Stock market and economic growth in Kazakhstan: is there a mutual dependence?

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Abstract

The mutual codependence between stock market development and the economic growth is empirically investigated in Kazakhstan. The study employs the Vector Autoregression technique (VAR) to test the relationship between economic growth (Industrial Production Index) and the stock market development in Kazakhstan. KASE Index is employed as an indicator of stock market development in Kazakhstan. Money Supply is employed as an additional macroeconomic variable besides Industrial Production Index. The credit spread is employed because of its anticyclical nature. It grows during recessions and decreases during an economic boom. Besides the aggregate data, oil and gas sectors' sample data is also employed, as these are the most important economic sectors in Kazakhstan. The results indicate that there is no significant mutual dependence between the Industrial Production Index and the stock market development indicator in Kazakhstan over the period between 2006 and 2022.

Keywords: dependence, Vector Autoregression, stock market, economic growth, mutual causality

Introduction

Financial sphere's effect on the economy or an impact of the economy on the sphere of finance may include both direct and indirect finance. And, in this particular study, the effects of stock market (direct finance) on or from the economy are investigated in such a developing country as Kazakhstan. Although there are many papers discussing relations between economic and financial variables, few studies deal with post-Soviet, Commonwealth of Independent State (CIS) countries. Such reasons might be mentioned as an underdeveloped stock market, lack of data, dependent market structure. However, Kazakhstan has its own well-functioning stock market and well-functioning financial system. The paper will contribute further on the studies about CIS economies as well as to the development of the economy and equity market in developing post-Soviet countries. The mutual codependence between stock market development and economic growth was investigated in

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Kazakhstan. And, the results confirm the fact that there is no any mutual causality between economic growth and stock market development in Kazakhstan.

Evolution of Gross Domestic Product and stock market

A stock market Index is an indicator of industrialization in a particular country. In some countries, it may include 200-300 corporations' stock; in other countries, it may have fewer corporations. KASE Index includes stock of ten Kazakhstan's corporations. The figure 1 below presents the capitalization of stock market in Kazakhstan. Focusing on the stock market development for the country, it should be noted that the presence of a developed stock market promotes the inflow of foreign investments to the national economy, which is extremely important for developing countries (Arefiev and Kuznetsov 2015). A stock investment tends to be pro-cyclical. And pro-cyclical investment behavior may accelerate the development in an economy. However, if investors behave in a counter-cyclical way to exploit the low-price advantage during a recession, they may affect the economy in an opposite way, improving economic conditions. Therefore, the study attempts to discuss the effect of stock markets on and from the economy and to compare the magnitudes of those impacts.

How the economy is measured? Gross Domestic Product (GDP), a widely used indicator, refers to the total gross value added by all resident producers in the economy. Growth in the economy is measured by the change in GDP at constant price. Many World Developing Indicators use GDP or GDP per capita as a denominator to enable cross-country comparisons of socioeconomic and other data. (World Bank Development Indicators, 2024)
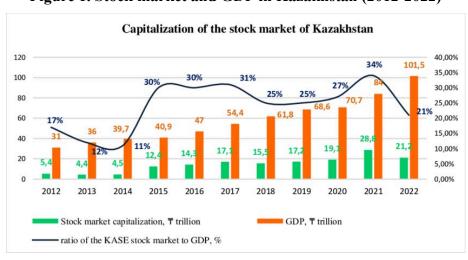
Figure 1. Stock market and GDP in Kazakhstan (2012-2022)

Source: Akanayeva (2024)

The dynamics of Kazakhstan's economy

When it comes to the economy of Kazakhstan; it should be noted that Kazakhstan's' Gross Domestic Product (GDP) rose dramatically in 2000-s because of oil export. The ratio of money supply (M2) to Gross Domestic Product also increased rapidly, from 13.3% in 1995 to 44.2% in 2007 International Monetary Fund Report (2012). We also have to mention that this article covers between 2006 and 2022. Kazakhstan's economy grew increasingly concentrated during the 2000s, in terms both of exports of natural resources and production development. Kazakhstan is an export-oriented country, which is mostly focused on natural resources. Between 2010 and 2014, the process of relative deindustrialization stopped and new major non-natural resource export products were discovered (OECD, 2017).

Kazakhstan has quickly achieved significant progress since 2000 towards realizing its long-term development ambitions. How it happened? Firstly, Gross domestic product (GDP) increased 3 times during 14-year period (between 2000 and 2014). Average monthly salaries rose between 2010 and 2015, pensions quadrupled, while the proportion of the population living on incomes below the subsistence level fell 11 times (OECD, 2017). That period of time (2000-2014) is known for an increase in domestic production, exports, and capital investment, which benefited from rising world prices for oil, minerals and metals (Kazakhstan's major exports) and the recovery in Kazakhstan. During a short period of time, the output of crude oil and gas condensate expanded by 15.1 percent, while output of gas rose by 25.5 percent to 5.7 billion cubic meters.

According to the National Bank Report (2017), since late 1999, the monetary policy has been designed and implemented to stimulate economic recovery while keeping inflation under control. National Bank of Kazakhstan worked hard to improve the situation. Four major policy measures were adopted by the central bank at that time.

- The refinancing rate was reduced three times in late 1999 and early 2000.
- The requirement that exporters must sell 50 percent of their export earnings to the central bank was abolished in November 1999.
- The reserve requirements for banks decreased from 10 to 8 percent of demand and time deposits. The monetary base has eased and growth of monetary aggregates has rapidly accelerated.
- Inflation slowed down because of three factors, which are: increased productivity, improved fiscal position, and the stable national currency.

It is universally accepted that any improvements in liquidity bring an enhanced economic boom. If we notice coincidental cyclical movements of financial variables connected to economic

development, such a phenomenon is referred to a procyclicality of financial variables (Landau 2009). When we notice greater procyclicality, it is treated as cyclical fluctuations with greater amplitude. Because of a high cost of procyclicality, which affects the economy, policy makers adopt and maintain countercyclical measures on financial variables to control business cycles (Athanasoglou et.al. 2013). The relationship between the economy and financial sector were actively studied by such authors as Rashid (2008), Dimitrova (2005), Hsing (2004), Ibragim and Aziz (2003), Abbasa et al. (2022), Wesiah et al. (2021) and Hondroyiannis and Papapetrou (2001). The results differ from each other. The current study adds value to literature by exploring a relationship between macroeconomic variables and stock market in Kazakhstan. The current study employed VAR technique as a main tool. The period of study is between 2006 and 2022 years.

Review of the literature

The relationship between financial sector and the economy were actively discussed in academia. Among them, Rashid (2008) discussed the idea of dynamic interaction between the economy and stock prices in such a developing/emerging country as Pakistan. The author used cointegration technique in his paper to test the long-term relationship between the economy and stock market indicators. The author reported the fact of cointegration between the stock prices and macroeconomic variables in Pakistan. Moreover, the author argued that well-functioning stock market facilitates economic growth. This is direct finance issue, which was popularized by other authors in academia as well. Dimitrova (2005), Hsing (2004), Ibragim and Aziz (2003), Abbasa et al. (2022), Wesiah et al. (2021) and Hondroyiannis and Papapetrou (2001) studied relationships between macroeconomic variables and stock market performance. The results those authors report differ from each other. Interestingly, Dimitrova (2005) discovered that stock prices and economic variables have negative relationships in the short run, but positive in the long run. Ibrahim and Aziz (2003) mentioned that stock market is playing a predictive role for macroeconomic variables. Hondroyiannis and Papapetrou (2001) presented an opposite view, which states that economic activity affects the performance of stock market (Hondroyiannis and Papapetrou 2001). Wesiah et al. (2021) proved empirically that there is a positive relationship between economic development and financial growth in Great Britain. Mutual causality between those variables was proved to work by authors in United Kingdom. Recently, Bhowmik and Wang (2020) mentioned that the stock market is a fundamental insulin in the economic activities today. It is a gauge meter employed to test the economy's well-being among a given calamity because it is the first market to send a signal of the growth of the

business trends to the policymakers. Therefore, the volatility of stock index returns is an important variable to measure adversity in an economy. In addition, Chaudhary et al. (2020) strengthened the claim that uncertainty in the markets is a view of the volatility of the stock markets, which has the highest bearing on investment and portfolio management analysis. Volatility usually indicates an economy's instability or uncertainty. Islam et al. (2023) investigated the impact of macroeconomic drivers, such as the gross domestic growth rate, inflation rate, and industrial production index, on the Dhaka stock exchange, i.e., through the usage of such techniques such as descriptive statistics, Pearson correlation analysis, and multiple regression analysis. They reported a significant and positive relationship between the Bangladesh Stock Market index and the GDP rate. It is confirmed that the GDP (Gross Domestic Product) is a key factor which affects the performance of the stock markets in such country as Bangladesh. Nichkasova (2022) confirmed the fact that world oil prices and total investment are the most powerful factors, which influence economic growth in Kazakhstan. The influence of the financial sector appears only after these two variables are employed in the regression. In addition, the main contribution to this study is the result, which shows that the direction of causation for Kazakhstan comes from economic growth towards the development of the local financial market. However, Akanayeva (2024) argue that there is the cause-and-effect relationship between the growth of real GDP and independent predictors. It indicates that the development of the stock market has a positive impact on the growth of the country's real GDP but is not the most important factor of Kazakhstan's economic growth.

The main idea in the literature is that developed and well-functioning financial systems facilitate economic growth. It is connected with reasoning of the new endogenous growth theorists. The causal relationship between financial depth and economic growth remains controversial despite the fact that it has been studied and saturated for a long period of time in literature. Such a difference might emanate from differences in methodological approaches and the data collection. Results differ greatly from study to study depending on different methods, tools, approaches and data collection techniques (Chukwu and Agu, 2009). Financial sector development is defined as the improvement in quantity, quality, and efficiency of financial markets and institutions' services (Calderon and Liu, 2002). Financial sector growth affects the growth of economic output in different ways: the volume of investment grows and the volume of savings grows as well (Goldsmith 1969). The finance and economic growth nexus have attracted global attention today in emerging and developing countries. There are different views related to the role of financial institutions and financial markets in promoting economic growth in the long-run.

Not only credits and lending (indirect finance), but an opportunity to raise funds in the capital

market is widely popular today. We refer it to direct finance. Levine and Zervos confirmed the fact that well-developed stock markets may be able to offer variety of financial services and also may facilitate an investment and growth. It may do it without an intervention of banks. (Levine and Zervos 1996). It was mentioned that increased stock market capitalization may improve an economy's ability to mobilize capital and diversify risk. They also mentioned that measures of stock market activity are positively correlated with measures of real activity and the correlation is stronger for developing and emerging countries. Those authors conclude that "stock market development explains future economic growth" (Alimpiev 2014).

Hessling and Paul (2006) mentioned that revolutionary changes in the sphere of financial markets, instruments, and institutions have stimulated further empirical investigations associated with the interaction of the financial and the "real" side of the economy. Authors primarily focused on updates and changes in financial markets and institutions. As it was mentioned, Bhowmik and Wang (2020) argued that the stock market serves as an insulin in the economic activities. According to those authors, it is the first market, which sends a signal of the growth or cycle of further business trends to policymakers. Thus, the volatility of stock index returns is a variable, which measures adversity in an economy. In addition, it should be mentioned that Chaudhary (2020) confirmed that uncertainty in the markets is a view of the volatility of the equity markets. Thus, volatility refers to an economy's instability and uncertainty.

Methodology and results

Following our review of literature, we assume that development of stock market affected the economy in Kazakhstan. We hypothesize the following three hypotheses:

- **Hypothesis 1:** There is a mutual causality between stock market and the economy (Gross Domestic Product)) in Kazakhstan.

- **Hypothesis 2:** There is a unidirectional causality so that stock market affects the economy in Kazakhstan.

- **Hypothesis 3:** There is a unidirectional causality so that the economy affects the stock market in Kazakhstan.

The development of the economy in Kazakhstan under the influence of negative external economic factors showed that the economic model that was created and improved in recent years proved unable to ensure the country's economic security in the face of sharp aggravation of the contradictions in the world financial system (Demeshev and Malakhovskaya, 2016).

This study employed two macroeconomic variables and one stock market development indicator, which is KASE Index. The data is of time series format. The macroeconomic factors include money supply in terms of M2 aggregate, Industrial Production Index (IPI). Besides three variables mentioned, the credit spread is employed as an indicator of economic conditions. It has anticyclical nature: credit spread increases during recessions and decreases during an economic boom.

The central model employed is VAR. As Bayramova (2010) mentioned, the vector autoregression (VAR) model is one of the most popular models, which were employed for the multivariate time series analysis due to its flexibility and successful forecast capability. All variables, which were employed in this model, are tested both on own lags and the lags of other variables. So, it is treated as a theoretical alternative to the structural models. VAR models were popularized in econometrics by Sims, who advocated a non-theoretical way of defining relationships between different time series (Sims, 1980).

Vector Autoregressive models and monetary transmission mechanism

When it comes to VAR (Vector autoregressive) model, it should be mentioned that Vector autoregressive (VAR) models were proposed initially by Sims (1980) and can be further employed to capture the dynamics and the interdependence of multivariate time series. It can be considered as a generalization of a system of autoregressive regression models. The employment of vector autoregressions by Christopher Sims was mainly aimed at analyzing the relationships between various macroeconomic variables. First of all, the author was interested in one of the most popular macroeconomic issues - the question of the impact of monetary policy on business activity. The main source of this discussion was the work of Milton Friedman and Anne Schwartz, in which they argued that the observed high correlation between the money supply (MS) and output indicates a unidirectional impact of monetary shocks on the real sector. It simply means that business fluctuations have a monetary nature. In addition, the shocks of monetary policy were considered as changes in monetary aggregates (Engle and Granger 2015). In the works of Christopher Sims, devoted to the analysis of monetary policy, change in his views on the issue was discussed. In the work of 1972, the existence of not only a high correlation of money supply and output, but also a unidirectional relationship characterizing the impact of monetary policy on business activity was revealed (Sims agreed with Friedman's and Schwartz's point of view). Conclusions were made on the basis of the main methodological innovation of this work - a direct test for the existence of a cause-effect relationship. But in his work of 1980, it was demonstrated that when the interest rate is

added to the number of regressors, the explanatory power of the money supply is significantly reduced. This conclusion contradicted the monetarist concept, according to which, monetary policy is responsible for exogenous shocks of the money supply, generating fluctuations in business activity (Lebedeva, 2015).

As it was mentioned, our study employed the VAR model as an estimator because the objective was to establish the causal effect of the stock market on economic growth and simulate the shocks to the system, and at the same time, to trace the effects of the shocks on the endogenous variables.

Results and discussion

The data is presented in table 1 below. The correlation matrix shows that the relationships among studied variables are insignificant. As it was mentioned, there are four main variables in the study. The data set covers seventeen years period from 2006 until 2022 on monthly basis. The more frequent the data, the more accurate results can be obtained from the model. This fact served as the motivation for taking monthly data. The study employed industrial production index as an economic variable and Index KASE as an indicator of stock market performance in Kazakhstan. Money Supply was employed as an additional economic parameter. Credit spread was employed as an indicator of economic conditions and it serves as an additional macroeconomic variable. Monthly data were collected in aggregate forms during January 2006 – December 2022 (204 observations) and also for the whole sample in levels, stock market index value, money supply and credit spread. In addition, the sample of oil and gas sector companies was studied. It is explained by the importance of oil and gas sector as a leading sector in Kazakhstan. The industrial production data were obtained from the National Bank of Kazakhstan. Index KASE data, as well as credit spread data were obtained from Bloomberg and LSEG respectively. The money supply data was obtained from LSEG as well. These monthly data were used for Vector Autoregressive (VAR) analysis to identify the direction of causality between the economic and financial variables. The level data are first transformed into logarithmic forms for the industrial production, and stock market index values. The first differenced data, and in some cases, monthly seasonal differenced data, are employed from the logarithmic data to assure stationarity of data sets in the VAR analysis.

The null hypothesis for ADF cannot be rejected both at a 1% and a 5% level of significance for IPI, Money Supply, KASE Index, and Credit spread. The log values of variables were taken. Only after this step was performed, all data showed stationarity at both significance levels. Both table 2 and table 3 below demonstrate unit root test results. Table 2 shows unit root for the raw data,

while table 3 shows the results of unit root test for logged data.

Table 1. Correlation matrix

	IPI	Money Supply	KASE Index	Credit spread
IPI	1			
Money supply	0.0723	1		
KASE Index	0.0827	0.0529	1	
Credit spread	0.0001	0.0003	-0.0001	1

Table 2. Unit Root Test

Unit root and stationarity	ADF (1%)	ADF (5%)	PP (1%)	PP (5%)
Critical values	-3.48	-2.88	-3.48	-2.88
IPI	1.26		1.02	
Money Supply	-1.10		1.08	
KASE Index	-1.66		1.01	
Credit spread	-1.89		-1.24	

Table 3. Unit Root Test

Unit root test	ADF (1%)	ADF (5%)	PP (1%)	PP (5%)
Critical values	- 3.48	-2.88	-3,48	-2,88
IPI	-4.98		-3.99	
Money Supply	-11.82		-11.62	
KASE Index	-10.96		-11.04	
Credit spread	-4.98		-4.79	

As mentioned earlier, the information criteria method is the best way to identify the proper lag length. LM   test was employed according to Akaike (1974), Schwarz' Bayesian (1978) information criterion, and Hannan-Quinn information criterion as well. The results help to determine the optimal lag length by looking at the smallest information criterion. The best lag length for all regressions is the one in which AIC and SBC show the lowest numbers. The minimal value is obtained at lag 1. Information criteria method was employed also to test the best lag length for other regressions and it was confirmed that the minimal value is obtained at lag 1 for all regressions in this study. Table 4 below shows residuals' correlation for all four variables studied.

Table 4. Residuals' correlation (from VAR model)

	IPI	Lending	KASE Index	CSP
IPI	1			
Money Supply	0.07	1		
RTS Index	0.09	-0.08	1	
CSP	0.03	-0.05	0.01	1

There are 204 monthly observations, which cover a ten-year period of time starting in January 2006 and finishing in December 2022. First of all, overall IPI was employed with overall aggregate M2, (money supply), credit spread, and KASE Index. After that, industrial data was employed based on two separate sectors: the oil and gas sector and the service sector. The results of the industrial IPI based on the industrial KASE Index and the industrial credit spread are demonstrated below. From the results below (Table 5 and Table 6), it is obvious that all coefficients are largely insignificant for the whole sample as well as for oil and gas industry sample. Table 5 demonstrates the results of the whole sample while Table 6 show the results for a sample of oil and gas sector firms.

Table 5. VAR Estimation Output based on whole sample 2006-2022

	IPI	MS	KASE	Credit spread
IPI	-0.1055	0.0754	-0.0165	0.0299
	(0.0865*)	(0.0976**)	(0.0199*)	(0.0188*)
	{-1.1543}	{0.9876}	{1.0276}	{0.9099}
MS	0.1165	0.1128	-0.1145	-0.1377
	(0.0876**)	(0.1324**)	(0.1277**)	(0.1199**)
	{0.9906}	{1.011}	{-1.2543}	{-1.2235}
RTS	0.1342	-0.1118	-0.1029	0.0726
	(0.1287**)	(0.1102*)	(0.1028*)	(0.0827*)
	{0.9982}	{-1.0726}	{1.0006}	{0.9726}
Credit Spread	-0.1009	-0.0827	-0.0827	0.0627
	(0.1082**)	(0.0899**)	(0.0966**)	(0.0728**)
	{0.9092}	{0.9627}	{0.9625}	{0.9928}

Note: Dependent variables are listed in the left column and independent variables are listed in the top row. Standard errors in () and t-statistics in { }; *** $p<0.01$; ** $p<0.05$; * $p<0$

Table 6. VAR Estimation Output oil and gas sector sample 2006-2022

	IPI	MS	KASE	Credit spread
IPI	-0.0685	0.0884	0.0445	0.0696
	(0.0633**)	(0.0803*)	(0.0326**)	(0.0544*)
	{-1.0088}	{1.0748}	{1.0938}	{1.0875}
MS	0.0555	0.0687	0.0787	0.0876
	(0.0512*)	(0.0666**)	(0.0754*)	(0.0899**)
	{1.0443}	{1.0087}	{0.9765}	{1.0732}
RTS	0.0897	0.0643	0.0585	0.0765
	(0.0885**)	(0.0685**)	(0.0563**)	(0.0899**)
	{0.9787}	{1.1328}	{1.0006}	{0.9645}
Credit Spread	0.0669	-0.0732	0.0692	0.0687
	(0.0666***)	(0.0723**)	(0.0685***)	(0.0618**)
	{0.9554}	{-0.9239}	{1.0008}	{1.0854}

Note: Dependent variables are listed in the left column and independent variables are listed in the top row. Standard errors in () and t-statistics in { }. *** $p<0.01$; ** $p<0.05$; * $p<0.1$

A co-integration test as an additional tool

The error terms of the cointegration regressions were taken and checked on a unit root test. All of them turned out to be non-stationary at the first level. A unit root test was employed again to

check at the first difference. The results showed that it is nonstationary at the first level. The conclusion to be drawn from the test is that there are no long-term relationships among variables tested both at the first level data and at the first difference. The results truly confirm the fact that there is no any relationship between studied variables.

Table 7. The results of unit root test at the first level for error term

Residual of equation (1) Log_IPI = α 0 + α1Log_Lendingt-1 + α2 Log_RTS_Index + α 3 Log_Credit Spread + ε it	1%	-1.095423
	5%	-2.112453
	10%	-2.096435
Residual of equation (2) Log_Lending = α 0 + α1 Log_IPI + α 2 Log_MS+ εit	1%	-2.115645
	5%	-3.012543
	10%	3.0376894

Conclusions and further recommendations

The results of the study reject all three hypotheses. Based on the results of the study, it can be concluded that stock market does not affect the economic growth in Kazakhstan. At the same time, the results support the evidence that the economy does not affect stock market in Kazakhstan. The view of causality is not supported in this particular study. The following limitations deserve particular attention. The study employed only seventeen-year period of time. VAR was employed as a central model in this study. The following theoretical implications can be taken into consideration. Some other models can be employed such as Ordinary Least Squares, Generalized Method of Moments (Sukhanova and Shirnaeva 2015). Such variables as exchange rate, Consumer Price Index can be added in further research. Also, it should be suggested that the empirical links between stock market development and economic growth warrant further investigation in emerging economies. Focusing on this particular issue and examining the impact of financial liberalization on stock market volatility and the effects of the latter on are presented below. By the methodology we employed, there does not seem to be a significant association between studied variables over a period between 2006 and 2022.The most important practical implication is that stock market does not promote economic growth in Kazakhstan and the economy does not affect the stock market. The limitation of the study is that the period covered is quite short, between 2006 and 2022. It can be explained by data availability and data accessibility. Another limitation is that only four variables are employed in this study.

The economic development of Kazakhstan is rapid and dynamic today. However, stock market does not significantly affect it. The results of the study partly agree with Nechkasova (2022) and disagree with Akanayeva (2024). According to expert estimates, foreign investment account for the bulk of turnover on shares of Kazakhstan's companies. In the conditions of full convertibility of the Kazakhstan's tenge and the increasing integration of Kazakhstan into the world economy, the

influence of foreign investors on Kazakhstan's market will intensify further. Foreign ownership might transfer some of its profit abroad and physical capital remains in the region, which will benefit Kazakhstan further. Domestic investments should be encouraged and foreign ownership might benefit the economy by providing some innovations in business as well as developing certain industries. But before talking about possible options for the development of Kazakhstan's financial system in the future, it is necessary to highlight the features and principles of the world financial centers' organization, which can serve as the basis for the formation of national financial institutions in Kazakhstan (OECD, 2017).

The key link in the financial market of any modern state is the stock market, which creates conditions for effective mutual organized trade in financial instruments between its participants. The purpose of the stock market functioning - as well as of all capital markets - is to provide a mechanism for attracting investments in the economy by establishing the necessary contacts between those who need money and those who would like to invest surplus income. The stock market is a free market, and it will fulfill its tasks of constant maintenance of economic growth only if there is complete freedom of investments' movement.

In the global economic community, global stock markets dominate. They are characterized by the largest capitalization, significant volumes of trading, the highest liquidity. Securities and derivatives are circulating, as well as depositary receipts and secondary placements of foreign companies in such markets. Obligatory participants in markets of this scale are stock exchanges - organizers of civil transactions with securities. The clients of the exchange are both national and foreign investors from all over the world. The study serves as a promising avenue for any further research in this area.

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