

R.M. Tazhibayeva<sup>1</sup>, I.P. Kenzhebekova<sup>2</sup>, B.N. Sabenova<sup>3</sup>, M.Zh. Toktibayeva<sup>4</sup>, B.Zh. Keneshbayev<sup>5\*</sup>

<sup>1,5</sup>*Khoja Akhmet Yassawi International Kazakh-Turkish University, Turkestan, Kazakhstan*  
<sup>2,3,4</sup>*Peoples' Friendship University named after Academician A. Kuatbekov, Shymkent, Kazakhstan*

<sup>1</sup>*raihan.tajibaeva@ayu.edu.kz*, <sup>2</sup>*kenzhebek.indira@mail.ru*, <sup>3</sup>*gulka07\_06@mail.ru*,  
<sup>4</sup>*madi8385@mail.ru*, <sup>5</sup>*keneshbayev\_bektur@ayu.edu.kz*

<sup>1</sup><http://orcid.org/0000-0002-1837-6706>, <sup>2</sup><http://orcid.org/0000-0001-7277-779X>,

<sup>3</sup><http://orcid.org/0000-0001-6905-3475>, <sup>4</sup><https://orcid.org/0000-0003-4358-335X>

<sup>5</sup><https://orcid.org/0000-0002-4504-1418>

## The Effect of Fixed Capital Investment, Consumer Price Index, and Small and Medium Enterprises (SMEs) on Economic Growth (GDP) in Kazakhstan

### Abstract

**Object:** The object of the research is the effect of Small and Medium Enterprises (SMEs) on economic growth in terms of three different variables.

**Methods:** This research aims to analyze the effect of SMEs active in Kazakhstan on economic growth. For a better explanation, we also included fixed capital investments and the consumer price index in Kazakhstan in the research. We determined fixed capital investments, economic growth data, the Consumer Price Index (2000=100), the number of people employed by SMEs, the number of active SMEs, and the production of SMEs (Tenge) as the research variables. Research data was obtained from the database of the Bureau of National Statistics of the Agency of Strategic Planning and Reforms of the Republic of Kazakhstan. The data range is 2002-2020.

**Findings:** The research findings showed that only the number of employees out of the three variables had a statis

**Conclusions:** This result shows that the structuring and economic productivity of SMEs need to be examined in more detail within the framework of different variables.

**Keywords:** Kazakhstan, SMEs, GDP, Fixed Capital Investment, Consumer Price Index, Multivariate Regression.

### Introduction

This study examines the impact of Small and Medium Enterprises (SMEs) on Kazakhstan's economic growth. Kazakhstan gained its independence after the collapse of the Soviet Union and soon started a major transformation in its economic mentality. In this way, it expanded its economy and experienced a rapid and great transformation by integrating with the world economy. National economies such as Kazakhstan, which experienced a series of changes to adapt to the free market economy after the Soviets, were called transition economies (Kökocak, 2011). Since transition economies are a subject of interest, many academic studies have been conducted on different dimensions of economic growth (GDP) in Kazakhstan (Alagöz et al., 2011; Khan, et al., 2012; Mudarrisov & Lee, 2014; Özdil & Turdalieva, 2015; Xiong et al., 2015; Mukhamediyev & Spankulova, 2020; Kelesbayev et al., 2022a; Raihan & Tuspekova, 2022;).

Mukhtarov et al. (2020) emphasized that Kazakhstan managed to become the second country after Russia among the post-Soviet countries in terms of economic size. Economic growth based on natural resources alone is not enough for a country's wealth. Because when a country bases its economy only on oil and similar natural resource exports, it can be adversely affected by fluctuations in world oil prices. Studies on the effect of fluctuations in global oil prices on Kazakhstan's GDP also support this effect (Aldibekova, 2018; Bolganbayev et al., 2021; Kelesbayev et al., 2022b).

Kazakhstan owes its strong economic growth in the post-Soviet period not only to its natural wealth but also to the economic regulations it enacted. This study examines the impact of SMEs, which play an important role in the spread of economic growth and prosperity, on the economic growth of Kazakhstan.

SMEs play an important role in promoting, directing, managing, and mobilizing individual capital and savings in a country. Moreover, they are an important macroeconomic element for countries as a support and complement to large industrial and commercial enterprises. In addition, SMEs form the basis of a democratic and competitive market economy as a stabilizing factor that provides solutions to the political and social problems that may arise in society (İrten, 2007). In this context, many different definitions of Small and Medium Sized Enterprises have been made depending on the economic structure of the countries. In Kazakh-

\* Corresponding author's e-mail: [keneshbayev\\_bektur@ayu.edu.kz](mailto:keneshbayev_bektur@ayu.edu.kz)

stan, on the other hand, the definition of SME was determined by Law No. 124-III of January 31, 2006, on "Private Entrepreneurship".

Due to their low initial investment cost, easy establishment, rapid adaptation to innovation and technological development, spreading capital, balancing income distribution, more resistance to economic crises, and increasing economic welfare and employment, small and medium-sized enterprises (SMEs) are considered very important in Kazakhstan as well as all over the world (Taş & Karataş, 2021). In Kazakhstan, state and non-state institutions and organizations provide significant support for the development, growth, and expansion of SMEs (Kupzhassarov, 2018).

The variables examined in this study are the effects of SMEs on Kazakhstan's economic growth, number of employees, number of active enterprises, and production size/volume variables. The data range is 2002-2020. The relevant data were obtained from the World Bank database and the database of the Bureau of National Statistics of the Agency of Strategic Planning and Reforms of the Republic of Kazakhstan.

### **Literature Review**

Due to its importance, numerous academic studies have been conducted on the different dimensions of Kazakhstan's economic growth. These studies examined different variables that affect and interact with Kazakhstan's economic growth. Since it is not possible to mention all of them here, we will only mention the studies on SMEs.

Kupzhassarov (2018), in his Master's thesis, examined the contribution of SMEs to the development of the private sector in the transformation process of Kazakhstan. He discussed the economy of Kazakhstan, entrepreneurship in Kazakhstan, institutions supporting SMEs, the development and current situation of SMEs in Kazakhstan, the problems faced by SMEs, and their possible solutions.

Abdrakhmanova (2011), in his Master's thesis, examined the effects of being customer and innovation-oriented on the performance of SMEs in Kazakhstan. He provided information about the relationship between market orientation, customer orientation, innovation orientation, and the performance of SMEs and covered the subject in detail with an emphasis on Kazakhstan.

Dandybayev (2008), after giving general information about SMEs in his master's thesis titled "SMEs in Kazakhstan Economy and Their Problems", outlined the development of SMEs in Kazakhstan, their current situation, their place in the economy, and the development of support systems.

Aycı et. al. (2020), in their study entitled "Business environment and SME support programs in Central Asian Turkic Republics: A research on the development of SMEs and mutual trade", discussed the suggestions regarding the improvement of the business environment and SME support system in Kazakhstan.

Kökocak (2011) examined the issues related to the development model based on SMEs in transition economies. As a result, he proposed a development model based on the strategic importance of SMEs, based on the new business approach and focused on business structure, as a policy proposal for the economic development of the Central Asian Turkic Republics, which have the character of a transition economy.

Dikhanbayeva et. al. (2022), in their study titled "Analysis of Textile Production SMEs in Kazakhstan for Industry 4.0", examined the rapidly growing textile sector in Kazakhstan's light industry dominated by SMEs. They examined the sector in the context of Industry 4.0 and focused on the digitization rate of the sector and the possible contributions of digitalization to the sector.

Türkyılmaz et. al. (2021), in their study titled "Industry 4.0: Challenges and opportunities for Kazakhstan SMEs", examined the concept of Industry 4.0, its effects on SMEs and its applicability, and especially the Industry 4.0 readiness of SMEs in Kazakhstan.

Syzdykova et. al. (2021), in their study titled "Attractiveness and Difficulties of SMEs in Kazakhstan Economy", identified the current situation and problems of SMEs in Kazakhstan and suggested new solutions.

Kurmanov et. al. (2016), in their study titled "A Research on Innovation in Small and Medium-Sized Enterprises: The Case of Kazakhstan", identified the main factors that affect the innovative activities of SMEs in Kazakhstan and made a statistical analysis of innovative growth indicators in the Republic of Kazakhstan. In the meantime, they also made comparisons with the indicators of technologically developed countries.

Suleimenova et. al. (2017) discussed the participation of SMEs in Kazakhstan in corruption practices in their study titled "SMEs Development and Corruption: Case of Kazakhstan". They aimed to analyze the corruption perceptions of SME representatives by providing a clear picture of corruption in Kazakhstan. The respondents believed that corruption is widespread, but they state that they are rarely involved in it. They

concluded that representatives of SMEs in Kazakhstan see corruption as an acute problem, but are not ready to talk about their own experiences.

### Methods

The research aims to analyze the effect of SMEs actively operating in Kazakhstan on economic growth. To better explain this effect, fixed capital investment and consumer price index are also included in the research. Thus, the research variables were determined as follows:

X1	Fixed capital investments in directions of use
X2	Consumer price index (2000=100)
X3	Number of employed, thousand people
X4	Number of active subjects, units
X5	Output production, million tenge
Y	Economic growth (GDP)

While the fixed capital investments and economic growth data are obtained from the World Bank database (<https://data.worldbank.org/indicator/NE.GDI.FTOT.CD?locations=KZ>, <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=KZ>); consumer price index (2000=100), the number of SME employees, the number of active SMEs and the amount of SME production (Tenge) are obtained from the Bureau of National Statistics of the Agency of Strategic Planning and Reforms of the Republic of Kazakhstan (<https://stat.gov.kz/>). The data range is 2002-2020.

### Discussion and Results

Explanatory statistics are given in Table 1 and the changes over time are presented visually in Figure. Explanatory statistics show that all variables fit normal distribution according to the Jarque-Bera test. As can be seen from the Figure, all of the variables follow an exponential increase trend over time. In line with these observations and the literature, the logarithms of the variables were used in the analysis.

Table 1. Explanatory Statistics

	X1	X2	X3	X4	X5	Y
<b>Mean</b>	3,27E+10	254,5921	2094,442	832336,3	8184468	1,38E+11
<b>Median</b>	3,60E+10	240,5	1865,1	801362	2706686	1,48E+11
<b>Maximum</b>	5,18E+10	451,5	3116,7	1354825	27164535	2,37E+11
<b>Minimum</b>	5,92E+09	113,4	1176,1	323731	548708	2,46E+10
<b>Std. Dev.</b>	1,38E+10	107,6273	638,1626	331795,3	9300076	6,55E+10
<b>Skewness</b>	-0,740077	0,358008	0,409237	0,188345	0,993749	-0,384523
<b>Kurtosis</b>	2,449292	1,901472	1,738838	1,760171	2,439949	1,980998
<b>Jarque-Bera</b>	1,974525	1,361225	1,789506	1,329266	3,375514	1,290255
<b>Probability</b>	0,372595	0,506307	0,408709	0,514462	0,184934	0,524596

*Note: compiled by authors on the basis of research*

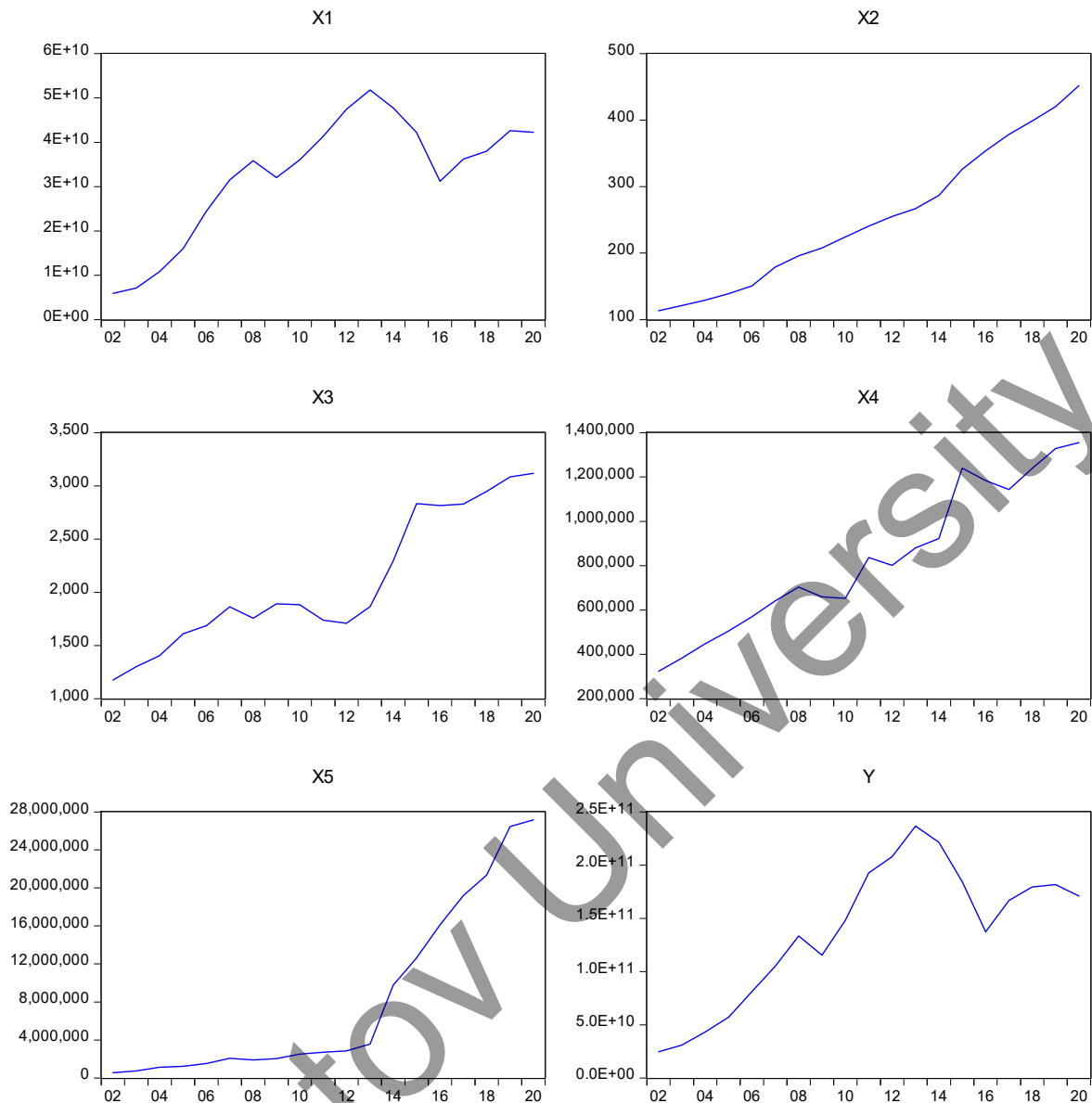


Figure. Line graph of the research variables

The first dimension of econometric time series to be analyzed is their stationarity. Because if a series is not stationary, the results do not reflect the truth and therefore they are misleading. Stationarity of a series is also an important criterion for models in which relationships between two or more variables are analyzed. The relevant variables must be at the same level and stationary. Therefore, various unit root tests have been developed to examine stationarity in time series. Augmented Dickey-Fuller (ADF) test was used in this study. The test statistic is obtained using the following equation:

$$\Delta Y_t = \beta_0 + \beta_1 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^m \Delta Y_{t-i} + \varepsilon_t \tag{1}$$

In the ADF test, if the null hypothesis is rejected for the  $k=0, 1, 3, \dots$  values, the series is considered stationary for the relevant level (Sevüktekin & Nargeleçekenler, 2007). The ADF test findings of the research variables are given in Table 2. The findings showed that LOGX1, LOGX3, and LOGY variables were stationary at the level, while LOGX2, LOGX4, and LOGX5 variables were stationary at the first difference. Since the difference levels of all variables were the same, the first differences of the variables were used.

Table 2. ADF Unit Root Test Findings of Research Variables

	Level		First Difference		Conclusion
	t- Statistics	P value	t- Statistics	P value	
LOGX1	-4,001375	0,0075	-1,934833	0,3099	I(0)
LOGX2	-0,934171	0,7527	-3,102844	0,0455	I(1)
LOGX3	-1,060069	0,7075	-3,140091	0,0436	I(0)
LOGX4	-1,873981	0,3359	-4,778333	0,0017	I(1)
LOGX5	-0,509786	0,8678	-3,520646	0,0205	I(1)
LOGY	-3,583295	0,0174	-2,407013	0,1544	I(0)
<b>Test critical values:</b>					
1% level	-3,857386		-3,886751		
5% level	-3,040391		-3,052169		
10% level	-2,660551		-2,666593		

Note: compiled by authors on the basis of research

Regression analysis aims to model the relationship between a dependent variable and independent variables and to produce estimations with this model. ANOVA (F) test is used to determine the significance of the model. The rate at which the independent variable explains the change in the dependent variable is expressed by the adjusted determination (adjusted R-squared) coefficient. Statistically, the significance of the variable coefficients (Beta coefficient) is determined by the student test.

In this study, the effect of SMEs on economic growth is examined step by step with four regression models and the models are given below:

$$\text{Model 1: } \Delta Y_t = \alpha + \beta_1 \Delta X_{1t} + \beta_2 \Delta X_{2t} \quad (2)$$

$$\text{Model 2: } \Delta Y_t = \alpha + \beta_1 \Delta X_{1t} + \beta_2 \Delta X_{2t} + \beta_3 \Delta X_{3t} \quad (3)$$

$$\text{Model 3: } \Delta Y_t = \alpha + \beta_1 \Delta X_{1t} + \beta_2 \Delta X_{2t} + \beta_3 \Delta X_{3t} + \beta_4 \Delta X_{4t} \quad (4)$$

$$\text{Model 4: } \Delta Y_t = \alpha + \beta_1 \Delta X_{1t} + \beta_2 \Delta X_{2t} + \beta_3 \Delta X_{3t} + \beta_4 \Delta X_{4t} + \beta_5 \Delta X_{5t} \quad (5)$$

The effect of the consumer price index and fixed capital investments on economic growth is included in all four models. Thus, the impact of SMEs on economic growth will be demonstrated more realistically.

In multivariate regression models, when there is a high level of correlation between independent variables, this is called the multicollinearity problem. Multicollinearity is important and needs to be fixed as it leads to inconsistent estimates. This problem can be detected by the condition index calculated using the eigenvalues of the correlation matrix. With the largest eigenvalue of the correlation matrix being  $\lambda_{max}$ ,

$$k = \sqrt{\frac{\lambda_{max}}{\lambda_i}}$$

the above condition index value is calculated for each eigenvalue of  $\lambda_i$ . A condition index exceeding 15 informs about the existence of negative effects related to multicollinearity, while a value above 30 indicates that remedial measures should be taken (Alpar, 2013). Multicollinearity findings of the research variables are given in Table 3. The findings show that there is no multicollinearity between the variables in the model.

Table 3. Multicollinearity Results of Research Variables

Dimension	Eigenvalue	Condition Index
1	3,941	1
2	0,915	2,075
3	0,48	2,866
4	0,421	3,061
5	0,186	4,604
6	0,057	8,327

Note: compiled by authors on the basis of research

In light of the information given about the multivariate regression, the findings regarding the effect of SMEs on economic growth are given in Table 3.

Table 4. Results of Regression Analysis on the Effect of SMEs on Economic Growth

Variables	Model 1		Model 2		Model 3		Model 4	
	Beta	t	Beta	t	Beta	t	Beta	t
X1	0,922	9,212 (p<0,05)	0,91	10,165 (p<0,05)	0,92	10,444 (p<0,05)	0,887	9,493 (p<0,05)
X2	0,011	0,112	0,066	0,708	0,079	0,859	0,05	0,525
X3			- 0,203	-2,186 (p<0,05)	- 0,298	-2,520 (p<0,05)	- 0,335	-2,720 (p<0,05)
X4					0,144	1,257	0,159	1,379
X5							0,108	1,042
F	42,485 (p<0,05)		37,053 (p<0,05)		29,338 (p<0,05)		23,841 (p<0,05)	
R <sup>2</sup>	0,850		0,888		0,9		0,909	
ΔR <sup>2</sup>	0,850 (p<0,05)		0,038 (p<0,05)		0,012 (p>0,05)		0,008 (p>0,05)	

Note: compiled by authors on the basis of research

The regression analysis findings in Table 4 show that the effect of fixed capital investment on economic growth is statistically significant in all four models. In Model 1, only fixed capital investment and consumer price index are used. Considering that the effect of only the consumer price index in this model is statistically insignificant, it can be said that according to Model 1, fixed capital investments explain 85 % of the variability in economic growth. The effect of the consumer price index on economic growth was found to be statistically insignificant in all four models. Therefore, the effect of SMEs on economic growth has been examined with three variables. Among these variables, the number of people working in SMEs is included in Model 2. The effect of this variable in Models 2, 3, and 4 were found to be statistically significant. The increase in the coefficient of determination by including the number of working people in the model was found to be statistically significant. The negative coefficient of the number of employed persons indicates that an increase in the number of SME employees has a decreasing effect on economic growth. The effect of the number of active SMEs and the production output of SMEs was not found statistically significant. Accordingly, the inclusion of two variables did not provide a statistically significant increase in the coefficient of determination.

### Conclusions

SMEs are structures that make significant contributions to the national economy, such as creating employment and providing a starting point for entrepreneurs. In this study, we examined the effect of SMEs on economic growth in terms of three variables (number of active firms, number of employees, and production). In addition, we aimed to better explain the effect by including the fixed capital investment and consumer price index, which are assumed to have an impact on economic growth and are closely related to SMEs.

The findings showed that among these three variables, only the effect of the number of employees on economic growth was statistically significant. Thus, it has been revealed that the increase in the number of employees in SMEs harms economic growth in Kazakhstan. This result proves the necessity of examining the structuring and economic productivity of SMEs in more detail within the framework of different variables.

In this study, SMEs were evaluated throughout the country. Regions can be included in statistical models and their effects can be evaluated by panel analysis methods. Thus, it can be argued whether the effect of SMEs varies from region to region.

Adding different variables to the research can also help us better understand the impact of SMEs on economic growth. In this framework, the impact of SMEs can be evaluated from a different perspective by including macro variables (such as population, the level of schooling, the level of health services, and the structure of household expenditures) as control variables.

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**Р.М. Тажибаева, И.П. Кенжебекова, Б.Н. Сабенова, М.Ж. Туктибаева, Б.Ж. Кенешбаев**

**Негізгі капиталға жұмсалған инвестициялардың, тұтыну бағасы индексінің және шағын және орта кәсіпорындардың (ШОК) Қазақстандағы экономикалық өсуге (ЖІӨ) әсері**

**Аңдатпа:**

**Мақсаты:** Зерттеу объектісі — үш түрлі айнымалы тұрғысынан шағын және орта кәсіпорындардың (ШОБ) экономикалық өсуге әсерін анықтау.

**Әдісі:** Зерттеу Қазақстандағы белсенді шағын және орта кәсіпкерлік субъектілерінің экономикалық өсімге әсерін талдауға бағытталған. Мәселені анық түсіндіру үшін зерттеуге Қазақстандағы негізгі капиталға жұмсалған инвестициялар мен тұтыну бағасының индексі де енгізілген. Зерттеу айнымалысы ретінде негізгі капиталға жұмсалған инвестицияларды, экономикалық өсім деректерін, тұтыну бағасының индексі (2000=100), ШОК субъектілерінің жұмыспен қамтылғандар санын, белсенді ШОК субъектілерінің санын және ШОК өндірісін (теңге) анықтаған. Зерттеу мәліметтері Қазақстан Республикасы Стратегиялық жоспарлау және реформалар агенттігінің Ұлттық статистика бюросының деректер базасынан алынған. Зерттеудегі деректер ауқымы 2002-2020 жылдар аралығын қамтиды.

**Қорытынды:** Зерттеу нәтижелері үш айнымалының ішінен, тек қызметкерлер саны ғана экономикалық өсудің статистикалық маңыздылығы мен әсерін көрсетті. ШОК саласында жұмыс істейтіндер санының кез келген өсуі экономикалық өсімге зиянын тигізетіні анықталған. Бұл үрдіс Қазақстанның бірегей экономикалық құрылымына тікелей байланысты.

**Тұжырымдама:** Зерттеу нәтижесі ШОК құрылымы мен экономикалық өнімділігін әртүрлі айнымалылар шеңберінде толығырақ қарастыру керек екенін көрсетеді.

**Кілт сөздер:** Қазақстан, шағын және орта кәсіпорын (ШОК), ЖІӨ, негізгі капиталға жұмсалған инвестициялар, тұтыну бағасының индексі, көпөлшемді регрессия.

**Р.М. Тажибаева, И.П. Кенжебекова, Б.Н. Сабенова, М.Ж. Туктибаева, Б.Ж. Кенешбаев**

**Влияние инвестиций в основной капитал, индекса потребительских цен и малых и средних предприятий на экономический рост ВВП в Казахстане**

**Аннотация**

**Цель:** Объектом исследования является влияние малых и средних предприятий (МСП) на экономический рост с точки зрения трех различных переменных.

**Методы:** Данное исследование направлено на анализ влияния МСП, действующих в Казахстане, на экономический рост. Для лучшего разъяснения были включены в исследование инвестиции в основной капитал и индекс потребительских цен в Казахстане. В качестве переменных исследования мы определили инвестиции в основной капитал, данные об экономическом росте, индекс потребительских цен (2000=100), количество занятых в МСП, количество действующих МСП и производство МСП (в тенге). Основные данные исследования были получены из базы данных Бюро национальной статистики Агентства по стратегическому планированию и реформам Республики Казахстан. Диапазон данных охватывает период с 2002 по 2020 гг.

**Результаты:** Результаты исследования показали, что только количество работников из трех переменных оказывает статистически значимое влияние на экономический рост. Было определено, что любое увеличение числа людей, работающих в МСП, вредит экономическому росту. Это напрямую связано с уникальной экономической структурой Казахстана.

**Выводы:** Данный результат показывает, что структурирование и экономическая эффективность МСП должны быть изучены более подробно в рамках различных переменных.

**Ключевые слова:** Казахстан, МСП, ВВП, инвестиции в основной капитал, индекс потребительских цен, многомерная регрессия.