ISSN 1648-2603 (print)
ISSN 2029-2872 (online)

VIEŠOJI POLITIKA IR ADMINISTRAVIMAS
PUBLIC POLICY AND ADMINISTRATION
2025, T 24, Nr. 2 / 2025, Vol. 24, Nr. 2

HIGHER EDUCATION POLICY AND ITS IMPACT ON MACROECONOMIC DEVELOPMENT: EVIDENCE FROM KAZAKHSTAN

Gulbakhyt Olzhebayeva
Almaty Management University,
Rozybakiyeva st. 227, 050000, Almaty, Kazakhstan

Peter Karácsony
Obuda University,
Tavaszmező st. 15-17, Budapest, Hungary

Alexander Tsoy
University of International Business,
Abaya st. 8a, 050000, Almaty, Kazakhstan

Kuralay Nurgaliyeva
University of International Business,
Abaya st. 8a, 050000, Almaty, Kazakhstan

DOI: 10.13165/VPA-25-24-2-03

Abstract. Higher education plays an important role in building human capital and stimulating economic growth. The aim of this research is to examine the impact of the relationship between the higher education policy and Kazakhstan's macroeconomic development by focusing on key economic indicators. The study employs a macroeconomic approach, using secondary statistical data from official sources, including the Bureau of National Statistics of Kazakhstan and the QS World University Rankings. A panel data set covering the period from 2001 to 2023 enables an analysis of the long-term trends. The results show that higher education reforms have contributed to reducing the number of universities, strengthening academic autonomy and increasing the international competitiveness of universities. However, structural problems remain, such as an insufficient adaptation of educational programmes to the demands of the labour market, limited research funding and insufficient integration of innovation into universities. These findings suggest that policymakers should focus on improving higher education financing mechanisms,

strengthening the integration of universities with the labour market and increasing their contribution to the development of national innovation. Future research may focus on the impact of higher education policies on employment and income growth, as well as the long-term effects of the digitalisation of education on adaptations to the labour market.

Keywords: higher education, education policy, macroeconomic development, human capital, public investment.

Reikšminiai žodžiai: aukštasis mokslas, švietimo politika, makroekonominė plėtra, žmogiškasis kapitalas, valstybės investicijos.

Introduction

Higher education is a key factor in innovative development, economic growth and the formation of human capital (Lueddeke 1999; Pitman 2014; Orazbek et al. 2023). Universities perform a dual function: providing training for qualified specialists, on the one hand; and forming a research base that promotes technological progress on the other. However, the effectiveness of the higher education system largely depends on the state's educational policy, which should ensure that the curricula meet the requirements of the labour market and support innovation and research (Ojha 2022; Olo et al. 2022).

Previous studies have highlighted the importance of higher education for macroeconomic development, noting the impact of public investment, university integration and the level of innovation. The increase in university funding contributes to the growth of the GDP and innovation activity, but in Kazakhstan, this indicator remains below the average level of the OECD countries (Hanushek and Woessmann, 2015). At the same time, the discrepancy between the training of specialists and the requirements of employers leads to an imbalance in the labour market (Abdiraiymova et al. 2020; Jonbekova et al. 2020). In countries with an active involvement of universities in R&D, stable economic growth is seen, but in Kazakhstan, the investment in research is low, limiting the impact of higher education on the country's macroeconomic performance (Ashirbekova and Nurmukhanova, 2022; Liu et al. 2024).

Over the past two decades, Kazakhstan's higher education system has undergone significant structural changes. Due to reforms, the number of universities decreased from 180 in 2003 to 112 in 2023. The introduction of the Bologna Process in 2010 made it possible to bring the educational standards in line with international standards and to increase student mobility. In 2018, a policy of academic autonomy was introduced, giving the universities more independence in relation to their curriculum development, financial management and scientific research. At the same time, there was an increase in international integration in the QS World University Rankings and the number of universities increased significantly, which indicates an increase in their competitiveness abroad. Despite the reforms that

were carried out, there is still insufficient research on how the educational policy affects key macroeconomic indicators, including the average income, employment and innovation activity. The existing research does not adequately explain which mechanisms of the educational policies have the most significant impact on economic development and which factors can enhance that effect.

The aim of this research is to examine the impact of the relationship between the higher education policy and Kazakhstan's macroeconomic development by focusing on key economic indicators. This study employs a quantitative analysis, including descriptive statistics, correlations and a regression analysis, to examine the relationship between the country's higher education policy and its macroeconomic development. Adopting a macroeconomic approach, the research utilises secondary statistical data from official sources, covering the period 2001 to 2023, to assess the long-term trends and economic impacts. This work contributes to the literature by addressing gaps in the research on the macroeconomic impact of higher education, assessing the interactions between the educational policy and macroeconomic factors, and offering empirically-based recommendations for optimising investments in education and improving the policies.

Literature Review

The higher education system, as one of the main factors of economic growth and social progress, plays a key role in the development of human capital. In economic theory, the theory of human capital formulated by Becker (1964) and later developed by Lucas (1988) and Romer (1990) had the greatest impact on studies focusing on the role of education. Becker's (1965) concept of human capital considers education as an investment that leads to increased labour productivity. Modern research highlights that investments in education not only enhance the skills of employees, but also contribute to technological innovation and the growth of productivity (Hanushek and Woessmann 2015).

Further developments in the theory of human capital have led to an understanding of the indirect effects of higher education on the economy. In particular, Lucas (1988) emphasised that increasing the population that has completed higher education promotes the dissemination of knowledge, accelerating scientific and technological progress and increasing innovation activity in a country. Thus, education plays a significant role in endogenous economic growth models, where knowledge accumulation and innovation drive long-term development (Romer 1990; Lueddeke 1999).

The rapid development of technology and the transition to a post-industrial economy have increased the demand for highly-qualified specialists (Haughton 1990). However, structural unemployment has arisen in several countries due to the inadequacy of graduates' skills to meet the requirements of the labour market (Lewis 1992). According to Saint-Paul (1996) less-educated workers are more likely to be unemployed than skilled

professionals. Similarly, education generally improves the employability but can also extend the unemployment duration for graduates with specialised skills that are not aligned with the immediate labour market demands (Altindag et al. 2022).

During this period, many countries began to develop government strategies to reduce youth unemployment through higher education reforms, including the introduction of vocational training programmes, cooperation with employers and an increase in the number of universities (Aamodt and Arnesen 1995; Yano 1997). Furthermore, the theoretical foundations of human capital were formed in parallel with the expansion of mass higher education which, in developing countries, led to problems such as a decrease in the quality and the emergence of diploma factories (Kerr 2001; Grolleau et al. 2008). In the European Union, educational reforms have been aimed at standardising educational programmes within the framework of the Bologna Process (Pitman 2014).

The effectiveness of higher education is largely determined by the level of public investment (Song, 2019). Research has indicated that countries with well-funded, high-quality education systems tend to experience sustained economic growth (Castelló-Climent and Hidalgo-Cabrillana 2012). However, the approach to financing higher education varies significantly in different countries. Higher education has been viewed as a market service in the United States and the UK, where students are viewed as consumers (Dougherty and Natow 2020). In China and South Korea, universities receive a significant public investment, allowing them to become leading research centres (Liu et al. 2024).

Despite active reforms in higher education, Central Asian countries continue to face several structural challenges that have limited their competitiveness on the international stage. One of the problems is the low competitiveness of the universities represented in international rankings, such as the QS World University Rankings, which is increasing, with the gap between leading and regional universities remaining significant (Hou 2021). In Central Asia, new technologies are created through grant programmes and increased funding for promising areas, which contributes to economic growth (Hwami et al. 2024).

The existing literature on the labour market demand and higher education in Kazakhstan highlights the fact that undergraduate-level training is generally sufficient for entry-level positions, although some sectors prefer advanced degrees (Abdiraiymova et al. 2020). However, employers are increasingly emphasising the need for practical skills, critical thinking and digital literacy, revealing a gap between the academic training and labour market expectations (Jonbekova et al. 2020; Kireyeva et al. 2024).

Kazakhstan's integration into the Bologna Process in 2010 and the subsequent modernisation of the country's higher education were intended to improve the labour market alignment by introducing standardised degree structures, expanding academic mobility and encouraging research-driven innovation. While these reforms enhanced the educational accessibility and global competitiveness, research indicates they have not fully addressed the mismatch between university curricula and the needs of employers (Uzhegova and Baik 2022). Despite the increased state investment in higher education, research suggests

its impact on innovation-driven economic growth remains constrained (Ashirbekova and Nurmukhanova 2022). Factors such as limited research funding, weak industry-academia collaborations and insufficient R&D commercialisation are contributing to this challenge. Additionally, there is a complex structural organisation of Kazakhstan's education system, which requires searching for new ways to solve its problems and achieve further development (Saparova et al. 2023).

The literature review confirms that higher education is a key factor in economic growth and innovative development. However, its impact is largely determined by the effectiveness of government policies. Kazakhstan's reforms in the field of higher education have made it possible to increase the nation's competitiveness, but challenges remain regarding the financing of science, integration with the labour market and the modernisation of educational programmes. The lack of empirical data from the region limits the possibilities for a comprehensive analysis of the ' effectiveness of educational reforms.

Research Methodology

In this study, a macroeconomic approach was used to assess the long-term impact of higher education policies on economic development. The research is focused on analysing structural changes at the national level, rather than the characteristics of individual educational institutions. This approach enables a comprehensive evaluation of how higher education policies influence key economic indicators, including employment, income distribution and investments in research and innovation. The findings will contribute to evidence-based policymaking, supporting the development of strategies aimed at enhancing human capital and improving economic sustainability.

The study is based on secondary statistical data from official sources, including the Bureau of National Statistics of the Republic of Kazakhstan and the QS World University Rankings. The period from 2001 to 2023 provides a sufficient time frame to analyse long-term trends in the higher education sector and to assess the outcomes of policy reforms. The period of 2001-2023 was a time of key higher education reforms in Kazakhstan, including the transition to the Bologna Process (2010) and the university modernisation programme (2017–2023). This allows for an assessment of the long-term impact of policy changes on macroeconomic indicators.

Based on the research aim of examining the impact of the higher education policy on Kazakhstan's macroeconomic development through key economic indicators, the following hypothesis are proposed:

H1: An increase in the number of universities reduces unemployment.

H2: Higher public investments in education raise the average income.

H3: Higher education expansion boosts innovation activity.

H4: Public investments improve the higher education system.

Data selection and key indicators

The choice of macroeconomic indicators was determined by their importance for the public policy and strategic economic planning. These indicators provide insights into general economic trends, the effectiveness of the public investment in education and the contribution of higher education to economic growth. The key indicator in this study was the public investment in education as a percentage of the GDP, which reflects the priority of education in the national policy and its role in human capital development. Also, cross-sectional data such as the Gini index, average income and unemployment rate were included to provide a broader social and economic context and to further illustrate the structural imbalances.

The study employed descriptive and statistical methods to analyse the trends in higher education and the macroeconomic indicators. The descriptive statistics included an analysis of the central trends (mean, median and mode) and distribution characteristics. Python and SPSS were used for the data processing, which provided accurate calculations and a convenient visualisation of the results. Missing values were processed using the multiple imputation method, which avoided shifting the results.

The data set included the dependent variables presented in Table 1.

Table 1. Descriptive statistics

Variable	Description	N	Minimum	Maximum	Mean	Median	Log (Mean)
YEAR	Year of the observation	23	2001	2023	2012	2012	7.606
HIGH_ED	Number of universities	23	112	185	145	139	4.977
STUD	Number of students	23	491,470	784,512	623,097	620,053	13.342
FACUL	Number of teaching staff	23	34,508	43,382	39,167	38,470	10.575
COVER	Higher education coverage (%)	23	43	67	54	53	4.007
UNEMPL	Unemployment rate (%)	23	5	10	6	5	1.945
AVER_INC	Average income (KZT)	23	17,303	364,295	119,572	101,263	11.692
GDP_EDU	GDP in the education sector (KZT)	23	118,227	5,337,073	1,260,962	886,296	14.048

Variable	Description	N	Minimum	Maximum	Mean	Median	Log (Mean)
EXPEN	R&D expenditure (KZT)	23	7154	172,586	56,429	51,253	10.941
INNOV_ ACTIV	Innovative activity (%)*	21	2	12	7	8	2.08
GINI	Gini index (%)	23	0.27	0.37	0.296	0.290	-0.866
*Data recorded since 2003							

The study employed a correlation and regression analysis to study the relationship between the higher education policy and economic development, which allowed for an in-depth study of the cause-and-effect relationship between the investment in education and the economic performance. The structure of the study is shown in Figure 1.

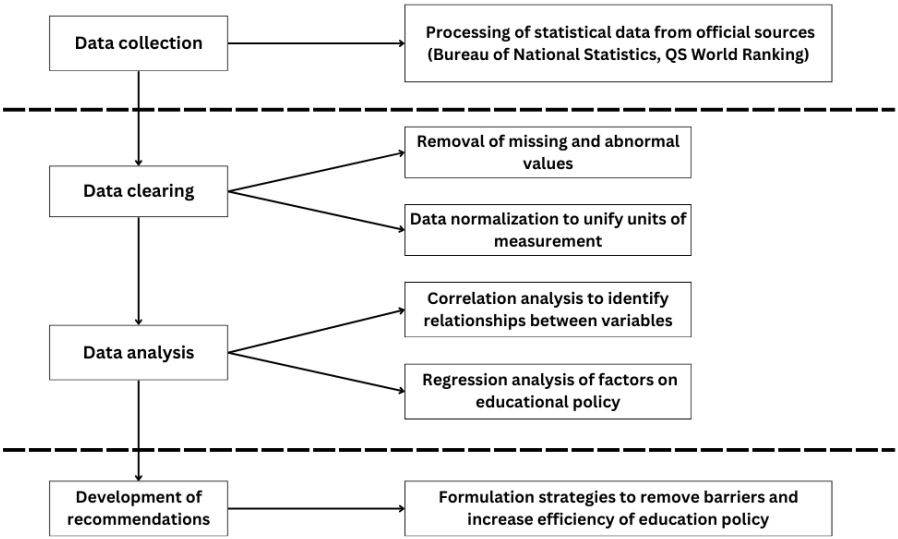

Figure 1. Stages of the research implementation

According to the presented scheme, the study consisted of four key stages. These stages included data collection, data purification, data analysis and the development of recommendations. The first stage involved collecting statistical data from official sources, as well as ensuring the sample's representativeness and reliability. After the data was collected, it was cleaned to improve the accuracy of the analysis. At this stage, missing values were eliminated and data normalisation was performed to ensure the correctness of the subsequent calculations.

Next, the data was analysed using correlation and regression methods.

A correlation analysis was used to assess the relationship between key variables, including the number of higher education institutions, public investment in education, innovation activity, unemployment and the average income. Based on these correlations, an econometric model was developed to examine the impact of educational and economic factors on the average income, unemployment and innovation activity, where *Y* represented the dependent variable. Independent variables included indicators reflecting the education level, human capital investments and socio-economic factors. Additionally, control variables reflecting temporal and institutional effects, such as the GDP in the education sector, were also included.

During the analysis, a correlation matrix containing Pearson correlation coefficients (ρ) demonstrated the degree of linear dependence between the variables. Based on the results of the correlation analysis, regression modelling was conducted to quantify the impact of educational policies on the macroeconomic indicators. A regression analysis was chosen as the primary method because it quantified the relationship between the dependent and independent variables.

Multiple regression models were employed to estimate the effect of the higher education policy on social and economic development. The regression model followed the general form (1):

$$Y = +\beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n + \epsilon \quad (1)$$

where:

Y – the dependent variable;

x_1, x_2 ...x_n – independent variables;

β_0 – the constant of the model;

β_1 β_2 ,...β_n – the regression coefficients that measured the impact of each independent variable on Y.

ε – the error term.

A key limitation of this study was that the dataset spanned 23 years, restricting the temporal scope of the analysis. While this time frame provided valuable insights into long-term trends, the absence of earlier data limited the ability to conduct a more historical assessment and to analyse the evolution of higher education policies over a broader period of time. Additionally, another limitation was the trade-off between the sample size and the model's stability. Attempts to expand the data set led to a decrease in the statistical reliability of the estimates due to errors, so the final sample size was chosen based on an optimal balance between reliability and the availability of data. The results served as the basis for developing recommendations to improve the educational policy in order to integrate universities with the labour market and to increase investments in research.

Analysis and Results

Analysis of the dynamics of higher education policy developments in Kazakhstan

The development of academic mobility programmes, expansion of international cooperation in the fields of science and education, and the active participation of Kazakh universities in the world rankings are all important. The dynamics of the involvement of Kazakh universities in the global rankings confirms the effectiveness of the ongoing reforms. For example, the QS World University Rankings showed that in 2010, only two universities from Kazakhstan were included in this ranking; but 24 years later, there were already 16 universities included. This indicates the growing competitiveness of Kazakh higher education on the international stage. For a more detailed analysis of the dynamics of change in the higher education system, see Table 2.

Table 2. *Leading indicators of higher education in Kazakhstan in 2003, 2008, 2013, 2018 and 2023*

Year	Higher education institutions	Faculty	Total students	Higher education institutions (%)	Faculty growth (%)	Students growth (%)
2003	180	40,972	665,843	0.0	0.0	0.0
2008	143	37,814	645,648	-20.56	-7.71	-3.03
2013	128	41,635	561,068	-28.89	1.62	-15.74
2018	124	38,275	586,661	-31.11	-6.58	-11.89
2023	112	37,391	635,151	-37.78	-8.74	-4.61

The results obtained demonstrate how the reforms have affected structural changes in higher education and what trends can be traced over the long-term period. In general, there has been a decrease by -37.78% in the number of universities operating in Kazakhstan. This trend may reflect the increased quality requirements for teaching, increased competition for personnel and the redistribution of resources among universities. During the study period, the number of faculty members decreased by -8.74%, which may also indicate the increased quality standards for teachers and the competition to hire faculty at universities. The total number of Bachelor's, Master's, and Doctoral students also showed a negative trend (-4.62). However, within this structure, there were multi-directional trends. The number of undergraduate students increased by 14.2% (from 31,950 in 2013 to 36,491 in 2023), indicating a growing interest in higher education programmes and an increasing importance of academic specialisation. Interestingly, the largest growth was seen in the segment of Doctoral students, as their numbers increased significantly (400 to 5966).

These trends highlight the change in the model of higher education in Kazakhstan: the transition from a quantitative expansion to a qualitative development of the scientific and educational environment. This has been transforming the approaches to university

management and requires a further analysis of the public policy in the field of education. Therefore, attention should be paid to the globalisation of higher education, which encourages universities to increase their competitiveness and their quality indicators.

One of the key tools for assessing the international status of higher education institutions is the QS World University Rankings, which take into account criteria such as the academic reputation, teaching quality, scientific productivity and the level of international cooperation. As is shown in Figure 2, there has been a steady increase in several Kazakh universities represented in the QS Rankings from 2010 to 2024.

According to the analysed period for 2010-2024, there have been significant dynamic changes in the participation of Kazakhstani higher education institutions in international rating systems, such as QS World University Rankings. From 2010 to 2013, the integration of Kazakh universities into international rankings was limited and characterised by a small number of represented universities. However, between 2014 and 2018, the participation remained relatively stable, probably reflecting the process of the universities adapting to international standards and efforts to improve the quality of education and research. Since 2020, the number of Kazakhstan's represented universities has increased sharply in the QS Rankings, resulting from successful reforms aimed at improving educational programmes, developing the country's scientific potential and strengthening international competitiveness. These changes can be considered as a result of the state policy in higher education, including measures to encourage universities to meet the global standards, improve the quality of their educational services and increase scientific productivity.

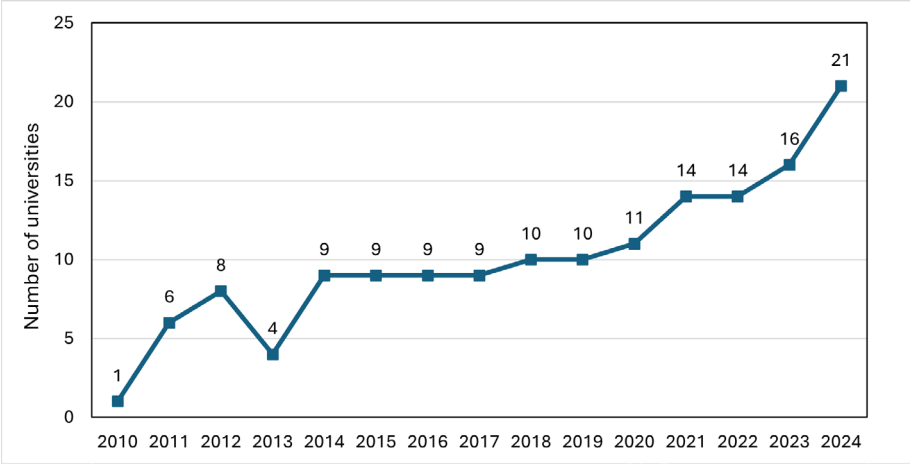

Figure 2. Kazakhstani universities in the QS Rankings for 2010-2024

Next, let us consider Kazakhstan's position in the QS Rankings among CIS countries, to assess the dynamics of the government policy and its impact on the competitiveness of universities (Figure 3).

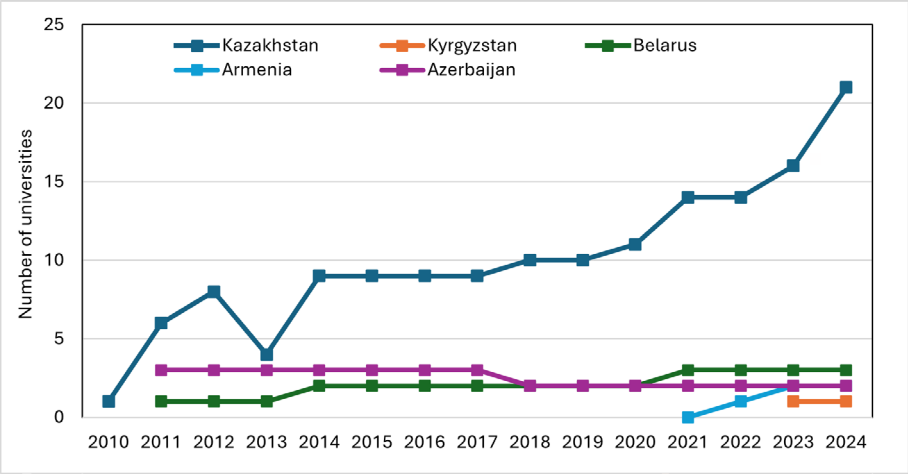

Figure 3. Dynamics of the number of universities participating in the QS Rankings for 2010-2024

According to the data, Kazakhstan has demonstrated a significant increase in the number of universities represented in the rankings since 2020. This indicates the effectiveness of educational reforms aimed at increasing the country's international competitiveness. The number of universities included in the rankings in other CIS countries remains relatively stable. It should be noted that Belarus has a limited number of represented universities, which may be due to the slow pace of their reforms. Armenia and Kyrgyzstan have shown a gradual increase in the universities included in the rankings since 2019, which may result from reforms aimed at improving the quality of higher education. Uzbekistan, Turkmenistan and Tajikistan are not included in the lists, although they had similar starting conditions. Thus, Kazakhstan stands out among the CIS countries in terms of the growth dynamics of the number of universities in the international rankings.

Analysis of the relationship between the higher education policy and macroeconomic factors

Higher education acts as a strategic tool for the formation of human capital, the development of innovations and economic growth. The education policy is linked with macroeconomic indicators such as unemployment, technical progress and economic well-being. Investments in education foster an upskilling of the workforce, which stimulates economic development and reduces social inequality. The relationship between the higher education system and macroeconomic indicators is essential for research on the educational policy. In this regard, the factors influencing the higher education system in Kazakhstan will be considered in a correlation analysis (Table 3).

Table 3. Correlation matrix of indicators

	YEAR	HIGH_ED	STUD	FACUL	COVER	UNEMPL	AVER_ INC	GDP_ ED	EXPEN	INNOV	GINI
YEAR	1.0										
HIGH_ED	-0.934	1.0									
STUD	-0.574	0.782	1.0								
FACUL	-0.816	0.799	0.549	1.0							
COVER	0.482	-0.214	0.248	-0.323	1.0						
UNEMPL	-0.900	0.965	0.758	0.702	-0.223	1.0					
AVER_INC	0.938	-0.814	-0.372	-0.769	0.469	-0.738	1.0				
GDP_EDU	0.824	-0.683	-0.238	-0.682	0.385	-0.596	0.958	1.0			
EXPEN	0.928	-0.833	-0.419	-0.732	0.385	-0.755	0.986	0.948	1.0		
INNOV	1.0	-0.893	-0.548	-0.739	0.545	-0.864	0.882	0.747	0.875	1.0	
GINI	-0.934	0.683	0.708	0.416	0.203	0.730	-0.309	-0.214	-0.362	-0.392	1.0

Based on the presented results, the following conclusions have been drawn.

1. *Unemployment (UNEMPL)*

The relationship between the level of higher education and unemployment (0.965) indicates structural discrepancies between the educational programmes and the labour market. These disparities could be caused by a lack of mechanisms for graduates to adapt to changing economic conditions or the insufficiency of an applicability approach in the higher education system. As a result, educational policy reforms are needed to modernise the educational programmes, develop a double-degree education system, and to strengthen interactions between universities and employers (Abdiraiymova et al. 2020).

2. *Average income (AVER_INC)*

Economic growth and a population's standard of living significantly depend on the dynamics of the average income. The positive correlation with time (0.938) reflects a long-term trend toward income growth. Still, its negative relationship with the higher education level (-0.814) indicates potential challenges facing the effectiveness of educational investments.

The inconsistency between the professional skills of graduates and the labour market needs limits the employment opportunities for highly-paid positions (Olo et al. 2022). It also leads to a decrease in the efficiency of educational investments. Therefore, the applicability of knowledge, as well as strengthening the mechanisms for integrating universities with the real sector of the economy, such as joint educational programmes with industrial partners and professional internships, should be applied to the educational strategy.

3. *R&D expenses (EXPEN)*

The high positive correlation between the level of R&D funding and a population's income (0.986) indicates a direct linkage between the country's economic growth and its R&D expenditure. However, the negative correlation between universities and the volume of R&D funding (-0.833) requires a detailed analysis of the mechanisms of budget redistribution and the effectiveness of educational reforms, as it indicates an insufficient integration of the university sector with research and innovation activities, which leads to a limited involvement of universities in the development and implementation of advanced technologies (Ashirbekova and Nurmukhanova 2022).

4. *Innovative activity (INNOV_ACT)*

The capacity growth of innovations is the principal factor for sustainability that contributes to the competitiveness of a national economy. A high positive correlation with the time frame (0.972) means active developments in science and technological advancements and efficient state mechanisms for innovative activities. However, the negative high correlation between higher education and innovative activity (-0.893) demonstrates there are barriers at universities, such as insufficient levels of research commercialisation, weak links between universities and industry, and inefficient technology transfers (Jonbekova et al. 2020).

5. *Education expenditure from the GDP (GDP_EDU)*

The accumulation of intellectual capital depends on education investments. A high

positive correlation with the income (0.820) confirms that increasing educational funding leads to economic prosperity. However, the negative relationship with the Gini index (-0.214) requires an additional analysis to assess its efficiency in decreasing social inequality.

Next, a regression analysis was conducted after excluding the variables that demonstrated multicollinearity and lacked a statistically significant relationship with the higher education system. Table 4 demonstrates that the proposed model fits well (R = 0.988).

Table 4. Model summary and coefficients

Model	R	R Square	Adjusted R Square	Std. Error	Change Statistics			
					R Square Change	F Change	df1	df2
1	0.988	0.976	0.972	4.117	0.976	260.147	3	19
1	Variable	Unstandardised Coefficients (B)	Standardised Coefficients (Beta)	Std. Error	t	Sig.	95% Confidence Interval for B (Lower Bound)	95% Confidence Interval for B (Upper Bound)
1	Constant	40.217		7.329	5.487	<0.001	24.876	55.558
1	STUD	7.317E-5	0.242	0.000	6.304	<0.001	0.000	0.000
1	GDP_ EDU	-4.262E-7	-0.237	0.000	-5.278	<0.001	0.000	0.000
1	UNEMPL	10.226	0.713	0.687	14.891	<0.001	8.788	11.663

The included indicators explain 97.6% of the variance in the number of higher education institutions. The adjusted R^2 (0.972) confirms the robustness of the model, after accounting for the number of predictors. The standard error of the estimate is relatively small, indicating a high level of accuracy in the model. The F-statistic ($F = 260.147$, $p < 0.001$) suggests that the overall model is statistically significant. Additionally, the p-values for all the predictors are below 0.001, confirming their statistical significance.

According to Figure 4, the number of higher education institutions (HEIs) positively correlates with both student enrolment and unemployment, indicating an ambiguous impact on the labour market.

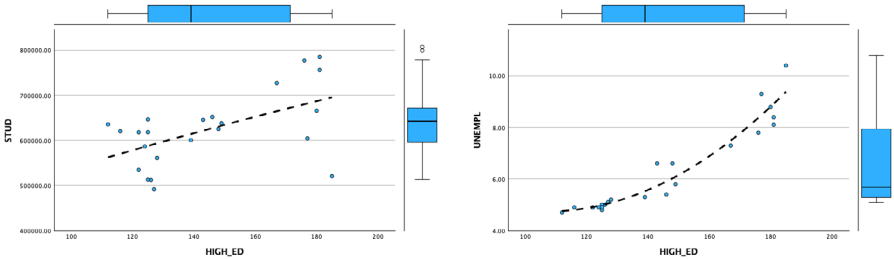

Figure 4. Impact of higher education on unemployment and student numbers

Mass accessibility of higher education, when not aligned with the industrial demand, leads to labour market imbalances (Grolleau et al. 2008). Therefore, a decline in student numbers may enhance the educational quality, producing more highly-skilled graduates with greater competitiveness in the labour market and ultimately reducing unemployment (Uzhegova and Baik 2022). However, according to the B coefficient (7.317E-5), increasing the number of students in the long term leads to increasing HEIs.

Furthermore, with a B coefficient of 10.226, increasing the number of HEIs does not decrease unemployment; in fact, it could even enhance it (Altindag et al. 2022). As a result, the country has more graduates than the workplace, and the optimisation of universities enhances the quality of education and contributes to a lowering of the unemployment rate.

Figure 4 shows the impact of higher education on unemployment and student numbers.

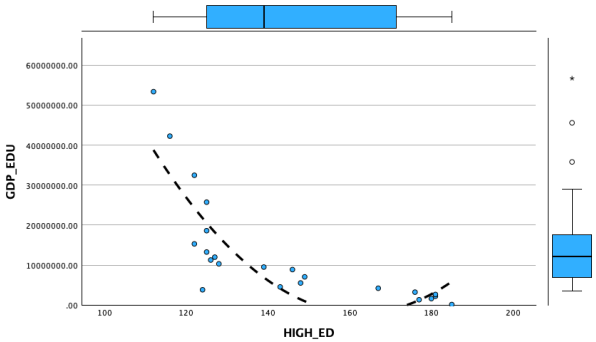

Figure 4. Impact of higher education on unemployment and student numbers

One unanticipated result was that the analysis revealed a negative correlation between the public investment in education (GDP_EDU) and the number of higher education institutions (Figure 5), with B = 4.262E-7. This suggests that an increase in public education funding does not necessarily lead to the expansion of HEIs. Thus, this finding contradicts previous research, in which a higher education investment is associated with institutional

growth (Song 2018). In this context, this indicator is an important signal for management structures about the need for a detailed analysis of the effectiveness of the public investment in education, including an assessment of its impact on the quality of trained specialists and the long-term economic effects.

Thus, the following results were achieved:

H1: An increase in the number of universities reduces unemployment – *rejected.*

H2: Higher public investments in education raises the average income – *confirmed.*

H3: Higher education expansion boosts innovation activity – *rejected.*

H4: Public investments improve the higher education system – *rejected.*

Conclusions

The results of the study confirm the key role played by higher education in the economic development of Kazakhstan. An analysis of the dynamics of the educational policy has shown that reforms aimed at optimising the university system contributed to the growth of the international competitiveness of Kazakh universities. However, structural challenges remain, including an insufficient integration of educational programmes with the labour market needs, limited funding for research, and an imbalance between many graduates and the demand for qualified personnel.

Policymakers should therefore consider the following:

1. The growing presence of Kazakhstani universities in the international rankings confirms the success of the internationalisation policy, but further integration with the global academic space is an urgent task.
2. Increased investments in R&D are key factors in stimulating innovation growth and long-term economic development. The government should provide targeted financing for applied research, while supporting technology transfers and taking measures to strengthen the cooperation between universities and industry partners.
3. To increase the efficiency of investments in higher education, we need to optimise the allocation of resources and to balance quality and accessibility. Strategic financial models should be developed to ensure a fair funding distribution and support the competitiveness of universities.

Future research should focus on a more detailed analysis of the causal relationship between higher education policies and macroeconomic indicators, particularly in the context of employment rates and income growth. A comparative study involving other developing countries could provide additional information. In addition, further research would be advisable in order to conduct a comparative study involving other developing countries, as well as to study the long-term effects of the digitalisation of higher education and its impact on the adaptability of the workforce.

This research was funded by the Science Committee MSHE RK (Grant titled "Modernisation of the quality assurance system of higher education in Kazakhstan based on digitalisation: development of approaches, mechanisms and an information base" BR24992974).

REFERENCES

4. Aamodt, P. O. and Arnesen, C. Å. "The Relationship between Expansion in Higher Education and the Labour Market in Norway." *European Journal of Education*, 1995, Vol. 30, No. 1, p. 65–76. https://doi.org/10.2307/1503568
5. Abdiraiymova, G. S., Verevkin, A. V. and Lifanova, T. Yu. "Graduates of Kazakhstani Universities Through the Eyes of Employers." *Siberian Socium, 2020,* Vol. 4, No. 4, p. 8–21. https://doi.org/10.21684/2587-8484-2020-4-4-8-21
6. Altindag, Duha T., Dursun, B. and Filiz, Elif S. "The Effect of Education on Unemployment Duration." *Economic Inquiry*, 2022, Vol. 60, No. 1, p. 21–42. https://doi.org/10.1111/ecin.13027
7. Ashirbekova, D.A. and Nurmukhanova, G.Z. "Financing high education in the context of new challenges." *Bulletin of Turan University*. 2022, Vol. 1, p. 297-305. https://doi.org/10.46914/1562-2959-2022-1-1-297-305
8. Becker, G. S. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. Chicago: University of Chicago Press, 1964.
9. Castelló-Climent, A. and Hidalgo-Cabrillana, A. "The role of educational quality and quantity in the process of economic development." *Economics of Education Review*, 2012, Vol. 31, No. 4, p. 391–409. https://doi.org/10.1016/j.econedurev.2011.11.004
10. Dougherty, K. J. and Natow, R. S. "Performance-Based Funding for Higher Education: How Well Does Neoliberal Theory Capture Neoliberal Practice?" *Higher Education*, 2020, Vol. 80, p. 457–78. https://doi.org/10.1007/s10734-019-00491-4
11. Grolleau, G., Lakhal, T. and Mzoughi, N. "An Introduction to the Economics of Fake Degrees." *Journal of Economic Issues*, 2008, Vol. 42, No. 3, p. 673–693. https://doi.org/10.1080/00213624.2008.11507173
12. Hanushek, E. A. and Woessmann, L. *The Knowledge Capital of Nations: Education and the Economics of Growth*. Cambridge, MA: MIT Press, 2015.
13. Haughton, G. "Skills Shortage and the Demographic Timebomb: Labour Market Segmentation and the Geography of Labour." *Area*, 1990, Vol. 22, No. 4, p. 339–45. http://www.jstor.org/stable/20002891
14. Hou, A. Y. C., Hill, C., Justiniano, D., Yang, C. and Gong, Q. "Relationship Between 'Employability' and 'Higher Education' from Global Ranker and Accreditor's Perspectives – Does a Gap Exist Between Institutional Policy Making and Implementation in Taiwan Higher Education?" *Journal of Education and Work*, 2021, Vol. 34, No. 3, p. 292–312. https://doi.org/10.1080/13639080.2021.1922619
15. Hwami, M., Yeszhanova, S., Amanzhol, M., Okafor, C. E. and Tursynbayeva, M. "Internationalization of Higher Education in Central Asia: A Systematic Review." *Central Asian Survey*, 2024, Vol. 43, No. 3, p. 400–419. https://doi.org/10.1080/02634937.2024.2317830
16. Jonbekova, D., Sparks, J., Hartley, M. and Kuchumova. G. "Development of

University-Industry Partnerships in Kazakhstan: Innovation Under Constraint." *International Journal of Educational Development, 2020, Vol. 79,* 102291. https://doi.org/10.1016/j.ijedudev.2020.102291

17. Kerr, C. *The Gold and the Blue: A Personal Memoir of the University of California, 1949-1967. Volume 1: Academic Triumphs*. Berkeley: University of California Press, 2001.
18. Kireyeva, A., Kenzhegulova, G., Kozhirova, S., Vasa, L. and Sabdenaliyev, B. "Assessing emotional intelligence in higher education: policy recommendations for Kazakhstan's education system." *Public Policy and Administration*, 2024, Vol. 23, No. 4, p. 490-507. https://doi.org/10.13165/VPA-24-23-4-05
19. Lewis, J. "Skill Shortages and the Re-Training Needs of the Unemployed: A Local-Labor Market Study." In: C. H. A. Verhaar, L. G. Jansma, M. P. M. De Goede, J. A. C. Van Ophem and A. De Vries (eds.). *On the Mysteries of Unemployment: Causes, Consequences and Policies*. *Studies in Operational Regional Science*, Vol. 10. Dordrecht: Springer, 1992, p. 438–451.
20. Liu, Z., Chen, S., Tang, T., Luo, H. and Guan, Q. "How Public Education Investment and Advanced Human Capital Structure Affect Regional Innovation: A Spatial Econometric Analysis from the Perspective of Innovation Value Chain." *Socio-Economic Planning Sciences*, 2024, Vol. 91, p. 101800. https://doi.org/10.1016/j.seps.2023.101800
21. Lucas, R. E. "On the Mechanics of Economic Development." *Journal of Monetary Economics*, 1988, Vol. 22, No. 1, p. 3–42. https://doi.org/10.1016/0304-3932(88)90168-7
22. Lueddeke, G. R. "Toward a Constructivist Framework for Guiding Change and Innovation in Higher Education." *The Journal of Higher Education*, 1999, Vol. 70, No. 3, p. 235–+. https://doi.org/10.2307/2649196
23. Ojha, V. P., Ghosh, J. and Pradhan, B. K. "The Role of Public Expenditure on Secondary and Higher Education for Achieving Inclusive Growth in India." *Metroeconomica*, 2022, Vol. 73, No. 1, p. 49–77. https://doi.org/10.1111/meca.12353
24. Olo, D., Correia, L. and Rego, M. C. "(Mis)match Between Higher Education Supply and Labour Market Needs: Evidence from Portugal." *Higher Education, Skills and Work-Based Learning*, 2022, Vol. 12, No. 3, p. 496–518. https://doi.org/10.1108/HESWBL-02-2021-0032
25. Orazbek, Y., Zakirova, D. and Grinevich, Y. "Development of human capital in Kazakhstan's higher education institutions: financial investments, faculty qualifications, and research output (2018–2022)." *Bulletin of Turan University*, 2024, Vol. 3, p.335-347. https://doi.org/10.46914/1562-2959-2024-1-3-335-347
26. Pitman, T. "Reinterpreting Higher Education Quality in Response to Policies of Mass Education: The Australian Experience." *Quality in Higher Education*, 2014, Vol. 20, No. 3, p. 348–63. https://doi.org/10.1080/13538322.2014.957944
27. Romer, P. M. "Endogenous Technological Change." *Journal of Political Economy*, 1990, Vol. 98, No. 5, p. S71–S102. https://doi.org/10.1086/261725
28. Saint-Paul, G. "Unemployment and Increasing Private Returns to Human Capital." *Journal of Public Economics*, 1996, Vol. 61, No. 1, p. 1–20. https://doi.org/10.1016/0047-2727(95)01552-3
29. Saparova, N., Kireyeva, A.A., Orynbet, P., Alimbekova, G. and Amirova, A. "Analysis of the development level of higher educational institutions in the regions of Kazakhstan." *Problems and Perspectives in Management*, 2023, Vol. 21, No. 2, p. 244-256. http://dx.doi.org/10.21511/ppm.21(2).2023.26.
30. Song, X. "Analysis for Capital Investment Efficiency in Higher Education of Northeast

China Based on DEA Model." *Educational Sciences: Theory & Practice*, 2018, Vol. 18, No. 6, p. 3202–3208. https://doi.org/10.12738/estp.2018.6.223

31. Uzhegova, D. and Baik, C. "Internationalisation of Higher Education in an Uneven World: An Integrated Approach to Internationalisation of Universities in the Academic Periphery." *Studies in Higher Education*, 2022, Vol. 47, No. 4, p. 847–859. https://doi.org/10.1080/03075079.2020.1811220
32. Yano, M. "Higher Education and Employment." *Higher Education*, 1997, Vol. 34, No. 2, p. 199–214. https://doi.org/10.1023/A:1003089017197

G. Olzhebayeva, P. Karácsony, A. Tsoy, K. Nurgaliyeva

AUKŠTOJO MOKSLO POLITIKA IR JOS POVEIKIS MAKROEKONOMINEI PLĖTRAI: KAZACHSTANO PATIRTIS

Anotacija. Aukštasis mokslas vaidina svarbų vaidmenį kuriant žmogiškąjį kapitalą ir skatinant ekonomikos augimą. Šiuo tyrimu siekiama išsiaiškinti aukštojo mokslo politikos ir Kazachstano makroekonominės raidos santykio įtaką, daugiausia dėmesio skiriant pagrindiniams ekonominiams rodikliams. Tyrime naudojamas makroekonominis metodas, įvertinant antrinius statistinius duomenis paimtus iš oficialių šaltinių, įskaitant Kazachstano nacionalinio statistikos biuro ir QS World University Rankings duomenis. Duomenų rinkinys, apimantis laikotarpį nuo 2001 iki 2023 m., leidžia analizuoti ilgalaikes tendencijas. Rezultatai rodo, kad aukštojo mokslo reformos prisidėjo prie universitetų skaičiaus mažinimo, akademinės autonomijos stiprinimo, universitetų tarptautinio konkurencingumo didinimo. Tačiau išlieka struktūrinių problemų, tokių kaip menkas švietimo programų pritaikymas darbo rinkos poreikiams, ribotas mokslinių tyrimų finansavimas, nepakankama universitetų integracija į inovacijas. Šios išvados rodo, kad politikos formuotojai turėtų sutelkti dėmesį į aukštojo mokslo finansavimo mechanizmų tobulinimą, universitetų integracijos į darbo rinką stiprinimą ir jų indėlio į nacionalinę inovacijų plėtrą didinimą. Būsimi tyrimai gali būti skirti aukštojo mokslo politikos poveikiui užimtumui ir pajamų augimui, taip pat pritaikant ilgalaikį švietimo skaitmeninimo poveikį darbo rinkai.

Gulbakhyt Olzhebayeva, PhD candidate at the Almaty Management University
in Almaty, Kazakhstan.
E-mail: g.olzhebayeva@gmail.com

Péter Karácsony, Professor at the Obuda University
in Budapest, Hungary.
E-mail: karacsony.peter@uni-obuda.hu

Alexander Tsoy, Master at the University of International Business
in Almaty, Kazakhstan.
E-mail: alt@ayattranstrade.kz

Kuralay Nurgaliyeva, Dr Professor at the University of International Business
in Almaty, Kazakhstan.
E-mail: nurgalieva.k@uib.kz

Gulbakhyt Olzhebayeva – daktarė (PhD), Almatos vadybos universitetas, Almata, Kazachstanas
E. paštas.: g.olzhebayeva@gmail.com

Péter Karácsony – dr. Obuda universiteto profesorius, Budapeštas, Vengrija
E. paštas.: karacsony.peter@uni-obuda.hu

Alexander Tsoy – magistras, Almatos tarptautinio verslo universitetas, Almata, Kazachstanas
E. paštas.: alt@ayattranstrade.kz

Kuralay Nurgaliyeva – dr. Almatos tarptautinio verslo universiteto profesorė, Almata, Kazachstanas
E. paštas.: nurgalieva.k@uib.kz