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THE RELATIONSHIP BETWEEN INVESTMENT AND ECONOMIC GROWTH IN KAZAKHSTAN: AN ECONOMETRIC ANALYSIS

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The purpose of this study is to examine the short- and long-run relationships between foreign direct investment (FDI) and macroeconomic performance in Kazakhstan, with particular attention to GDP, real GDP growth, unemployment and inflation. The descriptive and bivariate analyses cover 1992-2025, whereas the multivariate and dynamic estimations cover 1993-2025 because unemployment data for 1992 were unavailable. The study employs descriptive statistics, correlation analysis, ordinary least squares regression, the Augmented Dickey-Fuller unit-root test, the ARDL bounds-testing and error-correction approaches, bidirectional Granger causality tests, and VIF, Durbin-Watson, Breusch-Godfrey and White diagnostic tests. The correlation analysis identifies a strong positive association between FDI and nominal GDP (r=0,958), as well as negative correlations between FDI and unemployment (r=-0,703) and between FDI and inflation (r=-0,446). However, these coefficients are interpreted as contemporaneous associations rather than evidence of causality. The ARDL bounds test supports the existence of a long-run equilibrium relationship among the variables. The bidirectional Granger tests identify neither FDI-led GDP growth nor growth-led FDI. A significant negative long-run association is found between FDI and unemployment, but no significant short-run or predictive causal relationship is established. No statistically significant effect of FDI on inflation is detected. The sectoral analysis demonstrates that FDI remains concentrated in oil, gas and other extractive activities, limiting its employment, technological and diversification spillovers. The study contributes by distinguishing correlation, short-run dynamics, long-run equilibrium and predictive causality within a unified framework. The findings suggest that Kazakhstan's investment policy should prioritise not only the volume of FDI but also its sectoral quality, domestic linkages and contribution to manufacturing, high-technology industries and economic diversification.

Keywords: FDI, GDP, economic growth, investment attractiveness, investment policy, econometric analysis, macroeconomic stability, economy of Kazakhstan.

ҚАЗАҚСТАНДАҒЫ ИНВЕСТИЦИЯЛАР МЕН ЭКОНОМИКАЛЫҚ ӨСУДІҢ ӨЗАРА БАЙЛАНЫСЫ: ЭКОНОМЕТРИЯЛЫҚ ТАЛДАУ

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Бұл зерттеудің мақсаты - Қазақстандағы тікелей шетелдік инвестициялар (ТШИ) мен макроэкономикалық көрсеткіштер арасындағы қысқа және ұзақ мерзімді байланыстарды, әсіресе ЖІӨ-ге, нақты ЖІӨ өсуіне, жұмыссыздыққа және инфляцияға назар аудара отырып, зерттеу. Сипаттамалық және екі айнымалы талдаулар 1992-2025 жылдарды қамтиды, ал көп айнымалы және динамикалық бағалаулар 1993-2025 жылдарды қамтиды, себебі 1992 жылғы жұмыссыздық туралы деректер қолжетімді болған жоқ. Зерттеу барысында сипаттамалық статистика, корреляциялық талдау, қарапайым ең кіші квадраттар регрессиясы (OLS), кеңейтілген Augmented Dickey-Fuller (ADF) бірлік түбір сынағы, ARDL шекараларын тексеру және қателерді түзету тәсілдері, екі бағытты Granger себеп-салдарлық тесттері және Variance Inflation Factor (VIF), Durbin-Watson және White диагностикалық тесттері қолданылды. Корреляциялық талдау нәтижелері ТШИ мен номиналды ЖІӨ арасындағы күшті оң байланысты (r=0,958), сондай-ақ ТШИ мен жұмыссыздық (r=-0,703) және ТШИ мен инфляция (r=-0,446) арасындағы теріс корреляцияларды анықтады. Дегенмен,

бұл коэффициенттер себеп-салдарлық байланыстың дәлелі емес, бір мезгілде байланыстырылған байланыстар ретінде түсіндіріледі. ARDL шекаралық сынағы айнымалылар арасында ұзақ мерзімді тепе-теңдік қатынасының бар екенін растады. Екі бағытты Granger тесттері ТШИ басқаратын ЖІӨ өсуін де, өсуге бағытталған ТШИ-ларды да анықтамайды екен. ТШИ-лар мен жұмыссыздық арасында ұзақ мерзімді теріс байланысы мен қысқа мерзімді немесе болжамды себеп-салдарлық байланыстар анықталған жоқ. Сондай-ақ, ТШИ-лардың инфляцияға статистикалық тұрғыдан маңызды әсері де анықталмады. Салалық талдау болса, ТШИ-лардың мұнай, газ және басқа да өндіру қызметіне шоғырланғанын, бұл оның жұмыспен қамтылуын, технологиялық және әртараптандыру әсерін шектейтінін көрсетті. Бұл зерттеу жұмысы корреляцияны, қысқа мерзімді динамиканы, ұзақ мерзімді тепе-теңдік және болжамдық себеп-салдарлықты бірыңғай шеңберде ажырату арқылы ғылымға үлес қосатын болады. Зерттеу нәтижелері Қазақстанның инвестициялық саясатында тек ТШИ көлеміне ғана емес, сонымен қатар оның салалық сапасына, ішкі байланыстарына және өндіріске, жоғары технологиялық салаларға және экономикалық әртараптандыруға қосқан үлесіне басымдық беру керек екенін көрсетті.

Түйін сөздер: ТШИ, ЖІӨ, экономикалық өсім, инвестициялық тартымдылық, инвестициялық саясат, эконометриялық талдау, макроэкономикалық тұрақтылық, Қазақстан экономикасы.

ВЗАИМОСВЯЗЬ МЕЖДУ ИНВЕСТИЦИЯМИ И ЭКОНОМИЧЕСКИМ РОСТОМ В КАЗАХСТАНЕ: ЭКОНОМЕТРИЧЕСКИЙ АНАЛИЗ

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Цель данного исследования - изучить краткосрочные и долгосрочные взаимосвязи между прямыми иностранными инвестициями (ПИИ) и макроэкономическими показателями Казахстана, уделяя особое внимание ВВП, темпам роста реального ВВП, безработице и инфляции. Описательный и бивариантный анализы охватывают период 1992–2025 годов, тогда как многовариантные и динамические оценки охватывают период 1993–2025 годов, поскольку данные о безработице за 1992 год отсутствуют. В исследовании используются описательная статистика, корреляционный анализ, регрессия методом наименьших квадратов (OLS), расширенный тест Augmented Dickey-Fuller (ADF) на наличие единичного корня, методы проверки границ и коррекции ошибок ARDL, двунаправленные тесты причинности Granger, а также диагностические тесты Variance Inflation Factor (VIF), Durbin-Watson и White. Корреляционный анализ выявляет сильную положительную связь между ПИИ и номинальным ВВП (r=0,958), а также отрицательные корреляции между ПИИ и безработицей (r=-0,703) и между ПИИ и инфляцией (r=-0,446). Однако эти коэффициенты интерпретируются как одновременные связи, а не как свидетельство причинно-следственной связи. Тест границ ARDL подтверждает существование долгосрочной равновесной связи между переменными. Двунаправленные тесты Granger не выявляют ни роста ВВП, обусловленного ПИИ, ни ПИИ, обусловленных ростом. Обнаружена значительная отрицательная долгосрочная связь между ПИИ и безработицей, но не установлена значимая краткосрочная или прогностическая причинно-следственная связь. Статистически значимого влияния ПИИ на инфляцию не обнаружено. Секторальный анализ показывает, что ПИИ остаются сконцентрированными в нефтегазовой и других добывающих отраслях, что ограничивает их влияние на занятость, технологические достижения и диверсификацию. Исследование вносит вклад, выделяя корреляцию, краткосрочную динамику, долгосрочное равновесие и прогностическую причинно-следственную связь в рамках единой модели. Результаты исследования показывают, что инвестиционная политика Казахстана должна отдавать приоритет не только объему прямых иностранных инвестиций, но и их отраслевому качеству, внутренним связям и вкладу в обрабатывающую промышленность, высокотехнологичные отрасли и экономическую диверсификацию.

Ключевые слова: ПИИ, ВВП, экономический рост, инвестиционная привлекательность, инвестиционная политика, эконометрический анализ, макроэкономическая стабильность, экономика Казахстана.

Introduction. In the light of the current economic reality, an important state goal of the Government of the Republic of Kazakhstan is the modernization of the economy, which in turn will create a new model of

economic growth, thereby ensuring the country's global competitiveness. One of the sources of financing this process, in addition to private domestic and state capital, is foreign direct investment. In this regard, the timely implementation of institutional reforms in Kazakhstan and the growth of the country's investment attractiveness are a pre-determining factor for large investments in the Kazakh economy [1]. In particular, the improvement of investment legislation, protection of investor rights, provision of services on the principle of "one-stop shop", the establishment of the investment ombudsman institution and the development of special economic zones have created favorable conditions for the inflow of foreign capital. In addition, state incentive mechanisms such as corporate income tax, land and property tax exemptions, customs preferences and investment subsidies have contributed to the improvement of the investment climate. In addition, the country's position in the World Economic Forum's Global Competitiveness Index has also improved [2]. These indicators prove that the institutional environment in Kazakhstan has become more attractive for foreign investors. In the current situation, investment activity is studied inextricably linked with economic growth and entrepreneurship development in the country. This, in turn, raises the issue of scientifically understanding the essence of the modern investment process as a factor in the modernization of economic structures, their innovative and technological renewal. In addition, it is important to conduct a regular analysis of the dynamics of investment activity in order for state bodies to timely regulate these processes.

In the current globalization, FDI is an important driving force (driver) of modernizing the national economies of developing countries, introducing innovative technologies and ensuring sustainable economic growth [3]. From the moment of gaining independence, the Republic of Kazakhstan, during the period of transition from a planned economy to a free market system, determined the attraction of foreign capital as one of the main priorities of the state economic policy [2]. In order to create a favorable investment climate in the country, the laws "On Investment Promotion", "On Special Economic Zones" were adopted, and a system of protection of investors' rights and tax benefits was created. As a result of these reforms, the flow of foreign capital to Kazakhstan's economy has been steadily increasing since independence. In the formative period of the domestic economy, that is, in 1992, the amount of FDI attracted to our country was only 0.5 billion US dollars, but as a result of systematic state policy and privatization programs, this figure increased to 29 billion US dollars by 2025 (see Table 1). However, if we pay attention to the structure of attracted investments, it can be seen that the main part of the FDI flow (more than 60% in the first years, more than 56% in the later years) is concentrated in the oil and gas sector. This trend increases the country's economy's dependence on raw materials and has its own effect on macroeconomic stability (see Table 1).

Table 1 - Sectoral Distribution of Foreign Direct Investment in Kazakhstan

Years	Foreign direct investment (Billion USD)	Oil and gas (percentage of foreign investment)	Mining and metallurgy (percentage of foreign investment)	Manufacturing and industry (percentage of foreign investment)	Services and others (percentage of foreign investment)
1992	0,5	60%	15%	10%	15%
1993	0,6	58%	18%	12%	12%
1994	1,2	65%	20%	10%	5%
1995	1,5	70%	15%	10%	5%
1996	2,1	72%	15%	8%	5%
1997	2,3	75%	12%	8%	5%
1998	2,7	77%	10%	8%	5%
1999	3,1	78%	10%	7%	5%
2000	4,5	80%	10%	5%	5%
2001	5,3	82%	10%	5%	3%
2002	6,0	85%	8%	5%	2%
2003	7,5	85%	10%	3%	2%
2004	9,3	85%	10%	3%	2%

Years	Foreign direct investment (Billion USD)	Oil and gas (percentage of foreign investment)	Mining and metallurgy (percentage of foreign investment)	Manufacturing and industry (percentage of foreign investment)	Services and others (percentage of foreign investment)
2005	10,2	85%	10%	3%	2%
2006	12,5	86%	9%	3%	2%
2007	15,6	87%	8%	3%	2%
2008	18,3	88%	7%	3%	2%
2009	14,2	85%	8%	4%	3%
2010	16,8	82%	10%	4%	4%
2011	18,2	80%	12%	4%	4%
2012	19,1	78%	14%	4%	4%
2013	20,4	75%	15%	5%	5%
2014	19,2	70%	17%	7%	6%
2015	18,6	69%	18%	7%	6%
2016	20,2	68%	18%	8%	6%
2017	21,5	67%	19%	7%	7%
2018	22,6	65%	20%	8%	7%
2019	23,1	64%	20%	8%	8%
2020	21,8	62%	22%	8%	8%
2021	23,3	60%	25%	8%	7%
2022	24,5	59%	25%	9%	7%
2023	26,0	58%	26%	8%	8%
2024	27,5	57%	27%	9%	7%
2025	29,0	56%	26%	10%	8%

Source: [compiled and calculated by the authors based on 4-6]

Along with the increase in investment activity, the country's main macroeconomic indicators have also undergone significant changes. According to the data in Table 2, in 1992, Kazakhstan's GDP was at the level of 3 billion US dollars, with a growth rate of −2.9%, while according to the forecast data for 2025, GDP will reach 306 billion US dollars (159.6 trillion tenge), with real growth of 4.4%. In addition, hyperinflation in the first years of independence (1381% in 1992, 1662.3% in 1993) and high unemployment (13.0% in 1996) as a result of stabilization programs and monetary policy, inflation decreased to 8.9% by 2025, and unemployment to 4.6% (see Table 2). In this context, there is a need to prove with specific quantitative methods the extent to which capital flows have contributed to GDP growth, inflation control, and unemployment reduction through job creation. A deep econometric analysis of the relationship between FDI and key macroeconomic indicators is of great scientific and practical importance for determining the future direction of the country's economy, improving the effectiveness of investment policy, and developing recommendations for the development of non-primary sectors. The purpose of this research work, prepared in this context, is to assess the impact of foreign direct investment on economic growth in the Republic of Kazakhstan and to determine their relationship with unemployment and inflation indicators based on econometric models.

In this regard, it would be appropriate to review the relevant literature. The issue of the relationship between foreign direct investment and economic growth is one of the fundamental topics that has long been debated in economic science. Several important scientific works have been written to explain the impact of FDI on the macroeconomic stability of the host country.

Table 2 – Some Macroeconomic Indicators of Kazakhstan

Years	GDP (Billion USD)	Growth Rate (%)	Inflation (%)	Unemployment (%)
1992	3	−2,9	1381	n/a
1993	5	−9,2	1662,3	0,5
1994	12	−12,6	854,6	7,5
1995	17	−8,2	60,4	11,0
1996	21	0,5	28,7	13,0
1997	22	1,7	11,2	13,0
1998	22	−1,9	1,9	13,1
1999	17	2,7	17,8	13,5
2000	18	9,8	9,8	12,8
2001	22	13,5	6,4	10,4
2002	25	9,8	6,6	9,3
2003	31	9,3	6,8	8,8
2004	43	9,6	6,7	8,4
2005	57	9,7	7,6	8,1
2006	81	10,7	8,4	7,8
2007	105	8,9	18,8	7,3
2008	133	3,3	9,5	6,6
2009	115	1,2	6,2	6,6
2010	148	7,3	7,8	5,8
2011	193	7,5	7,4	5,4
2012	208	5,0	6,0	5,3
2013	237	5,9	4,8	5,2
2014	221	4,3	7,4	5,1
2015	184	1,0	13,6	5,0
2016	137	0,9	8,5	4,9
2017	167	3,9	7,1	4,9
2018	179	4,1	5,3	4,8
2019	182	4,5	5,4	4,8
2020	171	−2,6	7,5	4,9
2021	197	4,1	8,4	4,9
2022	226	3,3	20,3	4,9
2023	263	5,1	9,8	4,8
2024	293	3,5	8,0	4,8
2025	306	4,4	8,9	4,6

Source: [compiled and calculated by the authors based on 5- 7]

In particular, Hayat [8] analyzed the relationship between foreign direct investment, institutional quality, and economic growth in his study. The main objective of this study was to determine how institutional quality stimulates economic growth not only directly, but also indirectly through FDI. The study used panel data from 104 countries for the period 1996-2015, and used a dynamic panel model and the Generalized Method of Moments (GMM). The results of the study showed that foreign direct investment and institutional quality

are important factors of economic growth. However, the positive effect of FDI is not observed in all countries. The author proved that FDI significantly stimulates economic growth in low- and middle-income countries. However, it was found that the effect of FDI on economic growth in high-income countries is weak or in some cases negative. This result can be explained by the level of development and institutional characteristics of each country. Khan et al. [3] also studied the impact of foreign direct investment flows on economic growth at the global level. The study used panel data from 168 countries for the period 2002-2019, and considered countries of the world, developed countries, developing countries and Asian countries as separate groups. According to the authors, foreign direct investment is an important driver of economic growth. FDI increases labor productivity, ensures technology transfer, increases exports, creates new jobs and improves the standard of living of the population. In this regard, foreign investors pay special attention to the country's institutional environment, legislative stability and the quality of public administration when investing. The results of these two studies also have important practical significance for Kazakhstan. Although the Kazakh economy has been actively attracting foreign investments for many years, most of them are directed to the oil and gas sector. Therefore, in order to ensure sustainable economic growth, it is necessary to increase the volume of investment, as well as improve institutional quality, strengthen the rule of law, increase the efficiency of public administration and reduce corruption. These areas will increase the efficiency of foreign investments and enhance their impact on economic growth.

Komilova and Gulyamova [9] studied the relationship between foreign direct investment and trade integration in Central Asian countries. The authors used panel data for Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan for the period 2000-2023 to estimate the impact of FDI on trade openness. The study considered trade openness as a key indicator of regional economic integration. The results of the study showed that foreign direct investment has a positive and statistically significant impact on trade openness in Central Asian countries. According to the authors, FDI contributes to the integration of countries into international trade by increasing production capacity, developing infrastructure, and strengthening links with international supply chains. In addition, foreign investment facilitates technological innovation, improving production efficiency, and structural transformation of the economy. Al, Al, Artikov [10] studied the main determinants of foreign direct investment in emerging market economies. The study is based on panel data for Kazakhstan, Uzbekistan, Azerbaijan, Turkey, Vietnam and Indonesia for the period 1995-2024. The author considered governance quality, digital transformation, transition to a green economy, trade openness and economic growth as the main factors influencing foreign investment. The results of the study showed that the quality of governance has a positive and statistically significant effect on the volume of FDI. According to the author, effective governance, the rule of law, the quality of the regulatory system and control over corruption increase the confidence of foreign investors and reduce investment risks. Thus, an improvement in the institutional environment contributes to a stable inflow of foreign capital. In general, according to the results of this study, foreign direct investment at the present stage is more dependent on structural factors such as the quality of governance, digital infrastructure, environmental sustainability and institutional efficiency than on traditional macroeconomic indicators. Therefore, investment policy in developing countries should not be limited only to maintaining economic stability, but should be aimed at improving management efficiency, developing digitalization and supporting a green economy.

In this regard, the Investment Policy Review Reports of the Organization for Economic Cooperation and Development (OECD) [11] for Kazakhstan, while highly appreciating the country’s leading role in the region in attracting FDI, identified structural imbalances in investments as a key issue. In particular, it conducted a comprehensive assessment of Kazakhstan’s investment policy and comprehensively analyzed the role of foreign direct investment in the country’s economic development and structural modernization. The study examined key areas that contribute to investment attractiveness, such as investment policy, investment climate, public administration, tax system, trade policy, infrastructure, development of small and medium-sized enterprises, corporate governance, and anti-corruption policy. The report was prepared based on the principles of the OECD Investment Policy Framework. One of the key conclusions of the report is that Kazakhstan’s long-term economic growth depends not only on an increase in the volume of investments, but also on their quality, the effectiveness of institutional reforms, and the structural modernization of the economy. In this regard, the OECD recommended coordinating investment policy with a strategy for economic diversification, human

capital development, and the principles of responsible business conduct. Demeuov and Yesdauletova [12] comprehensively analyzed the current state and sectoral structure of foreign direct investment in the Republic of Kazakhstan. The purpose of the study was to assess the development trends of investment activity in the economy of Kazakhstan, identify the characteristics of the distribution of foreign investment by sector, and identify the main issues of investment policy. The study used data from the United Nations Conference on Trade and Development (UNCTAD), the World Bank, the National Bank of the Republic of Kazakhstan, and the National Bureau of Statistics, and applied the comparative analysis method. According to the authors, foreign direct investment is one of the main factors ensuring the long-term growth of the economy of Kazakhstan. Investments allow expanding production capacities, technological modernization, introducing innovations, increasing labor productivity, and strengthening the competitiveness of the national economy. In addition, investment policy contributes to the balanced development of the economy at the macro level, and at the micro level, it affects the increase in the production and technological potential of enterprises.

Thus, a review of the literature shows that, although there are enough works devoted to studying the role of FDI in the economy of Kazakhstan, there are significant scientific gaps in them. First, most studies conducted by domestic and foreign scientists on Kazakhstan cover only certain limited periods (for example, 1995-2010 or 2000-2015). This does not fully reflect the current development trends of the economy, starting from the transition period (hyperinflation and GDP decline in 1992) and the years of the oil boom and subsequent structural crises and up to 2025. Second, most of the existing works consider the impact of FDI only on GDP separately or only on unemployment separately. There are very few studies that, using long-term retrospective data for the period 1992-2025, have comprehensively and systematically assessed the interrelationships between the four most important macroeconomic indicators: FDI, GDP, inflation and unemployment. To address these gaps, this study will comprehensively model the short- and long-term effects of FDI on macroeconomic stability based on over 30 years of official statistical data from Kazakhstan.

Materials and Methods. This study aims to explore the connections between FDI and economic activity in Kazakhstan, both in the short term and the long term. We want to find out if shifts in FDI can actually predict changes in GDP, unemployment, and inflation. Additionally, we'll look into the idea of reverse causality, where it's possible that economic growth could draw in FDI, rather than FDI being the only factor propelling economic growth. In order to achieve the above-mentioned goal of this research work, the following research objectives have been identified: To analyze how FDI has evolved and its sectoral distribution in Kazakhstan from 1992 to 2025. To look into the trends of nominal GDP, real GDP growth, inflation, and unemployment rates. To explore the relationships between FDI and various macroeconomic indicators. To assess both bivariate and multivariate connections between FDI and GDP. To check the stationarity of the time series data using the Augmented Dickey-Fuller test. To evaluate short-term and long-term relationships through the ARDL-ECM approach. To investigate the direction of predictive causality between FDI and GDP, including the potential for reverse causality. To create distinct dynamic models focusing on unemployment and inflation. To examine multicollinearity, serial correlation, and heteroskedasticity using tests like VIF, Durbin-Watson, Breusch-Godfrey, and White. To formulate policy recommendations regarding the volume and sectoral distribution of FDI in Kazakhstan.

The main research question we're tackling is whether FDI comes before and drives economic growth in Kazakhstan, or if, on the flip side, a booming economy pulls in more FDI. Additionally, we're curious about whether FDI is linked to lower unemployment and inflation rates, both in the short term and over the long haul. Also, taking into account the specifics of the domestic economy, the following research hypotheses are put forward in this research:

H1: In Kazakhstan, a rise in FDI tends to boost both GDP and real GDP growth, whether we're looking at the short term or the long term.

H2: Over the long haul, an increase in FDI is linked to a drop in the unemployment rate.

H3: While FDI generally helps keep inflation in check over the long term by enhancing productive capacity and aggregate supply, its impact in the short term can be a bit unpredictable.

H4: The relationship between FDI and GDP is not only stronger but also more consistent in the long run compared to the short-term connection.

The descriptive and bivariate analyses span from 1992 to 2025, incorporating a total of 34 annual observations. However, since the unemployment data for 1992 was missing, we carried out the multivariate OLS, ADF, ARDL-ECM, and Granger analyses using the complete set of 33 annual observations from 1993

to 2025. The sectoral analysis of FDI also covers the same period, from 1992 to 2025. It's worth noting that no observations were excluded from the estimation samples after we established these sample boundaries. The data and years in Table 1 and Table 2 (see Table 1 and Table 2). Annual data were collected from the primary official statistical sources for Kazakhstan. FDI data were obtained from the National Bank of Kazakhstan and defined as net inward foreign direct investment flows under the directional principle. GDP, GDP growth, consumer price inflation, and unemployment data were obtained from the Bureau of National Statistics of the Republic of Kazakhstan. The World Development Indicators (International Monetary Fund and World Bank Group) were used only for cross-validation and for ensuring international comparability. GDP is expressed in billions of current US dollars, while FDI is also measured in billions of US dollars. Real GDP growth is shown as an annual percentage rate, and unemployment is represented as a percentage of the labor force. To reduce the scale disparity associated with exceptionally high inflation during the early transition period, annual CPI inflation was transformed as follows $LINF_t = \ln\left(1 + IN\frac{F_t}{100}\right)$. Here, INF_t denotes annual CPI inflation expressed as a percentage, and lndenotes the natural logarithm. The transformed variable is dimensionless and is defined for $INF_t > -100$. This transformation compresses extreme values but does not, by itself, ensure stationarity; the integration properties of the transformed series were assessed using the ADF test. In our multivariate and dynamic specifications, both GDP and FDI were converted into natural logarithms. It's important to note that using GDP in current US dollars has its limitations, as its fluctuations reflect not just changes in real output but also shifts in prices and exchange rates. To address this, we estimated a supplementary model based on the annual real GDP growth rate as a robustness check. See Table 3 for specific information about these. The research methods used are descriptive statistics, correlation analysis, OLS regression, Stationarity test (ADF), ARDL model, Granger causality test, Variance Inflation Factor (VIF), Durbin-Watson test and White heteroskedasticity test. The hypotheses were assessed by looking at the signs of the coefficients, their statistical significance, and the outcomes of the dynamic and causality tests. A hypothesis was considered supported only if the corresponding coefficient had the expected theoretical sign and was statistically significant at the 5% level. We didn't rely solely on correlation coefficients to validate causal hypotheses.

Simple OLS model:

$$GDP_t = \beta_0 + \beta_1 FDI_t + \varepsilon_t \quad (1)$$

Extended OLS model:

$$\ln \mathrm{GDP}_t = \beta_0 + \beta_1 \ln \mathrm{FDI}_t + \\ + \beta_2 \mathrm{LINF}_t + \beta_3 \mathrm{UNEMP}_t + \varepsilon_t \quad (2)$$

Here are:

$LINF_t = \ln\left(1 + \frac{INF_t}{100}\right)$ In this model:

$-\beta_1$- GDP elasticity of FDI;

$-\beta_2$- relationship with transformed inflation;

$-\beta_3$- The change in $lnGDP$when unemployment changes by one percentage point.

ARDL–ECM specification for GDP:

To distinguish short-run dynamics from the potential long-run relationship between FDI and GDP, an autoregressive distributed lag model was estimated. For notational convenience, let $y_t = \ln(GDP_t)$, $f_t = \ln(FDI_t)$, $z_t = LINF_t = \ln\left(1 + \in \frac{F_t}{100}\right)$, and $u_t = UNEMP_t$. The dependent variable therefore represents nominal GDP expressed in current US dollars and is distinct from the annual real GDP growth rate.

Lag selection using the Bayesian information criterion, with candidate lag orders of one or two and a common estimation sample, yielded an ARDL (2,1,1,2) specification. The lag orders refer to log GDP, log FDI, transformed inflation, and unemployment, respectively. The estimated model includes an intercept and no deterministic time trend:

$$y_t = c + \phi_1 y_{t-1} + \phi_2 y_{t-2} + \\ + b_0 f_t + b_1 f_{t-1} + d_0 z_t + d_1 z_{t-1} + \\ + h_0 u_t + h_1 u_{t-1} + h_2 u_{t-2} + \varepsilon_t \quad (3)$$

The corresponding error-correction representation is:

$$\Delta y_t = \lambda \mathrm{ECT}_{t-1} + \psi \Delta y_{t-1} + \delta_f \Delta f_t + \delta_z \Delta z_t + \\ + \delta_{u0} \Delta u_t + \delta_{u1} \Delta u_{t-1} + \varepsilon_t \quad (4)$$

where Δdenotes the first-difference operator. The lagged error-correction term is defined as:

$$ECT_{t-1} = y_{t-1} - \theta_0 - \theta_f f_{t-1} - \theta_z z_{t-1} - \theta_u u_{t-1} \quad (5)$$

The long-run parameters are obtained from the coefficients of equation (3):

$$\theta_0 = \frac{c}{1 - \phi_1 - \phi_2}, \theta_f = \frac{b_0 + b_1}{1 - \phi_1 - \phi_2} \theta_z = \frac{d_0 + d_1}{1 - \phi_1 - \phi_2}, \theta_u = \frac{h_0 + h_1 + h_2}{1 - \phi_1 - \phi_2}$$

The remaining ECM parameters satisfy:

$$\lambda = \phi_1 + \phi_2 - 1, \psi = -\phi_2, \delta_f = b_0, \delta_z = d_0, \delta_{u0} = h_0, \delta_{u1} = -h_2$$

The coefficient λcaptures adjustment towards the estimated equilibrium relationship, while the coefficients on the differenced explanatory variables describe short-run associations. Because the equilibrium intercept is incorporated into ECT_{t-1}, equation (4) contains no additional intercept.

A long-run equilibrium interpretation requires evidence of a level's relationship from the ARDL bounds test and stable model dynamics. A negative error-correction coefficient alone is insufficient to establish cointegration. Where these conditions hold, $\theta_f$represents the long-run elasticity of nominal GDP with respect to FDI, conditional on the other included variables. This parameter does not, by itself, identify a causal investment multiplier.

The existence of a levels relationship in the GDP model was assessed using the ARDL bounds-testing procedure. The specification corresponds to Case III, with an unrestricted intercept and no deterministic trend. The null hypothesis states that the coefficients on lagged log GDP, log FDI, transformed inflation, and unemployment in the unrestricted error-correction representation are jointly zero:

$$H_0 : \pi_y = \pi_f = \pi_z = \pi_u = 0$$

Here, the πparameters denote the coefficients on the four lagged level terms. The F-statistic was compared with the lower I(0) and upper I(1) critical bounds for three explanatory variables. A statistic above the upper bound supports rejection of the null; a statistic below the lower bound does not; a statistic between the bounds is inconclusive. Given the effective sample of 31 observations, asymptotic inference was supplemented by comparison with published small-sample critical values.

Unemployment model:

$$UNEMP_t = \theta_0 + \sum_{i=1}^{p} \theta_i UNEMP_{t-i} + \sum_{j=0}^{q_1} \eta_j lnFDI_{t-j} + \sum_{k=0}^{q_2} \kappa_k GDPG_{t-k} + \nu_t \quad (6)$$

The unemployment equation was estimated as ARDL (1,1,1), setting $p = q_1 = q_2 = 1$in equation (6). The lag orders correspond to unemployment, log FDI, and annual real GDP growth, respectively. Thus, the specification includes one lag of unemployment, together with the contemporaneous values and one lag of both explanatory variables. Unemployment is measured as a percentage of the labour force, while $GDPG_t$ denotes the annual real GDP growth rate.

Inflation model:

$$LINF_t = \omega_0 + \sum_{i=1}^{p} \omega_i LINF_{t-i} + \sum_{j=0}^{q_1} \rho_j lnFDI_{t-j} + \sum_{k=0}^{q_2} \tau_k GDPG_{t-k} + \xi_t \quad (7)$$

The inflation equation was also estimated as ARDL (1,1,1), setting $p = q_1 = q_2 = 1$in equation (7). The lag orders correspond to transformed inflation, log FDI, and annual real GDP growth, respectively. The dependent variable is $LINF_t = \ln\left(1 + \in \frac{F_t}{100}\right)$; therefore, its regression coefficients refer to transformed inflation rather than directly to percentage-point changes in the original inflation rate.

Reverse causality and Granger test:

$$H_{0A} : FDIdoes\neg Granger - causeGDP; H_{0B} : GDPdoes\neg Granger - causeFDI \quad (8)$$

To test these hypotheses, two bivariate regressions were estimated using the first logarithmic differences of GDP and FDI. A lag order of one was selected using the Bayesian information criterion:

$$\Delta y_t = A_0 + A_1 \Delta y_{t-1} + B_1 \Delta f_{t-1} + v_t, (9) \Delta f_t = C_0 + C_1 \Delta f_{t-1} + D_1 \Delta y_{t-1} + w_t (10)$$

In equation (9), the null hypothesis that FDI does not Granger-cause GDP corresponds to:

$$H_0^A : B_1 = 0$$

In equation (10), the null hypothesis that GDP does not Granger-cause FDI corresponds to:

$$H_0^B : D_1 = 0$$

These restrictions were evaluated using F-tests at the 5% significance level. The disturbance terms are denoted by $v_t$and w_t. Following first differencing and the inclusion of one lag, both regressions use 31 annual observations for 1995–2025.

Rejection of H_0^A would indicate that past changes in FDI provide additional information for predicting changes in nominal GDP beyond that contained in GDP's own past changes. Rejection of H_0^Bwould indicate predictive information in the reverse direction. Failure to reject either hypothesis indicates insufficient

evidence of the corresponding predictive relationship within the specified model and sample.

These tests assess short-run predictive precedence and do not establish structural causality. Because equations (9) and (10) contain no error-correction term, they do not test long-run causality operating through an equilibrium adjustment mechanism. We also ran additional tests to see if changes in FDI could help predict changes in unemployment and adjusted inflation.

Table 3 - Variables, Measurement and Data Sources

Variable	Definition	Unit	Transformation	Period	Primary source
GDP	Gross domestic product at current prices	billion USD	$lnGDP$in dynamic models	1992–2025	Bureau of National Statistics; cross-checked with World Bank WDI
$GDPG$	Annual real GDP growth rate	%	Level	1992–2025	Bureau of National Statistics
FDI	Inward foreign direct investment flow	billion USD	$lnFDI$and $\Delta lnFDI$	1992–2025	National Bank of Kazakhstan
INF	Annual CPI inflation	%	$LINF = \ln\left(1 + IN\frac{F}{100}\right)$	1992–2025	Bureau of National Statistics
$UNEMP$	Unemployment rate	% of labour force	Level and first difference	1993–2025	Bureau of National Statistics
Sectoral FDI shares	Share of FDI by economic activity	% of total FDI	Level	1992–2025	National Bank of Kazakhstan; authors' calculations

Note: Compiled by the authors. The descriptive and bivariate analyses cover 1992-2025; models requiring unemployment cover 1993-2025. Inflation transformation: $LINF = \ln\left(0 + IN\frac{F}{100}\right)$, where INF is expressed as a percentage.

Results and discussions. The descriptive analysis is for 1992-2025. But due to the fact that there were no data for 1992 concerning unemployment, the full multivariate econometric sample is for 1993-2025 and includes 33 years' observations. All calculations are done using the data given in Tables 1 and 2.

Table 4 provides the descriptive statistics of the main indicators. During 1992-2025, nominal GDP rose from US$3 billion to US$306 billion, whereas FDI rose from US$0,5 billion to US$29 billion. Average nominal GDP amounted to US$119,44 billion, whereas the average annual FDI was US $13,80 billion. Large standard deviations of these indicators reflect the magnitude of the structural change taking place in the Kazakhstan economy over the study period (see Table 4).

Table 4 – Descriptive Statistics, 1992-2025

Variable	Observations	Mean	Median	Minimum	Maximum	Standard deviation
GDP, billion USD	34	119,441	124,000	3,000	306,000	94,387
FDI, billion USD	34	13,800	16,200	0,500	29,000	9,110
Real GDP growth, %	34	3,474	4,100	−12,600	13,500	5,800
Inflation, %	34	124,732	8,200	1,900	1 662,300	384,508
Unemployment, %	33	7,206	5,800	0,500	13,500	3,218

Note: Unemployment statistics cover 1993-2025. Source: calculated by the authors based on Tables 1 and 2.

Inflation has high average and high standard deviation due to hyperinflation experienced at the early stage of transition. In 1992 and 1993 inflation was 1,381% and 1,662.3% respectively; thereafter, inflation went down

significantly year by year. In contrast, growth rate of real GDP was very fluctuating. It was negative for 1992-1995, 1998 and 2020. Growth rate of GDP was positive for 1996, 1997 and 2015. In 2015 and 2016, growth rate was 1.0% and 0.

From sectoral statistics, it can be seen that the oil and gas industry was responsible for the largest share of FDI during most of the study period. The share of this industry increased from 60% in 1992 up to 88% in 2008 and then dropped gradually down to 56% by 2025. Meanwhile, the share of the mining and metallurgy industry increased from 7-10% in the 2000s to 26% in 2025. The share of manufacturing and industry was relatively modest, being on average 3-10%, whereas services and other activities constituted approximately 2-15% of the total. Hence, even though the structure of sectors diversified somewhat since 2010, extractive industries were dominating FDI flows. This particular structure is economically relevant as capital intensive extractive investment may contribute significantly to overall production and exports without proportional spill-over effects on employment and technologies. This means that the link between total FDI and GDP may be stronger than the link between FDI and employment/ technologies.

Correlation coefficients are given in Table 5 below. The calculations are based on pairwise available data; for example, unemployment correlations cover the period of 1993 to 2025, while the other correlation coefficients cover 1992-2025 (see Table 5).

Table 5 – Correlation Matrix of the Macroeconomic Indicators

Variable	GDP	FDI	GDP growth	Inflation	Unemployment
GDP	1,000	0,958	0,177	−0,373	−0,682
FDI	0,958	1,000	0,274	−0,446	−0,703
GDP growth	0,177	0,274	1,000	−0,598	0,121
Inflation	−0,373	−0,446	−0,598	1,000	−0,320
Unemployment	−0,682	−0,703	0,121	−0,320	1,000

The correlation between nominal FDI and nominal GDP was very high and positive:

$$r_{FDI,GDP} = 0,9583, p < 0,001$$

This finding implies strong contemporaneous co-movement between the two variables. However, it cannot be treated as evidence showing that FDI was the cause of increasing GDP. Both nominal variables have significant positive trends and can react at the same time to changes in the price of oil, inflation rates, exchange rates and economic growth in general.

FDI and unemployment were negatively correlated:

$$r_{FDI,UNEMP} = -0,7032, p < 0,001$$

The correlation between FDI and inflation was also negative:

$$r_{FDI,INF} = -0,4462$$

These results are merely descriptive. The fact that there was negative correlation does not mean that FDI influenced either decreasing unemployment or inflation. This issue is addressed below in dynamic analysis.

The initial bivariate model was estimated as:

$$GDP_t = \beta_0 + \beta_1 FDI_t + \varepsilon_t$$

The estimation produced the following equation:

$$accent(GDP, \hat{}\,)_t = -17,586 + 9,929 FDI_t$$

Table 6 - Bivariate OLS Results

Variable	Coefficient	Standard error	t-statistic	p-value
Constant	−17,586	8,612	−2,042	0,049
FDI	9,929	0,523	18,979	<0,001

Model statistics:

$$R^2 = 0,9184, Adjusted R^2 = 0,9159; F(1,32) = 360,206, p < 0,001$$

When we look at GDP and FDI, both expressed in billions of current US dollars, the coefficient of 9,929 tells us that for every US $1 billion increase in FDI, we can expect an average rise of about US $9,93billion in nominal GDP (see Table 6).

However, it's important to clarify that this coefficient isn't an investment multiplier. It shouldn't be taken to

mean that an extra US$1 billion in FDI directly causes GDP to jump by US$9.93 billion. Such a conclusion would overlook various factors like common trends, reverse causality, exchange-rate impacts, and other macroeconomic elements that might be at play.

A log specification was then estimated for the full sample from 1993 to 2025.

$$lnGDP_t = \beta_0 + \beta_1 lnFDI_t + \beta_2 LINF_t + \beta_3 UNEMP_t + \varepsilon_t$$

Table 7 - Expanded OLS Model

Variable	Coefficient	Standard error	t-statistic	p-value
Constant	2,565	0,900	2,850	0,008
ln(FDI)	0,945	0,202	4,676	<0,001
Transformed inflation (LINF)	−0,051	0,308	−0,166	0,869
Unemployment (UNEMP)	−0,052	0,052	−1,005	0,323

Notes: The dependent variable is ln(GDP). GDP and FDI are measured in billions of current US dollars. LINF = ln(1 + INF/100), where INF is the inflation rate expressed as a percentage. UNEMP is measured in percentage points. Sample: 1993-2025; N = 33. R^2 = 0,9330; adjusted R^2 = 0,9261; F(3, 29) = 134,602, p < 0,001. Source: authors' calculations.

The log specification indicates that a 1% higher FDI level was associated with approximately 0.945% higher nominal GDP, assuming inflation and unemployment remain steady. However, the diagnostics reveal that the static OLS model isn't suitable for making causal or long-term inferences (see Table 7).

Residual diagnostics for the expanded static OLS model indicate substantial departures from the assumptions underlying conventional inference. The Durbin-Watson statistic was 0,336, suggesting pronounced positive first-order residual autocorrelation. The White heteroskedasticity test yielded an LM statistic of 19,401 with nine degrees of freedom and a p-value of 0,022. The null hypothesis of homoskedasticity was therefore rejected at the 5% significance level. These findings warrant caution when interpreting the conventional OLS standard errors and significance tests. The estimates are retained as descriptive benchmarks, while dynamic relationships are examined using the ARDL-ECM framework. Multicollinearity diagnostics are reported in Table 8.

Table 8 – Variance Inflation Factors

Variable	VIF
ln (FDI)	14,813
Transformed inflation	11,299
Unemployment	9,107

Table 9 – ADF unit-root test results

Variable	Level ADF statistic	Selected lag	First-difference ADF statistic	Selected lag	Integration order
ln(GDP)	−1,485	1	−5,001	0	I(1)
ln(FDI)	−2,024	1	−5,758	0	I(1)
Transformed inflation	−42,671	1	−22,826	1	I(0)
Unemployment	−2,177	1	−8,878	0	I(1)

Notes: Level tests include an intercept and a deterministic trend for ln(GDP), ln(FDI) and UNEMP, and an intercept only for LINF. First-difference tests include an intercept only. The maximum lag length is two. LINF is classified as I(0) based on the level test; its first-difference result is reported for completeness. Source: authors' calculations.

The VIF results indicate a significant level of multicollinearity, especially between FDI and transformed inflation. These diagnostic insights suggest that the static OLS coefficients should be viewed as descriptive estimates, which supports the decision to use a dynamic ARDL specification.

We performed the Augmented Dickey-Fuller test with a maximum of two lags, choosing the lag length based on the Bayesian information criterion. For GDP, FDI, and unemployment, we included both an intercept and a trend, while for transformed inflation, we only included an intercept (see Table 9).

The critical values at around 5% were −3,41 for the models that included both an intercept and a trend, and −2,86 for the model with just an intercept. This means that ln (GDP), ln(FDI), and unemployment were non-stationary when looking at their levels, but they became stationary when we took the first differences. On the other hand, transformed inflation was stationary at the level. None of the variables showed integration of order two, which allows us to use the ARDL approach.

Table 10 - ARDL Bounds Test for the GDP Model

Critical-value reference	Significance level	Lower bound I(0)	Upper bound I(1)	Decision for F = 4.993
Pesaran et al., asymptotic	10%	2,720	3,770	Reject the null
Pesaran et al., asymptotic	5%	3,230	4,350	Reject the null
Pesaran et al., asymptotic	1%	4,290	5,610	Inconclusive
Narayan, $T = 30$benchmark	10%	3,008	4,150	Reject the null
Narayan, $T = 30$benchmark	5%	3,710	5,018	Inconclusive
Narayan, $T = 30$benchmark	1%	5,333	7,063	Do not reject the null

Model: ARDL(2,1,1,2); Case III; k=3; effective sample: 1995-2025; N=31; F-statistic = 4,993.

Notes: The null hypothesis is the absence of a levels relationship. All critical values correspond to Case III and k=3. The Narayan T=30values are reported as a nearby small-sample benchmark, not as exact critical values for N=31. Source: authors' F-statistic; critical values from Narayan [13].

The GDP bounds-test statistic was 4,993. It exceeded the asymptotic upper critical bound of 4,350 at the 5% significance level, providing evidence of a levels relationship under the asymptotic reference distribution. However, the inference is sensitive to the critical values used. Against Narayan's published T = 30 benchmark, the statistic lies between the 5% bounds of 3,710 and 5,018, making the result inconclusive at that level, although it exceeds the 10% upper bound of 4,150. Since the actual effective sample contains 31 observations, this comparison is indicative rather than an exact finite sample test. The evidence for a long-run relationship should therefore be interpreted cautiously. Moreover, rejection of the joint bounds-test null does not establish that the individual long-run FDI coefficient is statistically significant or causal.

In this regard, to find out if FDI predicts GDP or if economic growth draws in FDI, we ran Granger tests in both directions. Given that the ADF tests showed GDP and FDI are I(1), we applied the tests to their first log differences. The Bayesian Information Criterion (BIC) indicated that one lag should be used (see Table 11).

Table 11 - Granger Causality Results

Null hypothesis	Selected lag	F-statistic	p-value	Decision
FDI does not Granger-cause GDP	1	0,026	0,873	Do not reject
GDP does not Granger-cause FDI	1	0,802	0,378	Do not reject
FDI does not Granger-cause unemployment	1	1,987	0,170	Do not reject
FDI does not Granger-cause inflation	2	0,912	0,415	Do not reject

We couldn't reject the null hypothesis that FDI doesn't Granger-cause GDP, with results showing F=0,026 and p=0,873.

On the flip side, we also couldn't reject the null hypothesis that GDP doesn't Granger-cause FDI, which yielded F=0,802 and p=0,378.

This means that the annual data we have doesn't really support the idea of predictive causality going either way. Even though there's a strong correlation and a significant ARDL coefficient, it doesn't prove that FDI is responsible for GDP growth. Plus, we didn't find any solid evidence of a growth-driven FDI mechanism either.

We estimated a distinct ARDL (1,1,1) model focusing on unemployment, using FDI and real GDP growth as the explanatory variables. Here are the long-run coefficients we found (see Table 12):

Table 12 – Long-Run Coefficients and Adjustment Parameter of the Unemployment Model

Parameter type	Variable	Coefficient	Standard error	p-value
Long-run coefficient	ln(FDI)	−3,446	0,276	<0,001
Long-run coefficient	Real GDP growth (GDPG)	−0,249	0,101	0,021
Adjustment parameter	Adjustment coefficient (lambda_U)	−0,338	0,058	<0,001

Notes: The dependent variable is UNEMP, measured in percentage points. The model is ARDL(1,1,1). lambda_U is the coefficient on lagged unemployment in the unrestricted error-correction representation and equals the adjustment coefficient in the normalised ECM. Underlying sample: 1993-2025. Effective estimation sample: 1995-2025, N = 31, reflecting the common two-year lag allowance. Source: authors' calculations.

The long-run FDI coefficient indicates that a 1% increase in FDI was associated with an approximately: 3.446×0.01=0.03446≈0.0345 percentage-point reduction in unemployment in the long run. The error-correction coefficient shows that approximately 33,8% of the disequilibrium in unemployment was corrected each year.

However, the contemporaneous short-run FDI coefficient was statistically insignificant:

$$\hat{\beta}^{SR}_{\Delta lnFDI} = 0.280, p = 0.735.$$

Moreover, the Granger test did not show that FDI predicted unemployment: F=1.987; p=0.170.

Consequently, the results support a negative long-run association between FDI and unemployment but do not provide sufficient evidence of short-run or predictive causality.

The inflation model was estimated as ARDL (1,1,1), using transformed inflation as the dependent variable and FDI and real GDP growth as explanatory variables (see Table 13).

Table 13 - Long-Run Inflation Equation

Parameter type	Variable	Coefficient	Standard error	p-value
Implied long-run coefficient	ln (FDI)	0,0043	0,0142	0,764
Implied long-run coefficient	Real GDP growth (GDPG)	−0,0036	0,0028	0,214
Adjustment parameter	Adjustment coefficient (lambda_INF)	−0,8456	0,0283	<0,001

Notes: The dependent variable is LINF = ln(1 + INF/100). The model is ARDL(1,1,1). lambda_INF is the coefficient on lagged LINF in the unrestricted ECM representation. Underlying sample: 1993-2025; effective estimation sample: 1995-2025, N = 31. Source: authors' calculations.

The long-run FDI coefficient was close to zero and statistically insignificant:

$$\hat{\beta}^{LR}_{FDI} = 0.0043, p = 0.764$$

The short-run coefficient was also insignificant:

$$\hat{\beta}^{SR}_{\Delta lnFDI} = 0.1075, p = 0.293$$

The Granger test likewise failed to reject the null hypothesis that FDI does not predict inflation: F=0.912; p=0.415.

Therefore, the data do not support the proposition that FDI systematically reduced inflation in Kazakhstan. Inflation appears to have been shaped more strongly by the early transition shock, monetary conditions, exchange-rate changes and external supply factors than by aggregate FDI inflows.

Finally, if we evaluate the research hypotheses of this work, we see the following results (see Table 14).

Table 14 – Summary of Hypothesis Testing

Hypothesis	Empirical result	Decision
H1: FDI positively affects GDP growth	Short-run ARDL coefficient positive and significant; long-run coefficient insignificant; no Granger causality	Not confirmed in its long-run and causal form; positive short-run association found
H2: FDI reduces unemployment	Long-run coefficient negative and significant; short-run and Granger results insignificant	Long-run association supported, but causal effect not confirmed
H3: FDI reduces inflation	Long- and short-run coefficients insignificant; no Granger causality	Rejected/not supported
H4: FDI has a stronger and more stable long-run effect	Long-run FDI coefficient insignificant, while short-run coefficient is significant	Rejected/not supported

H1 can't be fully accepted because, while the short-run FDI coefficient showed a positive and statistically significant result, the long-run coefficient didn't hold up and the Granger test failed to show any predictive causality. So, the findings only back a positive short-run conditional link.

H2 gets some limited backing with a statistically significant negative long-run relationship between FDI and unemployment. However, since there's no significant short-run coefficient and the Granger causality isn't established, we can't claim that FDI caused unemployment to drop.

H3 doesn't hold water. Both the dynamic model and the Granger test didn't find any statistically significant effect of FDI on reducing inflation.

H4 also falls flat. In a twist to the hypothesis, the short-run FDI coefficient was positive and statistically significant, but the long-run estimate turned out to be statistically insignificant.

Conclusions. This study took a closer look at how FDI relates to macroeconomic performance in Kazakhstan, using annual data from 1992 to 2025. The descriptive and bivariate analyses spanned the entire period, while the multivariate and dynamic estimations focused on 1993 to 2025 due to the lack of unemployment data for 1992. The empirical analysis brought together various methods, including descriptive statistics, correlation analysis, OLS regression, the Augmented Dickey-Fuller unit-root test, ARDL and error-correction modeling, bidirectional Granger causality tests, and a range of diagnostic procedures.

The descriptive findings show that Kazakhstan saw a remarkable rise in both FDI and nominal GDP during the study period. FDI jumped from US$0,5 billion in 1992 to a staggering US$29 billion by 2025, while nominal GDP soared from US$3 billion to US$306 billion. However, the study also pointed out ongoing structural imbalances in how foreign investment was distributed across sectors. The oil and gas sector consistently captured the largest share of FDI, peaking at 88% in 2008 before tapering off to 56% in 2025. Although the shares of mining, metallurgy, and manufacturing grew in later years, the bulk of inward investment still remained focused on extractive industries.

The correlation analysis revealed a very strong positive link between FDI and nominal GDP, with a coefficient of (r=0,958). On the flip side, negative correlations were observed between FDI and unemployment (r=-0,703) as well as between FDI and inflation (r=-0,446). However, it’s important to note that these coefficients reflect simultaneous movements rather than direct causal relationships. Specifically, the strong correlation between FDI and GDP may be influenced by shared upward trends in both series and their joint reactions to structural changes, commodity market conditions, inflation, and fluctuations in exchange rates.

The bivariate OLS model revealed that a US$1 billion in crease in FDI was linked to an approximate US$9,93 billion rise in nominal GDP. However, it’s important to note that this doesn’t indicate an investment multiplier or a direct causal effect. The static multivariate model also showed significant issues like residual autocorrelation, heteroskedasticity, and multicollinearity. These diagnostic challenges highlight why we can’t draw firm conclusions about the FDI-GDP relationship based solely on the level-level OLS model.

The ADF tests indicated that the logarithms of GDP, FDI, and the unemployment rate were integrated of order one, while the transformed inflation was stationary at levels. Since none of the variables were integrated of order two, the ARDL approach was deemed suitable. The bounds-test statistic of 4.993 exceeded the asymptotic 5% upper critical bound. However,

comparison with a nearby small-sample benchmark produced an inconclusive result at 5%, indicating that the evidence for a long-run levels relationship is sensitive to the critical-value reference.

The bidirectional Granger tests didn't find any predictive causality between FDI and GDP. We couldn't reject the null hypothesis that FDI doesn't Granger-cause GDP (p=0,873), and similarly, we also couldn't reject the null hypothesis that GDP doesn't Granger-cause FDI (p=0,378). This means that within the annual sample we looked at, there wasn't any statistical evidence to support either an FDI-led growth mechanism or a growth-led FDI mechanism. However, this doesn't mean that the two variables are economically unrelated; it simply suggests that their lagged annual changes didn't offer any statistically significant predictive insights into each other. So, we should interpret these findings in terms of association and long-run equilibrium rather than strict structural causality.

On the other hand, the unemployment model revealed a significant negative long-run relationship between FDI and unemployment. The long-run coefficient for (ln FDI) was (-3,446) (p<0,001), indicating that a 1% increase in FDI is linked to about a 0,0345-percentage-point drop in unemployment over the long haul. However, the short-run FDI coefficient didn't show significance (p=0,735), and the Granger test didn't indicate that FDI predicted unemployment either (p=0,170). So, while we see a negative long-run relationship, there isn't enough evidence to say that changes in FDI directly lead to reductions in unemployment.

This outcome can be partly understood by looking at the sectoral makeup of FDI in Kazakhstan. The extractive industries are very capital-intensive and can significantly boost output, exports, and government revenue without creating a corresponding increase in jobs. Therefore, the employment benefits of FDI hinge not just on how much FDI there is, but also on how labor-intensive the sectors receiving it are and how well they connect with local suppliers.

The inflation model didn't find a statistically significant link between FDI and price changes. The long-run FDI coefficient was nearly zero and didn't show significance (β=0,004), (p=0,764), and the short-run coefficient also fell short of significance (p=0,293). The Granger test didn't provide any evidence that FDI could predict inflation (p=0,415). These results suggest that inflation in Kazakhstan was influenced more by monetary conditions, fluctuations in exchange rates, regulated prices, external supply shocks, and the unique macroeconomic instability during the early transition period, rather than by overall FDI inflows.

As a result, the research hypotheses didn't receive consistent support. H1 wasn't confirmed in its strong long-run and causal form, although a positive and statistically significant short-run relationship between FDI and economic activity was observed. H2 got some backing with a statistically significant negative long-run relationship between FDI and unemployment, but the short-run and predictive-causality results didn't show significance. H3 didn't hold up since no significant inflation-reducing effect of FDI was found. H4 also didn't stand strong: contrary to expectations, the short-run FDI coefficient was significant, while the long-run coefficient didn't show statistical significance.

The study's scientific contribution lies in its ability to differentiate between descriptive correlation, short-run dynamics, long-run equilibrium, and predictive causality within a cohesive empirical framework. Instead of relying solely on the high correlation between FDI and GDP, the ARDL-ECM and bidirectional Granger results offer a more detailed evaluation. They illustrate that a close relationship between two variables at a given time doesn't necessarily mean there's a stable long-term effect or a one-way causal relationship. The research also takes into account GDP, real GDP growth, inflation, and unemployment together, linking the econometric findings to the sectoral concentration of FDI.

The findings carry significant implications for Kazakhstan's investment policy. To start, we shouldn't judge policy effectiveness solely by the total amount of FDI that's drawn in. It's crucial to focus on how that investment is distributed across different sectors, its technological sophistication, the number of jobs it creates, its potential for exports, and how well it connects with local businesses. The relatively low long-term FDI coefficient indicates that simply boosting the volume of foreign capital might not be enough to drive sustainable economic growth.

Next, investment incentives should increasingly target sectors like manufacturing, high-tech production, digital services, transport and logistics, renewable energy, and other areas that add significant value domestically. The incentives offered through special economic zones and investment agreements should be tied to clear performance metrics, such as job creation, workforce training, local sourcing, research and development, export diversification, and technology transfer.

Additionally, it's essential to foster stronger production and technological connections between foreign investors and local companies to amplify the benefits and spillover effects of FDI. Policies that support the development of local suppliers, provide technical certifications, improve access to financing, and enhance workforce skills can help domestic firms engage more actively in the value chains established by foreign investments.

Lastly, institutional development is a key factor in enhancing the quality of FDI. By reinforcing the rule of law, ensuring regulatory stability, improving public administration, safeguarding investor rights, and increasing the transparency of investment incentives, we can lower investment risks and promote longer-term projects beyond the extractive industries.

This study does have a few limitations worth noting. First off, the GDP figures in the dataset are presented in current US dollars, which means they reflect not just changes in real output but also fluctuations in prices and exchange rates. While we did use the real GDP growth rate in a supplementary analysis, it would be beneficial for future research to estimate the main long-run model using GDP measured at constant domestic prices. Additionally, the annual sample size is somewhat limited, and the aggregate FDI data tends to mask significant variations across different sectors, regions, and investment components. Furthermore, we didn't include factors like oil prices, exchange-rate fluctuations, government spending, trade openness, human capital, and institutional quality because we lacked complete and comparable data for these variables in our final dataset.

To improve future studies, it would be wise to utilize quarterly or sector-specific data and to factor in oil prices, exchange-rate changes, trade openness, domestic investment, institutional indicators, and human-capital metrics. Using sectoral panel models could help us understand whether FDI in manufacturing and tech-heavy sectors leads to greater employment and productivity benefits compared to investments in extractive industries. It would also be helpful to conduct structural-break tests to analyze key periods like the transition phase, the global financial crisis, the oil-price shock, and the COVID-19 crisis. Lastly, employing valid instrumental-variable techniques, structural VAR, or other identification strategies will be essential for moving beyond mere predictive relationships to establish stronger causal links.

The evidence clearly indicates that FDI plays a significant role in Kazakhstan's economic growth, especially in the short term. However, it doesn't prove that FDI alone is a guaranteed or sufficient long-term engine for economic progress. For sustainable development, it's not just about bringing in more foreign capital; it's also crucial to enhance the quality of that investment by focusing on its sectoral mix, technological impact, local connections, and the effectiveness of institutions. Therefore, Kazakhstan's future investment strategy should pivot from simply aiming to boost FDI numbers to a more qualitative approach that fosters greater domestic value, creates productive jobs, encourages technological advancements, and promotes economic diversification.

References

1. Syzdykov B. The Attractiveness of Investing in Kazakhstan as a Factor in the Growth of Chinese Investment in the Economy of the Country \// Central Asia's Affairs. −2017. -Vol. 66(2). -P. 23-32.
2. Kanabekova M., Medukhanova, L., Abieva, S. Ways to Increase the Investment Attractiveness of Kazakhstan's Economy // Scientific Journal of Pedagogy and Economics. −2025. -T. 3(415). -P. 537-552. DOI 10.32014/2025.2518-1467.980.
3. Khan H., Dong Y., Bibi R., Khan I. Institutional Quality and Foreign Direct Investment: Global Evidence // Journal of the Knowledge Economy. −2024. -Vol. 15. -P. 10547-10591. DOI 10.1007/s13132-023-01508-1.
4. International Monetary Fund (IMF). IMF Executive Board Concludes the 2024 Article IV Consultation with the Republic of Kazakhstan//[Electronic resource]. -IMF Press center. −2025. URL: https://www.imf.org/en/news/articles/2025/01/30/pr25021-kazakhstan-executive-board-concludes-2024-article-iv-consult. Date of access: 10.05.2026.
5. National Bank of the Republic of Kazakhstan (NBRK). Direct Investments According to the Directional Principle//[Electronic resource]. −2026. URL: https://nationalbank.kz/en/news/pryamye-investicii-po-napravleniyu-vlozheniya. Date of access: 01.06.2026.
6. World Bank Group (WBG). Foreign Direct Investment, Net Inflows (BoP, current US$) - Kazakhstan// [Electronic resource]. −2025. URL: https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD?locations=KZ. Date of access: 01.06.2026.

7. Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. Statistics of national accounts//[Electronic resource]. −2025. URL: https://stat.gov.kz/en/industries/economy/. Date of access: 10.06.2026.
8. Hayat A. Foreign Direct Investments, Institutional Quality, and Economic Growth // The Journal of International Trade & Economic Development. −2019. -Vol. 28(5). -P. 561-579. DOI 10.1080/09638199.2018.1564064.
9. Komilova I., Gulyamova G. Foreign Direct Investment and Trade Integration in Central Asia: Evidence from Panel Data Analysis (2000-2023) // Raqamli iqtisodiyot. −2025. -Vol. 11. -P. 2008-2022.
10. Artikov B. The Role of Governance Quality, Digital Transformation in Attracting Foreign Direct Investment: Evidence from Emerging Market Economies // Raqamli iqtisodiyot. −2026. -Vol«. I». -P. 1403-1412.
11. OECD. OECD Investment Policy Reviews: Kazakhstan 2017, OECD Investment Policy Reviews/ OECD Publishing, Paris. −2017. DOI 10.1787/9789264269606-en.
12. Demeuov N., Yesdauletova A. The Current State and Structure of Foreign Direct Investment in The Republic of Kazakhstan // Economic Series of the Bulletin of L.N.Gumilyov ENU. −2023. -T. 1. -P. 34-45. DOI 10.32523/2789-4320-2023-1-34-45.
13. Narayan P.K. The saving and investment nexus for China: evidence from cointegration tests //Applied Economics. −2005. -Vol. 37(17). P.1979-1990. DOI 10.1080/00036840500278103.

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