissions that reflect unrecorded operations, including the shadow business, have a significant impact. The increase in the amounts of this factor occurs in periods of crisis and deterioration of the economic situation in the country.

High elasticity coefficients for this factor may indicate unrecorded capital flows over countries or into the shadow economy. Unfortunately, the regression analysis only allows to reflect the closeness of the relationship between economic growth and investment, but is not able to capture the causes of these relations. In addition, the lack of regular statistics for many countries does not allow for greater coverage and grouping countries through cluster analysis.

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ЭКОНОМИКАЛЫҚ ДАМУДАҒЫ ИНВЕСТИЦИЯЛАР РӨЛІН ТАЛДАУ

Аннотация. Инвестициялардың елдің экономикалық өсіміне тиетін әсері зор. Мысалы, таза инвестиция индикаторы мемлекеттің экономикалық даму көрсеткіштерінің бірі болып табылады. Инвестициялардың төмендеуі немесе өсуі елдегі өндіріс деңгейінің және табыстың өзгеруіне әсерін тигізеді, бұл өз кезегінде экономикалық өсуді төмендетуге немесе ынталандыруға ықпал етеді. Онымен байланысты, шетелдік инвестицияларды тарту мәселесі барлық елдер үшін қызығушылық тудырады және олар ішкі инвестициялармен бірге пайдаланыла отырып, мемлекеттің экономикалық дамуына ықпал жасайды.

Экономикалық әдебиетте инвестицияның елдің экономикалық өсуіне әсері туралы көптеген зерттеулер жасалған. Дегенмен, негізінен, жұмыстарда талдау авторлардың тек өз елі тарапынан қарастырылған және жалпы тікелей шетелдік инвестициялардың ЖІӨ-ге әсері қарастырылған.

Сонымен қатар, авторлармен портфельдік инвестициялардың әсеріне, сондай-ақ салыстырмалы тұрғыда әлем елдерінің экономикалық өсуіне инвестициялар бойынша бастапқы кірістердің ықпалына назар аударылмаған. Осы мақалада авторлар тікелей және портфельдік инвестициялардың әсеріне, сондай-ақ әлемнің кейбір алыс және жақын шет елдерінде инвестициялардан түскен бастапқы кірістердің және таза қателіктердің ЖІӨ-ге ықпалына салыстырмалы талдау жасауға әрекет жасалды.

Түйін сөздер: экономикалық өсу, инвестициялар, экспоненциалды регрессия, инвестициялық талдаудың әлемдік тәжірибесі.

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АНАЛИЗ РОЛИ ИНВЕСТИЦИЙ В ЭКОНОМИЧЕСКОМ РАЗВИТИИ

Аннотация. Влияние инвестиций на экономический рост страны является очевидным. Например, показатель чистых инвестиций является одним из индикаторов развития экономики государства. Уменьшение или увеличение объемов инвестиций приводит к изменению уровня производства и доходов в стране, которые, в свою очередь стимулируют или способствуют спаду экономического роста. Исходя из этого, привлечение иностранных инвестиций вызывает интерес у всех стран, а наряду с использованием внутренних инвестиций способствуют экономическому развитию государства.

В экономической литературе представлено множество проведенных исследований, посвященных анализу влияния инвестиций на экономический рост страны. Однако, преимущественно в работах представлен анализ непосредственно по стране автора и рассмотрено влияние большей частью лишь прямых иностранных инвестиций на ВВП государства.

Вместе с тем, авторами не уделено внимания влиянию портфельных инвестиций, а также первичного дохода от инвестиций на экономический рост стран мира в сравнительном аспекте. В данной статье авторами сделана попытка проведения сравнительного анализа влияния прямых и портфельных инвестиций, а также первичного дохода от инвестиций и чистых ошибок на ВВП некоторых стран мира, причем как дальнего, так и ближнего зарубежья.

Ключевые слова: экономический рост, инвестиции, экспоненциальная регрессия, мировая практика анализа инвестиций.

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REFERENCES

[1] Strany SNG i Baltii v global'noy politike Kitaya / pod red. d-ra ist. nauk T. S. Guzenkovoy, kand. ist. nauk M. V. Karpova; avt. kol.: D. A. Aleksandrov, YA. A. Amelina, kand. filol. nauk Ye. V. Bakhrevskiy, I. V. Ippolitov, kand. ist. nauk V. B. Kashirin, A. I. Kucherenkov, kand. yurid. nauk D. S. Popov, d-r ist. nauk A. N. Sytin, K. I. Tasits, S. V. Tikhonova ; Ros. in-t strateg. issled. M.: RISI, 2013. 166 P. ISBN 978-5-7893-0155-5.

[2] Ofitsial'nyy sayt AO «Karazhanbasmunay» <http://www.kbm.kz/ru/>

[3] Ruziyeva E.A., Nurgaliyeva A.M. Sovremennyye tendentsii transformatsii sbrezeniy fizicheskikh lits v tsennyye bumagi v Respublike Kazakhstan // Izvestiya NAN RK. 2016. N 6(310). P. 176-183.

[4] Adam Smit. "Issledovaniye o prirode i prichinakh bogatstva narodov" https://www.gumer.info/bibliotek_Buks/Econom/smit/smit_1.pdf

[5] Sargent T.J., Sims C.A. (1977). Business cycle modeling without pretending to have too much a-priori economic theory. In: C. Sims et al. (eds.). New Methods in Business Cycle Research. Federal Reserve Bank of Minneapolis

[6] Borensztein E., De Gregorio J., Lee J.W. (1998). How does foreign direct investment affect economic growth? // Journal of International Economics. 45. P. 115-135.

- [7] Yakita A., 2001. Taxation in an overlapping generations model with human capital // *International Tax and Public Finance*. 8. P. 775-792.
- [8] Lee M., Tcha M. (2004). The color of money: The effects of foreign direct investment on economic growth in transition economies // *Review of World Economics*. 140(2). P. 211-229.
- [9] Yang Z. (2006). Empirical Studies on the Relationship Between Public and Private Investment and GDP Growth // *Applied Economics*. 38(1). P. 1259-1270.
- [10] Har W.M., Teo K.L., Yee K.M. (2008). FDI and economic growth relationship: An empirical study on Malaysia.
- [11] Ivanova Yu.Yu. Vliyaniye investitsiy na ekonomicheskiy rost Rossii: empiricheskiy analiz // *Vestnik NGU. Seriya Sotsial'no-ekonomicheskiye nauki*. 2008. Vol. 8, vyp. 2. P. 18-21.
- [12] Abu Nurudeen O.W. (2010). On The Causal Links Between Foreign Direct Investment And Economic Growth In Nigeria, 1970-2008: An Application Of Granger Causality And Co-Integration Techniques. *Romanian Statistical Review*.
- [13] Mah J.Sh. (2010). Foreign Direct Investment Inflows and Economic Growth: The Case of Korea. *Review of Development Economics*.
- [14] Taiwo Muritala Investment, Inflation and Economic Growth: Empirical Evidence from Nigeria // *Research Journal of Finance and Accounting*. 2011. Vol. 2, N 5. P. 68-76.
- [15] Herzer D. (2012). How Does Foreign Direct Investment Really Affect Developing Countries' Growth? // *Review of International Economics*. 20(2). P. 396-414.
- [16] Ahmed E.M. (2012). Are the FDI inflow spillover effects on Malaysia's economic growth input driven? // *Economic Modelling*. 29(4). P. 1498-1504.
- [17] Kozubekov A.A. Primenimost' standartnoy proizvodstvennoy funktsii Kobba-Duglasa v usloviyakh ekonomiki Kyrgyzstana // *Sbornik nauchnykh rabot Natsional'nogo banka KR*. 2012. P. 25-56.
- [18] Smagulova Sh., Semikina Ye., Rad'ko N. Modelirovaniye vliyaniya investitsiy na ustoychivost' ekonomicheskogo rosta Kazakhstana // *Aktual'nyye problemy ekonomiki*. 2013. N 8(146). P. 419-431.
- [19] Markovskaya Ye.I., Anoshkina Ye.S. Analiz vliyaniya pryamykh inostrannykh investitsiy na ekonomicheskiy rost v razvitykh i razvivayushchikhsya stranakh // *Nauchno-tehnicheskkiye vedomosti SPbGPU. Ekonomicheskiye nauki*. 2016. N 6(256). P. 21-30.
- [20] Yelekulova A.D., Uandykova M.K., Slivnev A.V. Analiz zavisimosti mezhdru pritokom pryamykh inostrannykh investitsiy i tempami ekonomicheskogo rosta // *KazEU*. 2012. <https://articlekz.com/article/13886>.
- [21] Samat Meldir Empiricheskaya otsenka vliyaniya investitsiy na ekonomicheskiy rost v Kazakhstane // *Departament issledovaniy i statistiki Ekonomicheskoye issledovaniye*. N 2. 2019.
- [22] Sanalieva L.K., Kengzhegalieva G.B., Idelbayeva A.S., Niyazbekova Sh.U. Investigation of morden economic mechanisms for construction of the intellectual potential of the country as a moving factor of innovative economic development // *Bulletin of National academy of sciences of the Republic of Kazakhstan*. 2018. Vol. 5, N 375. P. 144-148. ISSN 1991-3494. <https://doi.org/10.32014/2018.2518-1467.19>
- [23] Dyrka Stefan, Gussenov Barkhudar Sh. The main aspects of the development of foreign economic activity in the era of globalization // *Bulletin of National academy of sciences of the Republic of Kazakhstan*. 2018. Vol. 6, N 376. P. 234-238. ISSN 1991-3494. <https://doi.org/10.32014/2018.2518-1467.50>.
- [24] Gussenov Barkhudar Sh., Dyrka Stefan. Influence of globalization processes and the fourth industrial revolution on the development of foreign economic activity of Kazakhstan // *Bulletin of National Academy of Sciences of the Republic of Kazakhstan*. 2019. Vol. 1, N 377. P. 145-150. ISSN 1991-3494. <https://doi.org/10.32014/2019.2518-1467.17>.
- [25] *Ekonometrika: uchebnoye posobiye dlya studentov, obuchayushchikhsya po napravleniyam podgotovki ukрупnennoy gruppy spetsial'nostey «Ekonomika i upravleniye»* / [Avt.-sost. M. G. Tindova, O. S. Kuznetsova]. Saratov: CSEI REU im. G. V. Plekhanova, 2015. 108 p.
- [26] Shanchenko N.I. SH 20 Ekonometrika: laboratornyy praktikum. Ul'yanovsk: UIGTU, 2004. 79 p.

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