https://doi.org/10.31489/2024Ec4/69-78
JEL: G31, O16
UDC: 336.6
Received: 19 April 2024 | Accepted: 28 August 2024

G. Kalkabayeva[1], A. Atabayeva[2], A. Kurmanalina[3*], Alhassan Tijani Forgor[4]

[1,2,3]Karaganda Buketov University, Karaganda, Kazakhstan;
[4]Moscow Polytechnic University, Moscow, Russian Federation

[1]Kalkabayeva_G@buketov.edu.kz, [2]Atabayeva_Assiya_1@buketov.edu.kz,
[3]Kurmanalina_Anar@buketov.edu.kz, [4] atijaniforgor@gmail.com

[1]https://orcid.org/0000-0002-5954-0787,

[1]Scopus Author ID: 57205624512,

[1]Researcher ID: AAY-5116-2020

Modeling Sectoral Investments, Output and Costs Using VAR Models

Abstract

Object: This paper examines the dynamics and structure of fixed capital investment, quantifying its impact on output and material costs in different sectors of the Kazakhstani economy.

Methods: Using empirical and statistical methods, the study explores sector-specific investments, while VAR models are developed to evaluate how investment affects output and material costs. Ordinary Least Squares (OLS) was employed to assess the interrelationships among variables. Model fit was evaluated using information criteria (AIC, BIC, HQIC) and t-statistics.

Findings: The analysis revealed imbalances in the sectoral distribution of fixed capital investment, with predominance in the non-productive sector. VAR modeling indicated that fixed capital investment exerted the most significant positive impact on output in the short term for the trade sector and in both the short and long terms for the manufacturing and mining industries.

Conclusions: Our findings indicate that the impact of investment on different economic sectors is heterogeneous. In the short term, investments were found to reduce material costs only in the mining, construction, and transportation sectors, while in the long term, this effect was observed in agriculture and energy. The largest increase in output is expected in the trade and manufacturing sectors. The most significant growth in fixed capital investment is projected for the trade, manufacturing, construction, and agriculture sectors.

Keywords: investments, output, industries, material costs, investment effects, VAR model.

Introduction

Investments are one of the key factors ensuring sustainable economic growth. An increase in investments enhances the production capacity of economic sectors, fosters human capital development, drives innovation in technological processes, reduces costs and expenses, and supports environmental sustainability. The prospects for economic growth, its structural changes, job creation, employee skill levels, technological advancements in production, and labor productivity are all influenced by the volume and speed of investment inflows. The relevance of studying the impact of investments on economic indicators and searching for ways to increase the efficiency of investment is due to the growing need for investments and the need for effective management of investment flows.

The global economy is currently facing significant investment needs, particularly to sustain economic growth and achieve sustainable development goals. According to UNCTAD (2024), the investment gap in developing countries has widened to $4 trillion per year. A significant portion of this need is related to the transition to clean energy, infrastructure projects, and technological upgrades. The European Central Bank (2024) estimates that the European Union will require more than €5 trillion between 2025 and 2031 to invest in the green and digital economy and ensure security. At the same time, there is a significant gap between available and required investments.

Kazakhstan's investment needs have been estimated at $150 billion (The National Development Plan of the Republic of Kazakhstan until 2029, 2024). With the exception of the extractive industries, most sectors of the Kazakhstani economy experience a lack of funding to support investment projects. To meet the investment demand, accelerate the country's economic growth, and implement investment projects, targets have

* Corresponding author's e-mail address*: Kurmanalina_Anar@buketov.edu.kz*

been set to increase fixed capital investment to 25.1% of GDP and attract foreign direct investment of up to $25.5 billion by 2026 (The Investment Policy Concept of the Republic of Kazakhstan until 2026, 2024).

The significant demand for investment resources necessitates the search for new ways and incentives to attract investments, stimulate investment processes, and enhance the efficiency of sectoral investments.

The objective of this research is to analyze the impact of fixed capital investment on production volumes and material costs in Kazakhstan's economic sectors through the construction of an econometric model.

Literature Review

Economic literature offers various conceptual theoretical models of economic growth, including classical growth theory, neoclassical conception, theory of endogenous growth, and others. Endogenous growth models consider the impact of investments on economic growth and the limits of their positive effects (Lucas, 1988; Aghion, Howitt, 1992). An attempt to determine the optimal level of investment is made in the article by Baneliene et al. (2018). They prove that R&D investments in EU countries have the greatest multiplier effect when GDP per capita exceeds 10,397 euros.

In contemporary conditions, research on sectoral investments is becoming increasingly relevant. The study by Emako et al. (2022) found that the greater the investments countries attract into manufacturing, the stronger their economic growth. Meanwhile, research by Vertakova et al. (2022) identified the most promising sectors for investment, which have the potential to generate a catalytic effect on the development of other businesses, industries, and regions as a whole. Al-Banna et al. (2024) argue that it is necessary to find the optimal balance between avoiding the risks of excessive investment and the pitfalls of underinvestment in economic sectors. Kazakhstani researchers Temirbayev B., Zagal K., and Akhmetzhanova S. (2021), based on the calculation of the output multiplier of the intersectoral balance, assessed the effectiveness of investments across sectors, revealing that investments in health and social services yield the highest returns. Researchers He Y. et al. (2024) analyze the factors influencing the effectiveness of investments. They argue that financial development positively affects investment efficiency, but only up to a certain threshold. In turn, Zhang Y. et al. (2024) highlight such an important factor as the institutional quality of the host country, which has a significant impact on foreign direct investment. Another group of researchers argues that a key factor influencing investments, particularly inflows and outflows of foreign direct investment, is the uncertainty of government economic policy. The research of Sağdıç E.N. et al. (2021) confirms the significant impact of government investment incentives on regional and sectoral growth. Krasnopeeva and Nazrullaeva (2014) provide a more detailed analysis of how investments affect production volumes in industries and the reduction of unit production costs. They have found that the impact of investments may vary across different sectors of the economy.

The number of studies on sectoral investments remains quite limited. Our research aims to address this critical gap by contributing to the study of sectoral investments. Given that each sector has its own threshold level of investment that yields the greatest positive effect, additional research is needed in the area of assessing the optimal level of sectoral investments, as well as determining which models and tools should be used in planning and managing investment flows to minimize imbalances in sectoral investment provision.

This article aims to investigate issues related to the evaluation of sectoral investment effectiveness to ensure sectoral development. The study addresses key questions, including: which existing research examines the impact of investments on sectoral development, what are the volumes and structure of sectoral investments in the Kazakhstani economy, and whether a relationship exists between fixed capital investment and output volumes and material costs in specific sectors. The study presents the following hypotheses:

- investments positively influence the growth of output volumes in economic sectors, considering their unique characteristics;
- an increase in investments results in a reduction of material costs for the production of goods and services in specific sectors of the economy.

Methods

To achieve the stated goal, various empirical statistical research methods were employed, including comparison, generalization, structural analysis, graphical and dynamic analysis, regression modeling, and others.

The analysis of the dynamics and structure of sectoral investments was carried out using empirical and statistical methods. Time series analysis was performed using econometric modeling. Econometric modeling includes data processing and analysis, regression analysis, writing Python code, calculating indicators, and visualizing results in SPSS. The study of the effectiveness of sectoral investments was conducted based on

the construction of VAR models. The multivariate time series VAR model allows for the analysis of several dependent variables. This approach allowed us to reveal the relationship between investments and other economic indicators. In addition, the ordinary least squares (OLS) method was used to assess the interfactor relationship in the study. The quality of the model was assessed by calculating information criteria AIC, BIC, HQIC, t-statistics, standard errors, F-statistics, and DW tests. Time lags were used for each dependent variable, as the return on investment may manifest itself after a certain period.

The study used statistical data from the National Statistics Bureau of the Agency for Strategic Planning and Reform of the Republic of Kazakhstan covering the period from 2009 to 2023. The data was categorized based on types of economic activity, following the GCTEA classification. The study also employed normative legal, strategic, and programmatic documents, reports, and papers from government agencies and international organizations in the field of investment activities.

Results

Our analysis covers the following key sectors of Kazakhstani economy: mining and extraction, manufacturing, energy production, agriculture, construction, transportation, trade, and water distribution. The study focuses on macro-level examination of these sectors, and for this purpose, the data was aggregated into the eight listed activities.

Figure 1 presents the structure of the fixed capital investments by use for the period 2000–2023.

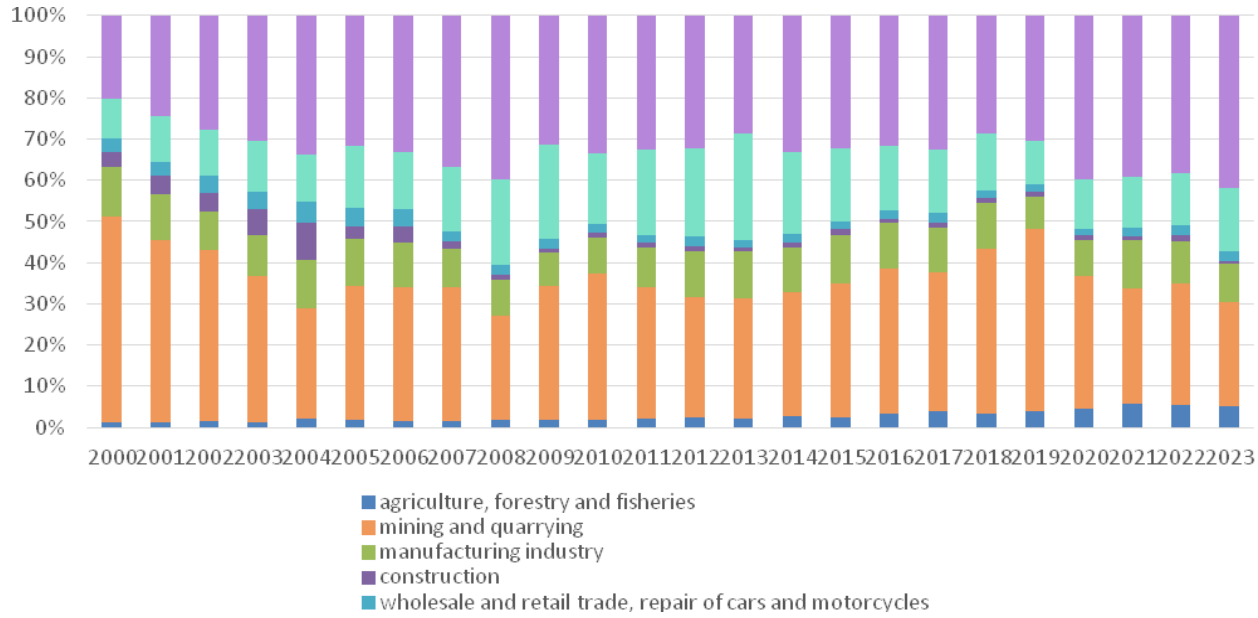


Figure 1. Structure of fixed assets investments by sectors for 2000–2023

Note — compiled by the authors using data from the National Statistics Bureau

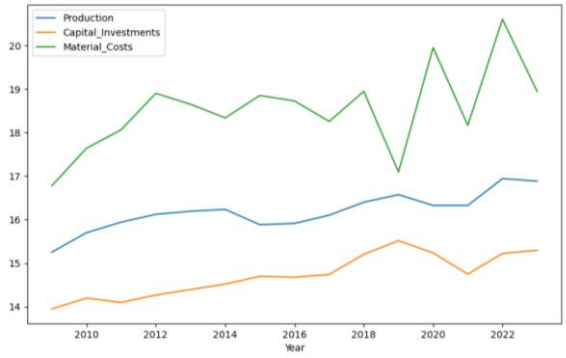
The intensity of investment activities differs greatly across sectors: in some areas of the economy, the volume of investment resources and their growth trends show a positive trajectory, while in others, a decline in investment volume is observed.

The structure of sectoral investments in fixed capital in Kazakhstan has changed significantly. The most significant increase is observed in the non-productive sector (41.9% in 2023), namely in the real estate sector. In turn, the share of investments in the transport and communications sector has increased to 15.61%, and investments in agriculture have increased to 5.1% of the total amount.

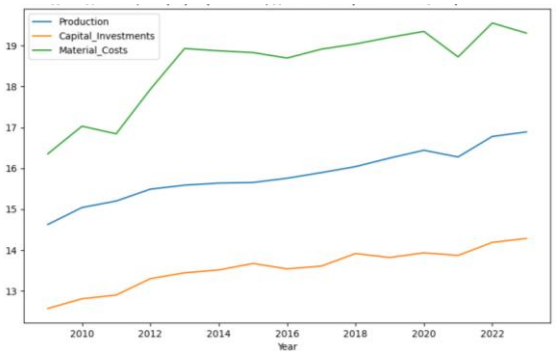
In contrast to the general trend, the proportion of investments in fixed capital within the industrial sector decreased from 64.8% in 2000 to 34.5% in 2023, although it still represents the largest share of total investments. In 2023, the mining industry accounted for the largest share of fixed capital investments, at 25.3%, compared to other sectors. This includes investments in crude oil and natural gas extraction, which accounted for 18.4%. The significant share of investments in fixed capital in crude oil and natural gas extraction is due to the investment attractiveness of this sector amid high global energy prices. This sector has a significant impact on the Kazakhstani economy. In 2023, the share of fixed assets investments for manufacturing accounted for just 9.25% of the total volume.

To examine the relationship between investments and sectoral development, we selected the following indicators for analysis: investments in fixed capital, material costs, and the total value of goods produced, work completed, and services provided. Fixed capital investments refer to funds invested for achieving economic, social, or environmental benefits, such as for new construction, as well as for the expansion, reconstruction, and modernization of facilities (resulting in an increase in the facility's initial cost), acquisition of machinery, equipment, and costs related to the formation of breeding livestock, perennial planting, etc. The volume of output produced, work completed, and services provided refers to the total value of goods and services at producer price. Material costs, in contrast, are the expenses for material resources based on their purchase price (including VAT and excise taxes), which also includes markups, commissions to suppliers, intermediaries, and foreign trade organizations, as well as costs for commodity exchange services, customs duties, transportation, storage, and delivery by third-party organizations and individuals not employed by the company. Before using the data for econometric modeling, adjustments were made based on the industrial producer price index. The subsequent step in the study was the logarithmic transformation of the data.

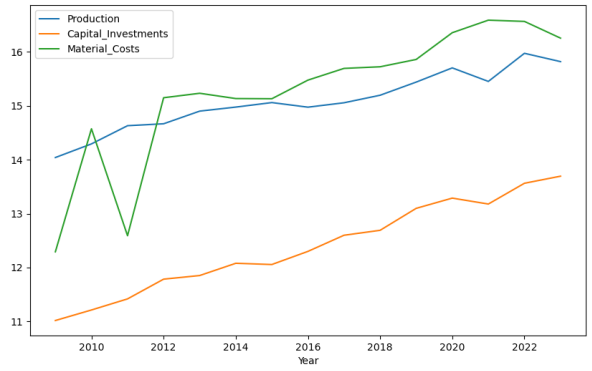
To construct the econometric model, logarithms of investments in fixed capital, output volume, and material costs were calculated. The results of the logarithmic transformation of the selected indicators are presented in Figure 2.



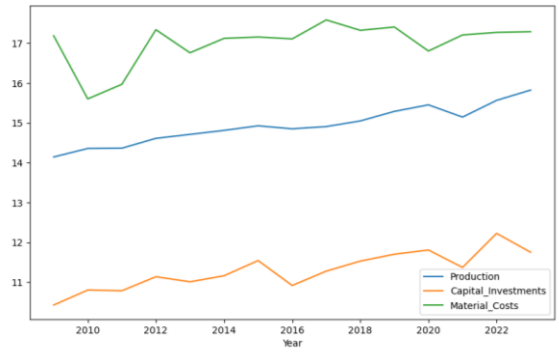
a) mining industry



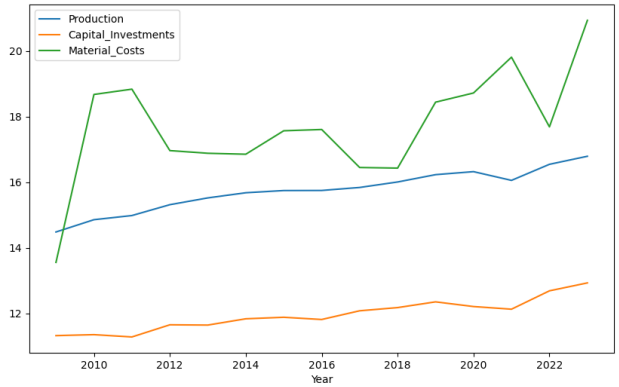
b) manufacturing industry



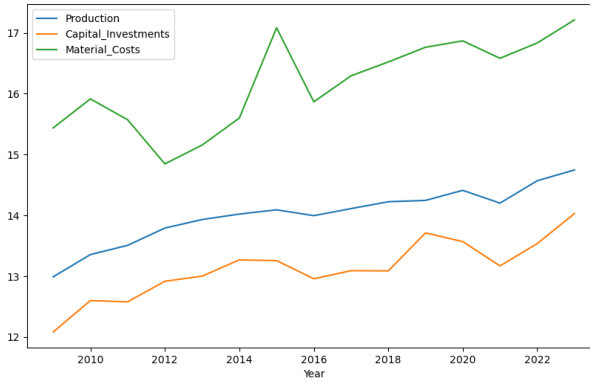
c) agriculture



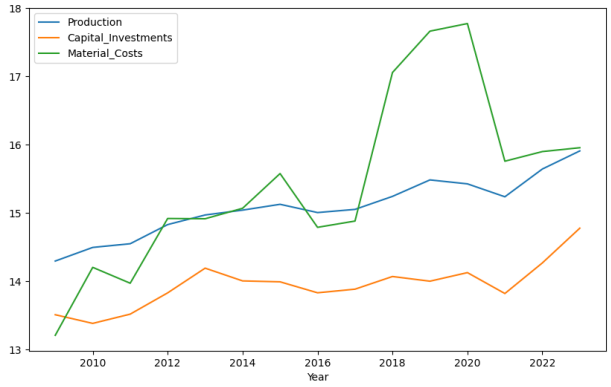
d) construction



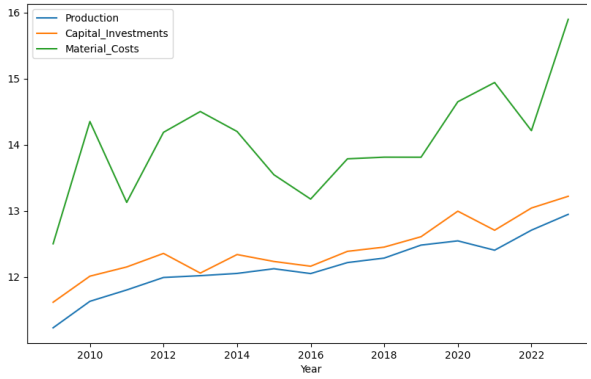
e) trade



f) power supply



g) transport



h) water supply

Figure 2. Results of logarithmization of investments in fixed capital, output and material costs

Note – compiled by the authors

To confirm the first hypothesis and determine the strength of the relationship between the volume of fixed capital investment in Kazakhstani economic sectors and output/service indicators, an econometric model was constructed. Two lags were included in the model for all sectors, as the return on investment may be realized after a certain time lag. Annual data for 2009–2023 were used for the model. As a result of building the econometric model, correlation coefficients were obtained, confirming the presence or absence of a correlation between the analyzed indicators of specific sectors (Table 1).

Table 1. Results of the VAR model for the dependent variable "output"

Economic sectors	Time lag in one period			Time lag in two periods		
	output	investments in fixed capital	material costs	output	investments in fixed capital	material costs
Mining industry	0,975	-0,335	0,129	-0,944	0,691	0,160
Manufacturing industry	0,291	0,713	-0,363	0,333	0,905	-0,259
Agriculture	-0,376	0,401	-0,015	0,001	0,407	-0,011
Construction	0,334	0,228	0,073	0,590	-0,151	-0,080
Trade	-1,183	1,678	-0,003	0,531	0,258	0,065
Power supply	0,693	-0,124	-0,043	0,722	-0,519	0,085
Transport	1,411	-0,249	-0,115	0,192	-0,298	-0,002
Water supply	0,927	0,066	-0,047	-0,367	0,396	0,029
Note – calculated by the authors using the VAR model						

The results of the VAR analysis showed that investments in fixed capital have a certain impact on the volume of output in economic sectors. The most significant positive effect of investments in fixed capital on output/production is observed in trade in the short term, in manufacturing in both the short and long terms, and in mining in the long term. A weak positive relationship between investments and output is demonstrated by agriculture and water supply in both the short and long terms, construction in the short term, and trade in the long term. In addition, a negative statistical relationship between investments in fixed capital and output was found in the energy supply and transport sectors in both the short and long terms. In the mining industry, a weak negative relationship between investments in fixed capital and output was found in the short term. In the construction sector, a weak negative relationship between investments in fixed capital and output was found in the long term.

Based on the application of the VAR model, it was found that investments in fixed capital have positive impact on the output volume of the three sectors of the Kazakhstani economy.

To validate the second hypothesis, the effect of fixed capital investments on material costs across Kazakhstani economic sectors was examined. The VAR model revealed a negative short-term effect (with a one-period lag) of fixed capital investments in the mining industry on material costs. The findings, shown in Table 2, suggest that increased investments in the mining sector could result in a reduction in overall material costs, potentially due to the adoption of more efficient equipment, fixed assets, and technologies. Moreover, in the short term, an increase in output in the mining industry corresponds to a 1.911 rise in material

costs. In the medium term (with a two-period lag), the model indicates that both higher fixed capital investments and increased output may led to a rise in material costs within the mining sector.

Table 2. Indicators of the VAR model for the dependent variable "material costs"

Economic sectors	Time lag in one period			Time lag in two periods		
	output	investments in fixed capital	material costs	output	investments in fixed capital	material costs
Mining industry	1.911	-2,027	-0,518	0,302	1,430	0,188
Manufacturing industry	-2,679	1,716	0,243	2,161	1,859	-1,002
Agriculture	-0,172	1,235	-0,566	3,021	-1,195	0,064
Construction	-0,214	-0,169	0,252	0,476	0,338	-0,169
Trade	5,464	0,484	0,531	-6,320	3,377	-0,002
Power supply	0,504	0,313	0,178	2,035	-1,392	0,015
Transport	1,673	-1,456	0,568	1,531	0,060	-0,544
Waters upply	1,714	1,356	-0,162	-2,353	1,222	0,150
Note – calculated by the authors using the VAR model						

In the manufacturing industry, in the short term, a negative impact of output on material costs (-2.679) was found, and at the same time, a positive impact of investments in fixed capital on material costs (1.716). In the case of a two-period time lag, both output and investments have a positive impact on material costs. That is, an indirect confirmation of the efficiency of production in the manufacturing industry may be a reduction in costs due to economies of scale in the short term.

Taking into account a time lag of 2 periods, in agriculture, investments have a negative impact on material costs (-1.195). In the short term (a time lag of 1 period), a statistically significant positive impact of investments on material costs was found (1.235). It should be noted that investments have a greater impact on material costs in the long term. In contrast, output in agriculture had a slight negative effect on material costs in the short term, but a substantial positive impact in the long term.

In the construction industry, a negative relationship was found between the logarithm of material costs and the logarithms of output and investments in fixed capital of the previous year (a time lag of 1 period). In this context, it can be inferred that a rise in production scale and investment volume results in lower costs in the construction sector. However, in the long term, both output and investment growth contribute to an increase in material costs.

The evaluation of the vector model revealed a significant positive impact of the growth of turnover on the material costs of the trade sector in the short term and a negative impact in the long term. At the same time, in trade, investments in fixed capital lead to an increase in material costs.

Modeling of energy supply indicators revealed a negative impact of investments in fixed capital on material costs in the long term (-1.392). It can be assumed that an increase in investments in fixed capital leads to technological improvement in the quality of energy supply and a reduction in electricity generation costs.

In the transport sector, a negative impact of investments in fixed capital in the previous period on material costs was found in the current period (-1.456). However, in the long term, investments in fixed capital do not lead to significant changes in material costs. The volume of transport services has a positive impact on material costs both in the short and long term.

When modeling the studied indicators in the water supply sector, a negative coefficient of the impact of output on material costs was obtained in the long term. Investments in fixed capital did not show a negative impact on material costs in water supply.

The correlation between investments in fixed capital and the volume of production/output of goods/services across economic sectors is quite high and can be used to forecast output volume, investments, and material costs based on historical data. The forecast of production volumes of goods (products, services) for the next five periods is presented in Figure 3.

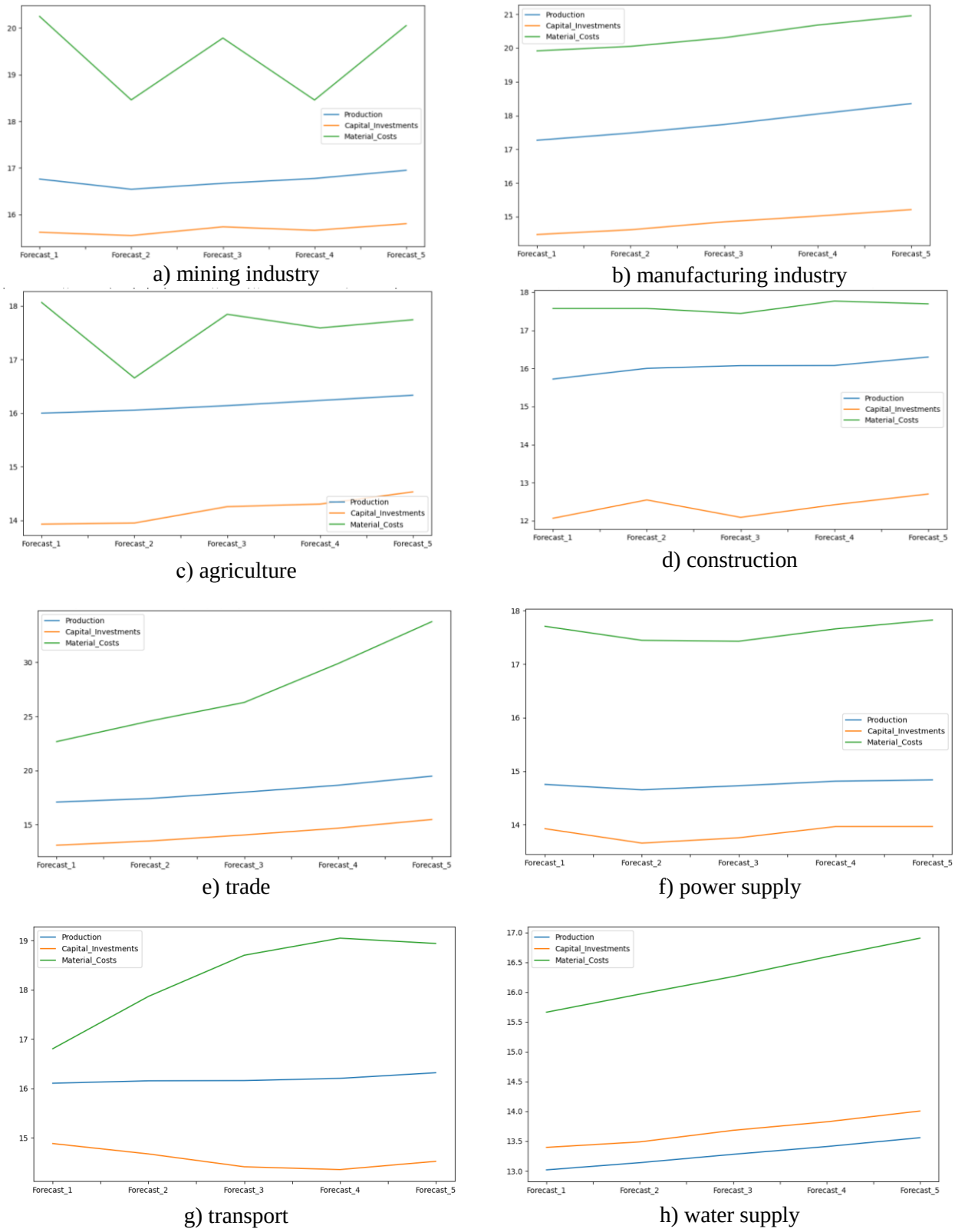


Figure 3. Forecast of investments in fixed capital, output and material costs, calculated using the VAR model for the next five periods

Note – compiled by the authors

The forecast results demonstrate the industry-specific nature and diverse dynamics of projected production volumes, investments in fixed capital, and material costs. According to the calculated forecast, the highest growth in production volumes is expected in the trade and manufacturing sectors. The largest increase in

investments in fixed capital is expected to be in trade, manufacturing, construction, and agriculture. A decrease in material costs of production is forecast in agriculture, mining, and construction.

Conclusions

This study analyzed the structure of fixed capital investments across economic sectors in Kazakhstan. It identified a disproportionate increase in investment share within the non-productive sector, particularly in real estate activities, while the share of investment in industry nearly halved from 2000 to 2023.

Econometric modeling results indicated a positive impact of fixed capital investments on production growth (goods and services) in the manufacturing industry over both the short and long term, in the mining sector over the long term, and in trade over the short term. Investments showed a minor positive impact on output in agriculture and water supply over both short and long terms, in construction over the short term, and in trade over the long term. However, a negative impact of investment on output was found in the electricity supply and transport sectors. Consequently, our initial hypothesis was only partially confirmed: statistically significant positive impacts of investment on production growth were found in three economic sectors of Kazakhstan.

The vector autoregression (VAR) model results partially supported the hypothesis that investments drive sectoral quality improvements by reducing material costs. Specifically, a negative relationship was found between the logarithm of fixed capital investments and the logarithm of material costs in the mining, construction, and transport sectors over the short term, as well as in agriculture and electricity supply over the long term. In these sectors, increased investments appear to reduce material costs for production. However, in manufacturing, trade, and water supply, investments were associated with rising material costs.

These findings suggest that Kazakhstani economy exhibits both extensive and intensive growth patterns. Increased investments boost production volumes in certain sectors, while in others, investments lead to reduced material costs, potentially due to productivity gains, technological advancements, and reduced energy consumption.

Acknowledgments

This research was funded by the National Bank of the Republic of Kazakhstan (Grant "Optimal level of investment to achieve sustainable economic growth in Kazakhstan". Agreement No.237 NB 29.05.2024)

References

Aghion, P. & Howitt, P. (1992). A Model of Growth Through Creative Destruction. *Econometrica, 60*(2), 323–351. https://doi.org/10.2307/2951599

Al-Banna, Adnan, Yaqot Mohamed, & Menezes Brenno, C. (2024). Investment strategies in Industry 4.0 for enhanced supply chain resilience: an empirical analysis. *Cogent business & management*, 11, 1. https://doi.org/10.1080/23311975.2023.2298187

Baneliene, Ruta, Melnikas, Borisas, Strazdas, Rolandas, & Tolocka, Eligijus (2018). Innovation activities and the impact of investment in R&D on the economic growth: Assessment and modelling. *Terra Economicus*, *16*(4), 66–76. https://doi.org/10.23683/2073-6606-2018-16-4-66-76

The Investment Policy Concept of the Republic of Kazakhstan until 2026. Retrieved from https://adilet.zan.kz/rus/docs/P2200000482

Emako, Ezo, Nuru, Seid, & Menza, Mesfi (2022). The effect of foreign direct investment on economic growth in developing countries. *Transnational corporations review*, *14*(4), 382–401. https://doi.org/10.1080/19186444.2022.2146967

He, Yizhou & Yoo, Tae Hwan (2024). Financial development impact on domestic investment: does income level matter? *Cogent business & management,* 11, 121–135. https://doi.org/10.1080/23322039.2024.2321811

Krasnopeeva, N.A. & Nazrullaeva, E.Yu. (2014). Modeling the impact of fixed capital investment on material costs in US industries. *HSE economic journal*, 1, 102–132. Retrieved from https://ideas.repec.org/a/scn/025886/15693626.html

Lucas, R. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22,* 3–42. Retrieved from https://www.parisschoolofeconomics.eu/docs/darcillon-thibault/lucasmechanicseconomicgrowth.pdf

National Development Plan of the Republic of Kazakhstan until 2029. Retrieved from https://adilet.zan.kz/rus/docs/U2400000611#z732

Sağdıç, E.N., Karaş, G., & Yıldız, F. (2021). The Impact of Investment Incentives on Regional Economic Growth in Turkey: An Empirical Analysis. *Sayıştay Dergisi*, *32*(121), 39–64. https://doi.org/10.52836/sayistay.966483

Temirbayev, B., Zagal, K., & Akhmetzhanova, S. (2021). Investment climate of Kazakhstan: trends of change. *Kazakhstan — Spectrum*, 4, 64–82. Retrieved from https://journal-ks.kisi.kz/index.php/ks/article/view/56

UNCTAD (2024). World investment report 2024. Investment facilitation and digital government. Retrieved from https://unctad.org/publication/world-investment-report-2024

Vertakova, Yulia, Klevtsova, Maria, & Zadimidchenko, Anna. (2022). Multiplicative Methodology for Assessing Investment Attractiveness and Risk for Industries. *Journal of risk and financial management*, 15, 10. https://doi.org/10.3390/jrfm15100419

Zhang, Yu, Li ,Yihang, & Zhang, Kun. (2024). The impact of host country institutional quality on OFDI: Evidence from China. *Journal of international trade & economic development*, 14, 51–64. https://doi.org/10.1080/09638199.2024.2320156

Г.М. Калкабаева[1], А.К. Атабаева[2], А.К. Курманалина[3], Alhassan Tijani Forgor[4]

[1,2,3]Академик Е.А. Бөкетов атындағы Қарағанды университеті, Қарағанды, Қазақстан;
[4]Мәскеу политехникалық университеті, Мәскеу, Ресей

[1]Kalkabayeva_G@buketov.edu.kz, [2]Atabayeva_Assiya_1@buketov.edu.kz,
[3]Kurmanalina_Anar@buketov.edu.kz, [4]atijaniforgor@gmail.com

[1]https://orcid.org/0000-0002-5954-0787,

[1]Scopus Author ID: 57205624512,

[1]Researcher ID: AAY-5116-2020

Салалық инвестициялардың, өнімнің және шығындардың VAR-модельдері негізінде модельденуі

Аңдатпа:

Мақсаты: Мақалада негізгі капиталға жасалған инвестициялардың динамикасы мен құрылымы талданған, сонымен қатар инвестициялардың Қазақстан экономикасының салаларындағы өнім (қызмет) көлемі мен материалдық шығындарға әсер ету дәрежесі анықталған.

Әдісі: Салалық инвестицияларды талдау эмпирикалық және статистикалық әдістер негізінде айқындалды. Инвестициялардың өнім шығару мен материалдық шығындарға әсерін зерттеу VAR-модельдерін құру негізінде жүргізілді. Зерттеудегі факторлар арасындағы байланысты бағалау үшін ең кіші квадраттар әдісі (OLS) қолданылды. Модельдің сапасын бағалау үшін AIC, BIC, HQIC ақпараттық критерийлері мен t-статистикасы арқылы есептелді.

Қорытынды: Зерттеу нәтижесінде негізгі капиталға жасалған инвестициялардың салалық таралуындағы диспропорциялар анықталды, яғни өндірістік емес салаларға инвестициялар басым екені байқалды. VAR-моделін құру негізінде негізгі капиталға жасалған инвестициялардың өнім көлеміне ең маңызды оң әсері қысқа мерзімде сауда саласында, қысқа және ұзақ мерзімде өңдеу өнеркәсібінде, ал ұзақ мерзімде тау-кен өндіру өнеркәсібінде байқалатыны анықталды.

Тұжырымдама: Алынған нәтижелер инвестициялардың әсері бойынша экономика салаларының біркелкі емес екенін көрсетеді: қысқа мерзімде инвестициялардың материалдық шығындарды азайтуға әсері тек тау-кен өндіру, құрылыс және көлік салаларында, ал ұзақ мерзімде ауыл шаруашылығы мен энергетика салаларында анықталды. Есептелген болжамға сәйкес, өнім көлемінің ең үлкен өсімі сауда және өңдеу өнеркәсібі салаларында болады деп күтілуде. Негізгі капиталға жасалған инвестициялар көлемінің ең үлкен өсімі сауда, өңдеу өнеркәсібі, құрылыс және ауыл шаруашылығы салаларында болуы мүмкін.

Кілт сөздер: инвестициялар, өндіріс, салалар, материалдық шығындар, инвестициялардың әсері, VAR-моделі.

Г. Калкабаева[1], А. Атабаева[2], А. Курманалина[3], Alhassan Tijani Forgor[4]

[1,2,3]Карагандинский университет имени академика Е.А. Букетова, Караганда, Казахстан;
[4]Московский политехнический университет, Москва, Россия

[1]Kalkabayeva_G@buketov.edu.kz, [2]Atabayeva_Assiya_1@buketov.edu.kz,
[3]Kurmanalina_Anar@buketov.edu.kz, [4]atijaniforgor@gmail.com

[1]https://orcid.org/0000-0002-5954-0787,

[1]Scopus Author ID: 57205624512,

[1]Researcher ID: AAY-5116-2020

Моделирование отраслевых инвестиций, выпуска и затрат с применением VAR-моделей

Аннотация:

Цель: В статье анализируются динамика и структура инвестиций в основной капитал, а также определяются степень влияния инвестиций на объемы производства продукции (услуг) и материальные затраты в отраслях экономики Казахстана.

Методы: Анализ отраслевых инвестиций осуществлен на основе эмпирических и статистических методов. Исследование влияния инвестиций на выпуск и материальные затраты проведено на основе построения VAR-моделей. Для оценки межфакторной связи в исследовании был использован метод наименьших квадратов (OLS). Оценка качества модели проведена с помощью расчета информационных критериев AIC, BIC, HQIC, t-статистики.

Результаты: Выявлены диспропорции в секторальном распределении инвестиций в основной капитал с преобладанием инвестиций в непроизводственный сектор. На основе построения VAR-модели было обнаружено, что наиболее значимое положительное влияние инвестиций в основной капитал на объемы производства/выпуска наблюдаются в торговле в краткосрочном периоде, в обрабатывающей промышленности в краткосрочном и долгосрочном периодах, а также в горнодобывающей промышленности в долгосрочном периоде.

Выводы: Полученные нами результаты свидетельствуют, что отрасли экономики по эффекту влияния инвестиций неоднородны: влияние инвестиций на снижение материальных затрат в краткосрочном периоде установлено только для горнодобывающей промышленности, строительства и транспорта, в долгосрочном — в сельском хозяйстве и энергоснабжении. Согласно рассчитанному прогнозу наибольший рост объемов производства характерен для сферы торговли и обрабатывающей промышленности. Наибольшее увеличение объемов инвестиций в основной капитал предположительно может быть в торговле, обрабатывающей промышленности, строительстве и сельском хозяйстве.

Ключевые слова: инвестиции, выпуск, производство, отрасли, материальные затраты, эффекты инвестиций, VAR-модель.