
The Influence of Chinese FDI on the Growth of Kazakhstan's Energy Sector

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Abstract

Since gaining independence, the government of Kazakhstan has regarded the development of the energy industry as a key strategic measure to attract foreign investment. As a result, the energy sector has become the primary direction for inbound foreign capital. In recent years, the volume of foreign direct investment (FDI) in Kazakhstan has continued to grow, making energy one of the most attractive sectors for foreign financing. Undoubtedly, this process significantly impacts the Kazakh economy, promoting sustainable development of the oil and energy industries, while also encouraging the enhancement of other production sectors within the national economic structure. Currently, under the Belt and Road Initiative, China is considered one of the most important foreign investors in Kazakhstan. Therefore, examining Chinese direct investment in the Kazakh economy is of particular relevance. This article first clarifies the concepts of the energy industry and FDI, as well as the theoretical foundations of industrial development and foreign direct investment. Then, it analyzes the current state of Kazakhstan's energy industry and the specifics of Chinese direct investment in this sector. Analysis of the current situation will help policymakers at the state level develop further measures to promote the development of this industry. Moreover, highlighting the scale of Chinese FDI in the energy sector may serve as an incentive for potential Chinese investors to invest in Kazakhstan's energy complex.

Keywords: Foreign Direct Investment, Energy Industry, Belt And Road Initiative, Kazakhstan, China.

1. Introduction

Energy Industry plays an important role in the economy of Kazakhstan. It has large reserves of energy resources such as oil, gas, coal, and uranium (Karatayev & Clerk, 2014). Currently, Kazakhstan is a net exporter of electricity (the North of Kazakhstan exports electricity to Russia, while the South buys it from Kyrgyzstan and Uzbekistan) (Zhanbulatova et al., 2020). The state of Kazakhstan's Energy sector depends on natural resources: oil, gas, coal, and uranium. Kazakhstan is certainly rich in natural resources; the entire periodic table is presented on the territory of this country. Thus, we use them as Energy, which will certainly lead to the fact that the number of natural resources will decrease, as well as the already precarious environmental situation will worsen even more (Opakhai et al., 2024). Kazakhstan contains 88.6% of coal, 86% of oil, and 32% of gas from the total amount of reserves explored in the region. But this reserve will sooner or later exhaust itself, so it is important to use what nature gives us, alternative sources of inexhaustible Energy. This deserves all the attention if it is considered that the country is going through a period in which it seeks to promote the oil and Energy industry developments as two locomotives of the nation's energy industry development (Chen & Khoso, 2025). According to the National Energy development Plan, Kazakhstan Energy industry development Country Vision for the Year 2019, "In 2019,

the Kazakhstan Energy Industry development will be one of the most important in Asia and will significantly expand its participation in the national economy (Zhang, 2026)". One of the strategies for this has been the creation of a regulatory framework that defines and encourages foreign investment in the sector. In this context, it is worth wondering what has been the evolution of FDI flows that have entered the Energy industry development in Kazakhstan and in particular in Energy industry development in the last ten years. Since the independence of Kazakhstan, the government strives to recruit its effort toward improving the country's economy, which extends to improve in turn other market sectors and industries. FDI has proven its impact on economic growth, especially in short-term predictions (Malik & Sah, 2023). Kazakhstan is one of the few countries around the globe that has many natural resources, which helps in producing renewable Energy.

China is viewed as one of the major investors for Kazakhstan. In 2019, the volume was 1.7 billion \$ with an increase of 55 % by 2017. In the country structure, the dynamics of FDI attracted from China shows moderate growth: 2017-5.2 %, 2018-6.1 %, 2019-7.0 %. China's investment in Kazakhstan is mainly in the Energy sector, where the volume of proven oil reserves according to BP is 39.6 billion barrels or 6.5 billion tons, which is 3.2 % of the total world reserves, as well as there is an accumulation of minerals in large quantities (O'niell, Daniel, 2014). The main sectors of direct investment are oil exploration and production, gas station networks, telecommunications, agricultural processing, leather processing, catering services, trade, etc. The main investment projects are: Aktobemunaigas, Karazhanbasmunaigas, Petro Kazakhstan oil company, oil exploration in the Eastern outskirts of the Central part of the Caspian basin, Pavlodar aluminum plant, Railways, development of a uranium mine, Moynak HPP, Kazakhstan-China oil pipeline, Kazakhstan-China gas pipeline, international center for cross-border cooperation "Khorghos" on the Kazakhstan-China border.

The Chinese-Kazakhstan relationship has strengthened over the last decade, it covers several areas of cooperation, in economic, political, and social aspects (KURAMAYEVA, G., & NURDAVLETOVA, S. (2018). The Chinese investment in Kazakhstan has declined dramatically over the last five years, specifically from 2015-2019, which motivates this study to investigate further what the situation of foreign direct investment in Kazakhstan, as there is an opportunity for the both countries in energy industry, this is due to the high demand of china to the energy, besides the availability of energy sources in Kazakhstan (Alvarez, 2015).

Kazakhstan has rich Energy resources. but unfortunately, due to the lack of sufficient investment in the Energy industry, the volume of productivity is very small, as well as the equipment used for production. Kazakhstan can create joint ventures through cooperation with foreign capital, especially Chinese capital, in order to improve the current situation in Kazakhstan's Energy sector and improve its development. This study provides an analysis of the FDI from China's investors and will benefit decision-makers in both countries in terms of bilateral trade, policy relationship improvement, and social development. Thus, this study has great importance because it aids to clarify the overall impact of China's direct investment on Energy industry that may help policy makers to set correct policy to increase the growth effect of FDI in Kazakhstan. The other significance of this thesis is to enrich the literature reviews about the relationships between China's direct investment on Energy industry in Kazakhstan.

2. Literature review

Braithwaite and Greenridge (2005) break down the effect of FDI on the general growth of the Barbados economy. Their sequential arrangement of yearly information traversed from 1970 to 2003 and was explored by the cointegration examination. To clarify the monetary advancement during the period 1970-2005, they present a trevorite structure that applies Granger causality tests utilizing a vector mistake remedy model (VECM). The hypothetical writing offers clashing conclusions about the impact of FDI on growth. This contention has been reached out to the field of exact research and is reflected in different ends. There are

concentrates, for example, that of Schneider and Frey (1985) in which positive and measurably huge connections were found among FDI and growth, yet in the exploration did by Balasubramanyam, Salisu, and Sapsford (1996) it was reasoned that no there was not a noteworthy impact of FDI on the way of economic growth.

Fry (1993) contemplates the advantages of FDI from an example of 16 developing countries. Utilizing yearly information from 1966-1988, gauge the genuine growth pace of gross national item (GNP) with iterative least-squares in three phases. As indicated by its underlying decisions, FDI didn't have an essentially extraordinary impact from inward investment in economic growth. In any case, while partitioning the example, a positive and noteworthy connection among growth and FDI is watched for five countries in the Pacific bowl. The consequences of the staying 11 countries (the benchmark group) were opposing, with a positive sign related to the FDI variable. Clearly, the connection among growth and FDI relies upon some particular subtleties of the country.

3. Research Methodology

This study employs a quantitative research design based on a time-series secondary data analysis to examine the impact of Chinese foreign direct investment (FDI) on the growth of Kazakhstan’s energy sector from 1992 to 2018, yielding a total of 27 annual observations. The variables include Kazakhstan’s energy sector development (dependent variable), net FDI inflows to Kazakhstan, Kazakhstan’s GDP, China’s direct investment in Kazakhstan, and China’s direct investment specifically in Kazakhstan’s energy industry (independent variables). Data were sourced from the World Bank database for macroeconomic indicators and the Statistics Committee of Kazakhstan for FDI-related variables. A linear regression model was constructed to estimate the relationships, with diagnostic checks including multicollinearity, heteroscedasticity, and autocorrelation tests to ensure model validity. The empirical strategy allows for identifying the direction and significance of the effects, thereby providing a robust assessment of how Chinese FDI contributes to energy sector growth in Kazakhstan.

4. Results

4.1 Review of studies on Kazakhstan's Energy Industry

Sarkar, Al-Amin, Mustapa, and Ahsan (2019) define Energy as power derived from the utilization of physical or chemical resources, especially to provide light and heat or to work machines. Energy development refers to the practices used to obtain and maintain Energy from natural sources (Zhang, Pang, Chen, & Lu, 2019)

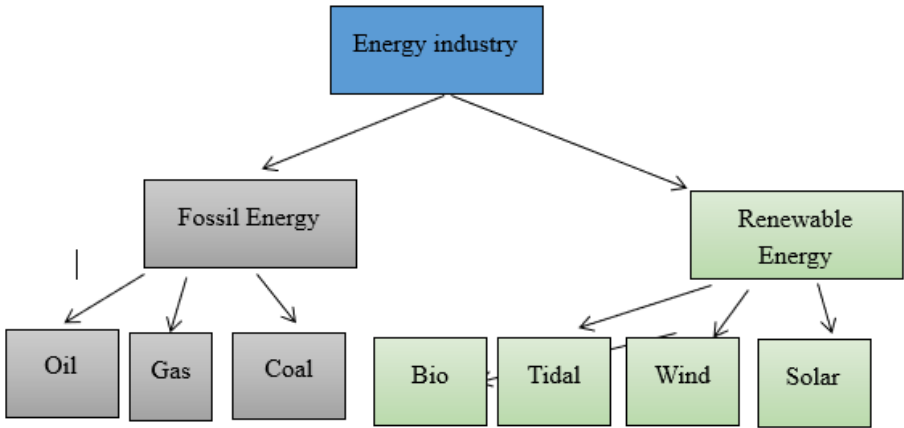


Figure 1: Energy industry formation

Figure:1 clarifies the classifications of the Energy industry, which can be categorized into two main sources, fossil Energy, these categorized into three main sources that oil, gas, and coal. Meanwhile, renewable Energy that categorized into four main sources that bio, tidal, wind, and solar.

4.2 Definition of Energy Industry

The Energy industry refers to the software control and hardware electrical solutions for Renewable Energy and the distribution of electrical production (Ying et al., 2024). These are two major challenges for potential improvements in energy efficiency in the electrical industry. Combined solutions such as virtual power plants (Virtual Power Plants) project the concept further: these power plants can be used to promote the transition from traditional electricity production to renewable s by compensating for some limitations and variability characteristic of green Energy sources.

The new Energy industry will have the following impacts on the Energy pattern. One is to promote the Energy independence of the country, the other is to diversify the Energy sources in the future, and the third is to make the Energy utilization more convenient. These impacts are interrelated but each has its focus. Let's talk about these impacts in detail. The first mentioned impact is to promote the Energy independence of our republic. The second is to diversify Energy sources in the future. The third impact is to make Energy use more convenient. The development of the new Energy industry will change the current Energy pattern invisibly, make the national Energy more independent, make the scope of Energy utilization more extensive, and make Energy extraction more convenient (Khoso et al., 2025).

4.3 Development Stage of Energy Industry in Kazakhstan

Kazakhstan Energy is a system of generation and power supply of electricity and power; an important branch in the industrial and social infrastructure of the national economy and a key basis for the development of other industries.

The first stage took place during 1990-2000. On the eve of the collapse of the USSR economy, the power of the republic's power plants is 18 mln. The total electricity consumption in Kazakhstan is 104.8 billion kWh., of which 87.4 kW / h were produced at own power plants. In 1990, the country produced \$ 131.5 million tons of coal, 25.5 mln tons of oil and gas condensate and 6.8 bln m3 of gas was extracted. Most of the coal and oil produced were exported outside the country. 1990 to other countries 10 mln. c. a ton of Energy coal (42.9%); tons of oil and gas condensate (82.4%). The share of gas in the fuel balance of the Republic was 15%. 1990 The share of gross national Energy in the republic was 4.01 kg per 1 ruble, which is 28% more than in the other allied republics. The electric power industry of Kazakhstan has experienced a crisis situation since 1991. The country's current Energy capacity in the early 1990s was around 17,000 MW, in 1998. By the end of 2000, the power consumption reduced to 8560 MW. Kazakhstan has imported electricity to the southern and western regions due to a shortage of Energy-generating capacities and a lack of power transmission lines from areas with excessive power.

The second stage took place during the crisis of 2000-2010. Electricity is one of the most important components of the fuel and Energy complex, accounting for 7% of all mechanical construction in the country. In June 2003, the Kazakh legislature reported another program to advance the Caspian, under which new oil and gas stations will be sold to the sea. In 2004 alone, local power stations delivered 66.9 billion kWh, of which 5.3 billion kWh were delivered to different countries (22% more than in the previous year). It is characteristic that about 86–88% of Kazakhstan's electricity is produced by young plants. Another disadvantage of the electrical structure of Kazakhstan is the uniformly selected vertical dispatching structure. Generating a lot of power like this (young stations). Most of the Kazakhstan power plants have been permanently demolished (58.5% of normal attenuation). The new obligation structure, which came into power in January 2004, incorporated an alleged "lease charge" into transactions, a dynamic expense that increases as oil costs increase. The change increased a large number of oil revenues in the range of 65-85%.

The new structure recalls a duty of abundance benefits and points of confinement of FDI to 50 percent in each maritime company without certifications for the administrator. The law of power was adopted in July 2004. The other fundamental act that manages the showcase of power is the Law on business models that normally impose, which was amended in December 2004. In 2005, the legislature forced new limitations to allow state responsibility and temporary worker status of the KazMunaiGas gas organization and, in any case, half of any creation that shares the understanding (Hapsari, Clemes and Dean). In 2005, Kazakhstan amended the subsoil law to avoid the supply of oil resources in the country and expand the administration's capacity to repurchase Energy resources by limiting the exchange of responsibility for resources in Kazakhstan. The market controller is the Agency for the guide of the business models that impose common (AREM). As of January 1, 2006, the total length of the lines was 23,383 km. There are 18 provincial appropriation organizations (agreement). The legislature directs the duties of transmission and appropriation.

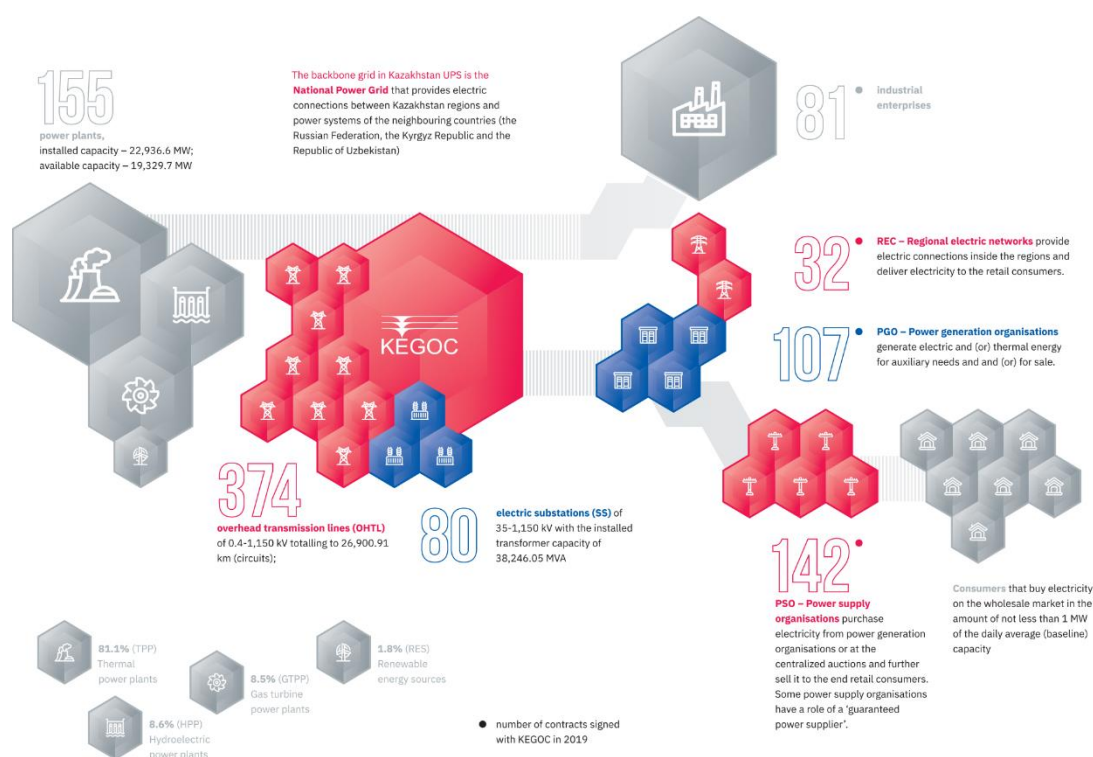


Fig-2: Kazakhstan's Energy Sector Overview

Source: Industry Review, 2019

4.4 Scale and Structure of Energy Industry in Kazakhstan

1) Scale of Energy Industry in Kazakhstan

Scale of Energy Industry in Kazakhstan is a strategically important industry for Kazakhstan. Only the oil and gas sector, according to the S&P rating Agency, accounts for about 15% of the country's GDP and provides about 40% of all budget revenues. 18 of the 30 largest taxpayers in Kazakhstan are companies engaged in oil and gas production – in 2019, they provided more than 4.3 trillion tenge of payments. In the past five years, the growth of hydrocarbon production has exceeded 90 million tons of oil per year, the

modernization of oil refineries has been completed, and gasification of the regions has intensified. Below is the percentage of the energy mix by technology in 2019 as shown in fig-3.

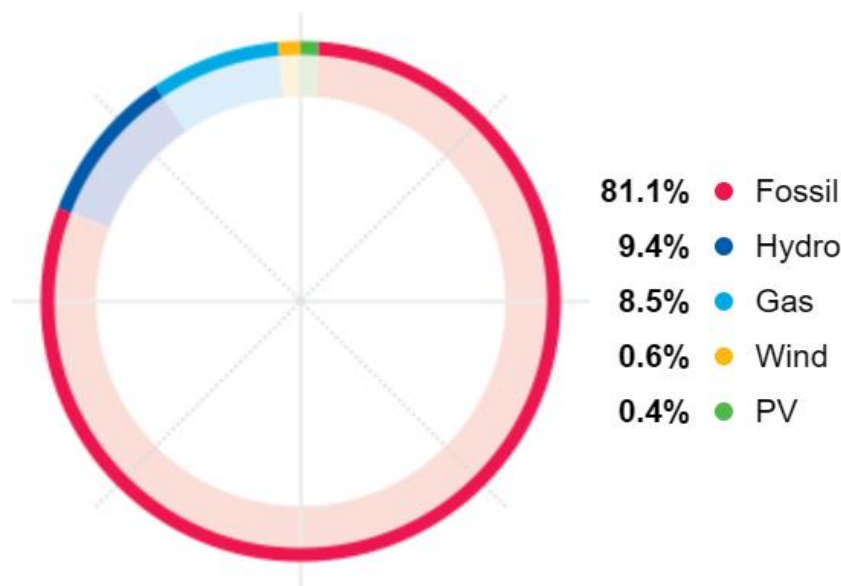


Fig-3 Kazakhstan's Energy mix in 2019 by technology

2) Structure of Energy Industry in Kazakhstan

Kazakhstan has large reserves of Energy resources (oil, gas, coal, uranium, power plants) and is a raw material country that lives on the sale of natural Energy resources. Until 2010, Kazakhstan was a net exporter of electricity, and after 2010, it is a net importer, that is, it consumes more electricity than it produces.

Kazakhstan has identified large-scale qualitative structural changes in the resource and Energy base of the national reproduction, which can be implemented in the framework of long-term development strategies of the country. In December 2012, in the Address of the President of the Republic of Kazakhstan N. A. Nazarbayev to the people, it was noted that the main target areas of the strategy "Kazakhstan - 2030" were achieved and a new long - term program "Kazakhstan-2050" was announced. The strategy "Kazakhstan-2030" and the strategy "Kazakhstan 2050", their consistent implementation determines both the present appearance of Kazakhstan and its Energy future in the context of economic development and social modernization of society (Hor et al., 2022).

Figure-4 shows that coal comprises 70% of the total Energy industry consumption in Kazakhstan, while the oil represents around 14.6%, followed by natural gas by 10.6%, and 4.9% for other types of fuels. The highest consumption of coal attributes to the high domestic consumption, as coal is considered as the cheapest source of Energy in Kazakhstan.

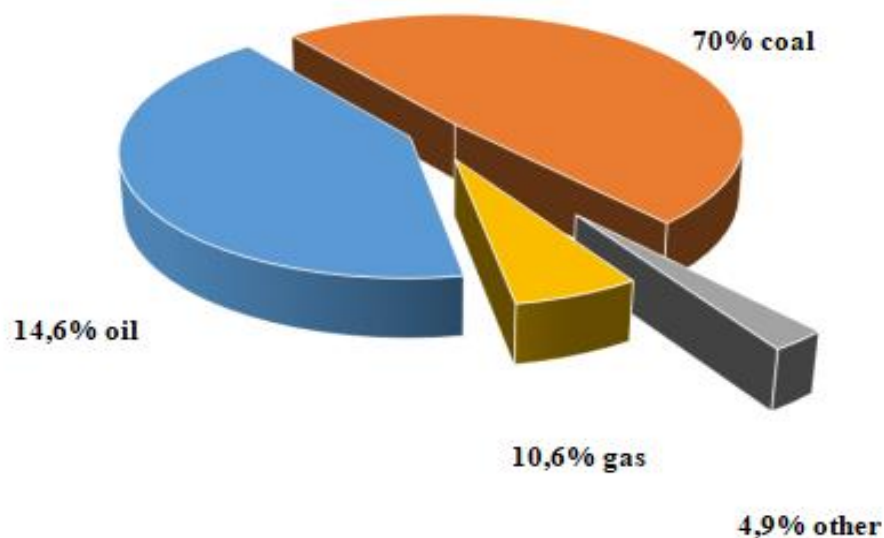


Fig-4 Energy Industry policy in Kazakhstan

Energy Industry policy in Kazakhstan can be divided into three periods. Kazakhstan has one of the leading positions in the world in terms of reserves and production of Energy resources. In the first period 1973-1990; after the global Energy crisis, measures were taken to conserve and use energy efficiently, which significantly reduced the Energy intensity of material production. As a result, the total energy intensity of a unit of GDP in industrialized countries since 1973. Before the beginning of the 1990s, it decreased by 22 %.

Second period 2000-2010; in June 2003, the government of Kazakhstan announced a new Caspian development program, under which new offshore blocks of oil and gas to be auctioned off (Kaiser et al., 2007). In 2005, the government introduced new restrictions on granting state-owned oil and Gas Company KazMunayGas contractor status and at least half of any production sharing agreement (PSA). The law on electricity was adopted in July 2004. The Other main act regulating the electricity market is the law on natural monopolies, which were amended in December 2004 (Raimondi, 2019). The new tax structure, which came into force in January 2004, included a so-called "rent tax" on exports, a progressive tax that increases as oil prices rise. The amendment raised the government's share of oil revenue in the range of 65-85%. The new structure includes a tax on excess profits and limits foreign participation to 50 percent in each offshore project without any guarantees to the operator. In 2005, Kazakhstan amended the subsoil law to pre-empt the sale of oil assets in the country and expand the government's power to buy back Energy assets by restricting the transfer of ownership rights to strategic assets in Kazakhstan.

Table 3-1: Incentives provided for FDI in Energy industry

Energy source	Incentives
Renewable Energy	100% tax exemption for 5 years
Natural gas	20% tax exemption for 5 years
Oil	20% flat tax

It should be noted that the issue of attracting foreign investment in the economy is relevant in any country in the world. The race for foreign investment has entered not only developing countries but also developed countries. Countries take measures to improve the investment climate and provide the most competitive

conditions for doing business, reduce or abolish taxes, provide a lot of benefits, infrastructure solutions, etc. In turn, investors give preference to countries that guarantee the preservation of capital, the rule of law, a transparent and comfortable business environment. Thanks to a number of successfully implemented reforms, the introduction of new approaches to attracting investments and working with investors, Kazakhstan is one of such countries.

4.5 Mutual investment flows between China and Eurasian countries, US \$ billions

China has established itself as a key investment partner for Eurasian countries. In recent years, Chinese companies have shifted their focus towards creating new manufacturing and energy production facilities. Most of the new projects are private business investments. This demonstrates the technological maturity of Chinese investors. But it also shows a significant improvement in the investment climate in Central Asia,” commented Evgeny Vinokurov, Chief Economist at the EDB. SO far, the fig-5 highlights the investment flow between china with Eurasians countries. Where the Kazakhstan has been the second biggest country of the china’s investment flow after Russia.

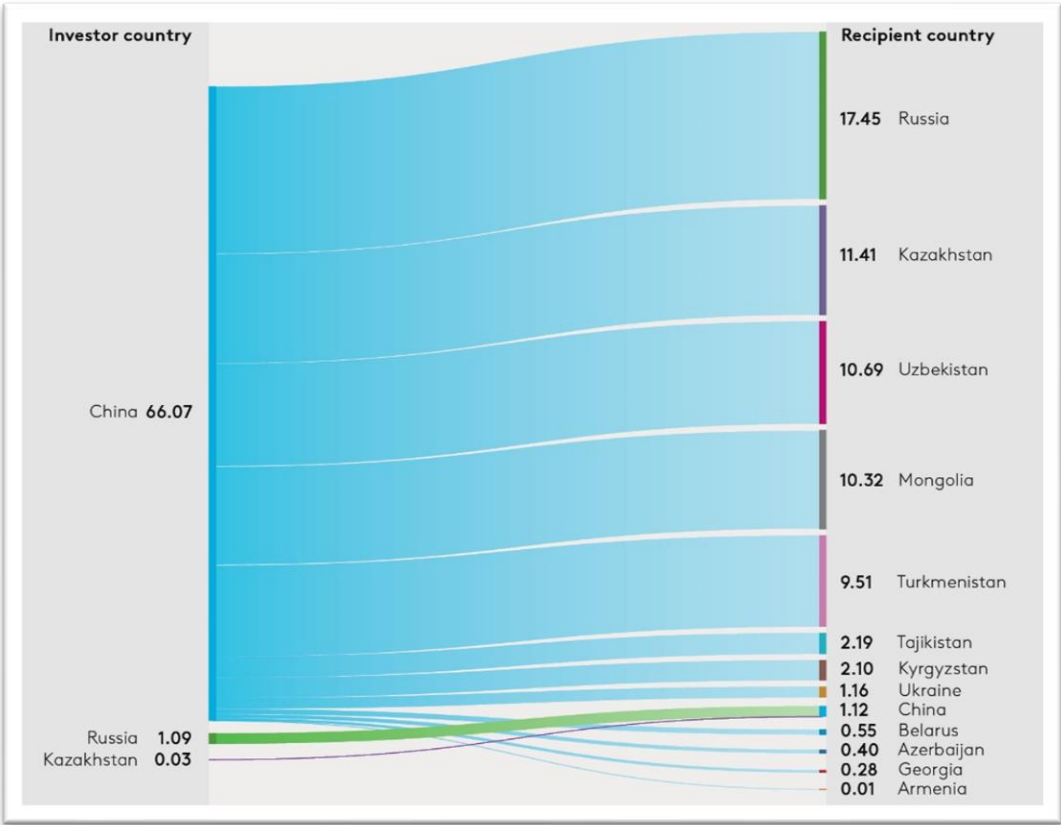


Fig-5: Investment flow between china and Eurasian countries

Source: EDB MMI database

China’s FDI stock in Central Asia has increased over ten years to US \$35.9 billion. Almost 90% of investment is concentrated in Kazakhstan (32%), Uzbekistan (30%) and Turkmenistan (27%). To date, investment has been largely concentrated in extractive industries (46%), although the share of manufacturing and energy, which together already account for more than one third of Chinese investment in Central Asia, continues to grow. Kazakhstan remains the largest recipient of Chinese FDI at US \$11.4 billion, while Uzbekistan is showing rapid growth and has increased attracted FDI to US \$10.7 billion by

mid-2025 (Razzaq et al., 2021). Over the past ten years, China's FDI stock in the South Caucasus increased 2.5 times, from US \$0.28 billion to US \$0.69 billion. The investment portfolio is divided between Azerbaijan (around 60%) and Georgia (around 40%), with manufacturing and energy as the priority sectors. China's total FDI stock in EAEU countries is estimated at US \$31.5 billion across 160 projects. Over the past ten years, Chinese investment in the EAEU has grown by 1.5 times. Russia and Kazakhstan account for 91% of total investment (Zhang, 2015) While extractive industries remain the key recipient with US \$14.7 billion (47% of the portfolio), manufacturing investment is expanding rapidly (US \$9.8 billion, or 31%, by mid-2025). Russia is the largest recipient of Chinese FDI. As of the first half of 2025, the investment stock there reached US \$17.5 billion, accounting for 55% of China's total investment in the EAEU. The largest project is Sinopec's participation in the Amur Gas Chemical Complex, in which the company holds a 40% stake. By mid-2025, cumulative investment in the project reached US \$3.2 billion. China's investment stock in Mongolia has reached a very high level, amounting to US \$10.3 billion by mid-2025. The portfolio is concentrated in the mining sector, primarily in projects developing iron ore and oil deposits. Manufacturing, energy including renewables, transport and logistics and agriculture remain the most attractive sectors for Chinese investors in the Eurasian region (Toxeitov, 2004). This reflects a combination of structural shifts within Eurasian economies and China's strategic priorities to secure leadership in high-tech industries, diversify value chains, develop green energy and low-carbon transport and ensure food security. Below in fig-6 is given the Kazakhstan's export to china total value from 2000-2021.

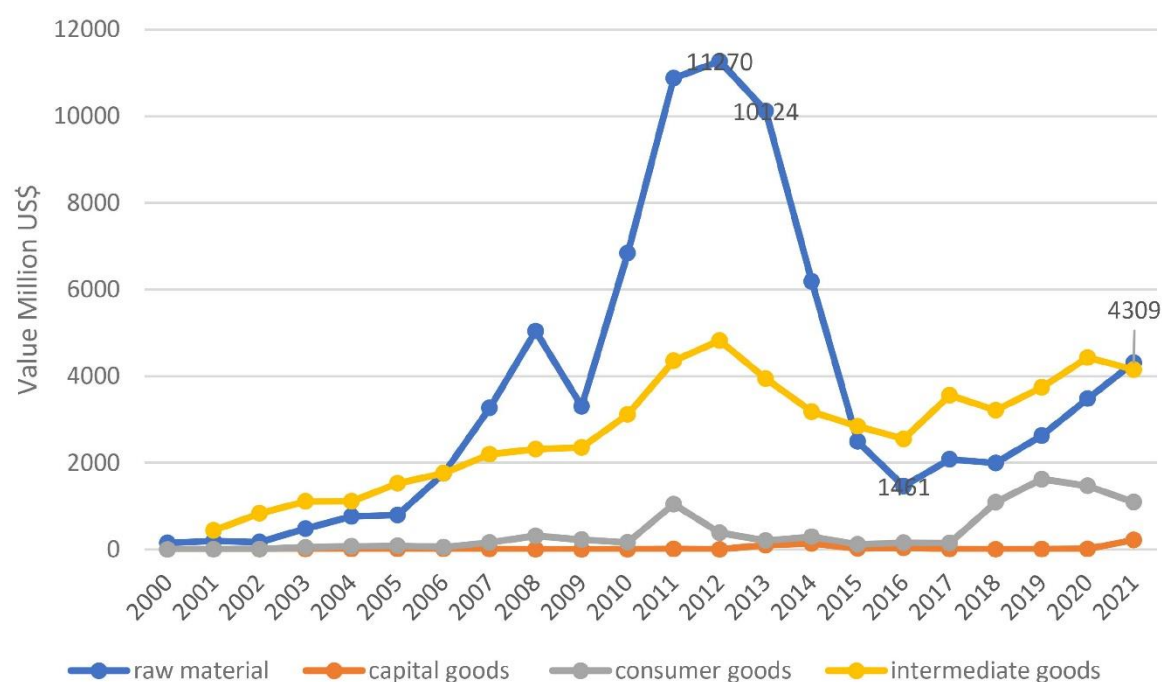


Figure-6. Kazakhstan's exports to China: total value by category, 2000–2021

Source: World Integrated Trade Solution data, 2023

5. Conclusion

This paper empirically analyzed the current situation and characteristics of China's direct investment in Kazakhstan's Energy industry and empirically tested the impact of China's FDI on it through the establishment of the linear regression model. The data used in this study is a secondary data source of the time series of data over the period 1992 to 2018 is constructed, which accounts for a total of 27

observations. The data of this study retrieved from the World Bank database for three variables are FDI; economic growth, and imported Energy, while the data for the net FDI sourced from China and FDI into the Energy industry were retrieved from Kazakhstan statistics committee. The results show that the impact of net FDI in Kazakhstan, Kazakhstan's GDP, China's direct investment in Kazakhstan, and China's direct investment in Kazakhstan's Energy industry on Kazakhstan's Energy development is significant and positively related. Among them, China's direct investment in Kazakhstan's Energy industry, compared with other factors, can have a more important impact on Kazakhstan's Energy industry, so Kazakhstan can through cooperation with foreign capital, especially China's capital, the establishment of joint ventures, in order to improve the current situation in Kazakhstan's Energy industry bad development.

Kazakhstan is one of the few countries around the globe that has many natural resources, which helps in producing renewable Energy. Energy industry in Kazakhstan, have five main scales of Energy comprises the Energy industry represented by natural gas 10.6%, oil 14.6%, coal 70%, electricity 5%, and other types 10% of Energy. The highest consumption of coal attributes to the high domestic consumption, as coal is considered as the cheapest source of Energy in Kazakhstan.

Kazakhstan over the years of independence has attracted about 350 billion US dollars of FDI. At the same time, over the past 10 years, the national economy has received 231.6 billion us dollars. The leaders in attracting investment to Kazakhstan are investors from the Netherlands 7.3 billion US dollars (with a share of 30.2 %), the United States 5.5 billion US dollars (23.0%), Switzerland 2.2 billion US dollars (9.3%) (see table 1). It is worth noting that in 2019, China's investors took the 4th place, pushing investors from the Russian Federation to the fifth position. In Kazakhstan, the total of FDI flows registered in the period from 2014 to 2018 reach the total sum of 99,439 million dollars (mUSD) of which, 20,847 million have been invested in the Energy industry, which absorbed 21% of the total foreign investment flows that entered the country in the aforementioned period. Disaggregating the figures for the Energy industry, about 18,649 mUSD (89%) were invested in renewable Energy, while 1,967 mUSD (9%) were used for fossil Energy.

China's investment in Kazakhstan is mainly in the Energy sector, where the volume of proven oil reserves according to BP is 39.6 billion barrels or 6.5 billion tons, which is 3.2 % of the total world reserves in the period from 2014 to 2018 the solar Energy was the most benefited, going from a share of 8 to 32% of FDI flows compared to the previous period, while the other renewable Energy means went from a share from 17% to 21%, respectively. China's investments in Kazakhstan are mainly direct investments. The number of China's companies in Kazakhstan is constantly growing. China today is one of the three largest investors in Kazakhstan's Energy industry. Regarding the commodity circulation, then over the 8 months of this year, countries traded nearly 680 million US dollars. China's investment in Kazakhstan is becoming more extensive, and the investment structure is becoming more complex.

According to Kukeyeva et al., (2015) the Energy in Kazakhstan is a promising industry, but it lacks to the enough financing, either from the foreign or domestic investment. Ke (2019) highlights the lack of the government of Kazakhstan in promoting the FDI toward developing the Energy industry, as this industry projects required huge capital investment, which can be provided only by the FDI. In this context, China is one of the main investors target to Kazakhstan, as Chinese foreign investment increased rapidly over the last decade (Bekmukhametova & Zhong, 2019). Hence, Kazakhstan looks forward toward getting significance portion of this investment to be directed to improving the economic growth and Energy sector development.

5.1 Recommendations

Based on the empirical findings that Chinese FDI, particularly in Kazakhstan's energy industry, has a significant and positive impact on the sector's development, several strategic recommendations can be made for policymakers in both countries. For Kazakhstan, it is recommended to further strengthen the regulatory framework and investment incentives specifically targeting Chinese capital in renewable energy projects, given the country's vast natural resource potential and the observed positive correlation between FDI and

energy sector growth. Given that coal still dominates the energy mix (70%) while renewable energy attracts only a minority of FDI flows, Kazakhstan should prioritize diversifying its energy structure by offering enhanced tax exemptions and infrastructure support for solar, wind, and bioenergy ventures with Chinese partners. Additionally, the government should establish more joint venture mechanisms and streamlined bilateral investment agreements to reduce barriers and transaction costs, thereby increasing the volume and efficiency of Chinese investment beyond extractive industries. For China, it is recommended to expand investment beyond traditional oil and gas exploration into renewable energy technologies, modernizing Kazakhstan's aging power infrastructure, and capacity-building initiatives. This would not only align with the Belt and Road Initiative's long-term goals but also help secure sustainable energy returns and foster mutual economic resilience. Finally, both nations should enhance data-sharing and policy coordination mechanisms to monitor FDI impacts continuously, enabling adaptive strategies that maximize growth effects while minimizing environmental and economic vulnerabilities.

5.2 Limitations

This study has several limitations that should be acknowledged. First, the empirical analysis is constrained by the time-series data spanning only from 1992 to 2018, yielding a total of 27 annual observations, which limits the generalizability of the findings to more recent years, particularly given the significant geopolitical and economic shifts that have occurred after 2018, including the COVID-19 pandemic and global energy market fluctuations. Second, the study relies exclusively on secondary data sourced from the World Bank database and the Statistics Committee of Kazakhstan, which may suffer from inconsistencies in reporting standards, missing values, or potential measurement errors across different time periods. Third, while the linear regression model provides evidence of positive relationships between Chinese FDI and Kazakhstan's energy sector growth, the analysis does not fully account for potential endogeneity issues, such as reverse causality where energy sector growth itself may attract more Chinese investment. Fourth, the study does not disaggregate the effects of Chinese FDI by energy subsector (e.g., oil, gas, coal, renewable) due to data limitations, which obscures nuanced differences in how each subsector responds to foreign capital. Fifth, external factors such as global oil prices, exchange rate volatility, domestic political changes in Kazakhstan, and China's shifting domestic energy policies were not incorporated as control variables, potentially confounding the estimated relationships. Finally, the study does not examine the environmental or social impacts of Chinese FDI on Kazakhstan's energy industry, which represents an important avenue for future research.

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