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Do macroeconomic variables impact stock market returns? Evidence from Kazakhstan.

Franck Edouard Gnahe [a *], Jiangxi University of Finance and Economics, China.
https://orcid.org/0000-0001-7927-1310

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Abstract

Globalization has resulted in increasing connectivity in the worldwide financial market, as well as a plethora of profit potential for international investors through global diversification. The stock market, also known as the securities exchange, is one of the most active businesses, and it plays an important role in economic development, benefiting the whole industry and trade. The purpose of this study is to investigate the impact of macroeconomic factors on stock market returns: evidence from Kazakhstan. This analysis uses quarterly data from Kazakhstan's stock market indices, gross domestic product, interest rate, inflation rate, currency rate, and foreign direct investment from 2000Q1 to 2019Q4. From the findings, it is explained that regulators should keep interest rate relatively low to encourage economic business, improve external financing through rule-based exchange rate policy. The paper recommends that both macro factors and stock market returns should adequately compensate investments.

Keywords: Kazakhstan, macroeconomic variables, stock markets return, World Bank Indicators

* ADDRESS FOR CORRESPONDENCE: Franck Edouard Gnahe [a *], Jiangxi University of Finance and Economics, China.
E-mail address: franckgnahe7@gmail.com

1. Introduction

The stock market is critical to the economy. Even though most rising nations have expanding stock markets, Kazakhstan has usually poor economic and political stability. Because the stock market's price cannot be anticipated, it is regarded as the most hazardous and commercially valuable financial asset. This might be linked to what makes stock trading appealing to aggressive or risk-taking investors who attempt to profit from price swings by following the recommendation to "buy and sell high prices." Most stock exchanges across the world have indexes that indicate the current stock market's typical behavior.

The stock market is seen to be a magical execution that allows investors to make long-term investments and leave if they are prepared to do Baumol (1960). The stock is always traded at a fixed price that represents its particle properties. At the same time, the market's stock values change, indicating volatility. The emerging financial market, according to Bekaert and Harvey (2002), is relatively unstable, undeveloped, inefficient, and volatile. Historical data suggests that investing in a diverse collection of stocks over a long period or maintaining a big number of stocks in a portfolio would yield high-interest rate returns, limit fluctuations in returns, and considerably decrease risks. A diverse investment portfolio helps investors to limit their losses by purchasing a modest number of shares in a big number of firms. Although diversification causes stock price volatility, the impact on investors is minimal. These risks may be shown to have balancing impacts, and the price gain of certain stocks will counteract the price decline of others. Furthermore, mutual funds enable small investors to maintain a diverse portfolio. Increase the portfolio regularly while maintaining transaction cost economies of scale. The introduction of a significant number of mutual funds into the market contributes to the rise in stock values (Gwartney, 2003).

The relationship between macroeconomic factors and stock market returns has been widely studied and recorded in established capital markets (such as the United States, Japan, Australia, Canada, and European nations). Chen et al. (1986) add nothing to the study of the US stock market, but they do set the tone for several contemporary research within the framework of arbitrage pricing theory (APT). According to Fama's (1981) study, macroeconomic variables such as the industrial output index rise, as do stock returns. Germany's industrial production and interest rates are also favorably associated with the returns of European stock markets such as the United Kingdom, France, and Italy (Cheung & NEG 1998; Nasseh & Strauss 2000). The stock market will steer investment capital into more profitable business operations. Successful company tactics will be recognized and rewarded by being reflected in stock prices, whereas unintentional project losses will teach corporate decision-makers to rectify themselves. Typically, investors are highly attentive to these indications.

The revenue generated by the stock market is referred to as stock market income. These returns might be in the form of trading gains or earnings that the firm distributes to investors regularly. Macroeconomic variables reveal the company's overall strengths or weaknesses. The main macroeconomic factors are GDP, inflation, money supply, interest rate, exchange rate, unemployment rate, foreign direct investment, and index of industrial production index, Alam & Rashid (2014). It is critical for academics, scientists, financial experts, controllers, and government agencies to determine the impact of macroeconomic conditions on the securities market. The primary market of the economy is financial exchanges, which reflect the level of monetary activity in the country (Menike,

2006). It is critical for people seeking returns on their ventures and strategic policies to observe how returns in the financial exchange react to the influence of macroeconomic developments.

Generally, a study in this field has found factual evidence to help the hypothesis that macroeconomic factors affect stocks market returns, but some researchers have discovered that there is no causal relationship between certain factors, for example, industrial production index, fabricating request business survey, short-term and long-term interest rates, foreign stock prices, short-term interest rate, and interest rates and output (Nasseh and Strauss 2000)Benchmarking and predicting stock market performance, as well as evaluating macroeconomic variables, are the most effective and precise alternative approaches for understanding more stock market activity. This is the stock performance, Azeez and Yonezawa (2003). This tendency, according to Naik and Padhi (2012), is more appropriate to ASEAN stock market movements since the transitory level of economic activity is sensitive and complex. Kazakhstan Stock Exchange, established in 1993, is a non-profit corporation and the republic of Kazakhstan's sole market for monetary instrument trading.

In addition to Fama's (1991) two-general motivation for encouraging this type of research, there are three (3) other reasons why such an investigation in Kazakhstan is most important. To begin with, Kazakhstan is an intriguing instance, partially because, with the continued growth of the “KASE” stock exchange, people's impact on Kazakhstan's local macroeconomics on the stock market will be one of the numerous actions taken by all shareholders. Second, considering its presence in many developing market indexes and the greater risks investments connected with it, it will be fascinating to see if the findings obtained in more established economies remain true. Finally, it has less capital than industrialized countries, which may imply that it is more subject to speculation and government policies.

Various studies have demonstrated that a well-functioning stock exchange may support economic development (for example, see Levin 1996), emphasizing the need of studying the link between macroeconomics and the stock market to ensure public power. For example, a public authority is not wrongfully looking for methods to undermine it. To ensure a thorough study, we want to concentrate on national macroeconomic factors connected to stock market returns. As a result, additional perspectives, such as the impact of macroeconomic policy decisions in other countries, are beyond the scope of this article. KASE is now divided into four submarkets: the international trade market, the authority securities market, Kazakhstan's supranational securities, the stock, and corporate securities market, and the derivatives market. Most listed companies in Kazakhstan incur monetary risks, particularly stock market returns.

1.1. Purpose of research

Previous research on Kazakhstan's stock market performance has disregarded hazards, evaluated numerous indicators of stock market performance, and utilized various indicator econometric methodologies. As a result, the purpose of this research is to examine the impact of macroeconomic issues on the stock exchange. We evaluated data from 2000Q1 to 2019Q4 due to data availability. This study used six macroeconomic variables: stock market return, (GDP) gross domestic product, (IR) interest rate, (INF) inflation, exchange rate, and (FDI) foreign direct investment. For each analysis, we used a different econometric approach. Using standard errors, we adjusted the results for autocorrelation and heteroscedasticity. Overall, we discovered that macroeconomic variables had a

significant impact on Kazakhstan's stock market results. This study employed macroeconomic indicators of stock traded return as well as other econometric approaches to give empirical evidence of the crucial influence of macroeconomic factors on stock market return data from the Kazakhstan financial exchange.

The contributions here stem from a focus on the impact of macroeconomic variables on emerging-market financial markets, using trading rules and considering the stage of development of Kazakhstan. This study has also added to the growing body of knowledge on the influence of alternate finance sources. We suggested that alternative funding channels are critical for determining economic outcomes, particularly in countries with weak general legal systems and inadequate property rights protection. The strategies of investors using moving average rules are compared to those of passive investors who use the information on an interest rate of individual companies when making trading decisions. Nonetheless, just a few publications provide direct data on the impact of alternate financing channels on economic performance. This study findings based on data from a typical emerging market should offer valuable policy insights for Kazakhstan regulatory authorities focused on improving the KASE overall efficiency.

By studying the influence of macroeconomic variables on the Kazakhstan stock market, this article advances the argument that a well-functioning alternative financing environment might encourage enterprises to rely heavily on access to finance, and the current research should yield insights for local and foreign investors as well as for analysts who wish to understand exactly how the market has behaved during the last past years. Furthermore, this research offers several advantages for KASE's supervisory board and significant investors. In fact, it helps these stock market earnings executives to better comprehend the impact of market risk on Kazakhstan's stock market earnings presentation. They may also benefit from implementing important recommendations and developing suitable performance management methods by enhancing stakeholders to minimize the stock market's return performance and maximize their businesses' monetary performance. The remainder of the paper is structured as follows: Part 2 is where we construct our hypotheses and review the empirical literature; Part 3 is where we present our dataset and the methodology of the paper, and Part 4 is where we describe the findings of our study. Part 5 concludes with a summary of our results and policy suggestions.

1.2.Literature Review and Testable Hypotheses

1.2.1. The Kazakhstan Stock Market (KASE)

November 15, 1993, Kazakhstan launched its own currency, the Tenge. The following day, November 17, 1993, the National Bank of Kazakhstan and 23 leading local commercial banks decided to establish a currency exchange office. The former center for the execution of interbank currency transactions was once the structural unit of the public bank of Kazakhstan. After the introduction of TENGE, the principal task relegated to the new trade is to establish and build up the national currency. The trade was established as a closed business entity on December 30, 1993, under the name of Kazakhstan interbank currency trade. March 3, 1994, due to the need to coordinate the exchange name with the current regulations, the transaction was re-enlisted with the mane of Kazakhstan interbank currency exchange. After the shareholders decided to open the trade on the stock market, July 12, 1995, the exchange was re-enlisted under the name Kazakhstan interbank currency and stock exchange. October

2, 1995, the exchange acquired permit No.1 to convey stock trade exchange, but the permit just covers the trading rights of in authority protections.

April 12, 1996, the trade was re-enrolled under the Kazakhstan stock exchange, because the current law forbids the stock trade from performing the functions of the commodity exchange. On November 13, 1996, the exchange acquired a limitless permit to operate securities trading from the state securities commission of the Republic of Kazakhstan. As the republic of Kazakhstan took effect on July 10, 1998, on the amendments and increases to certain lawful acts of the Republic of Kazakhstan on business entities, the prohibition prohibits exchanges from trading foreign currencies and monetary with exception of protections. The transaction was also canceled, which made it conceivable to add AFINEX to the exchange. The choice was made at the regular meeting of the shareholder on January 6, 1999, and on March 16, 1999, the suitable country re-enlistment of the reconsolidation trade was affected. December 15, 2006, KASE was approved as an extraordinary exchanging floor in the financial center of Almaty. August 23, 2007, the KASE shareholder's meeting decided to commercialize KASE.

As a feature of the commercialization of KASE, the previous voting principle “one shareholder, one vote” was adopted, while the customary rule “one share- one vote at the general meeting of shareholders” was embraced. KASE consists of the Main Board, the second Board of directors, and the Kazakhstan stock exchange for securities trading and automatic quotation. Among the KASE companies with less than 189, two are major companies. The Kazakhstan stock trade has a market capitalization of 37.66 billion U.S. dollars. In terms of market capitalization, KASE ranks 51st among 144stocks markets.

Market operations are divided into the foreign currency market, government securities market, stock securities market, corporate debt securities markets, repurchase trading markets, and repurchase exchanging markets. KASE covers the entire department, and the focus of this research will be limited to stock exchanges and index series.

Macroeconomic variables in the study of stock market returns are not novel in the performance of the Kazakhstan stock market. So far, several articles have been produced, and numerous researches have yielded a variety of outcomes. This section will discuss some studies, with an emphasis on those that believe macroeconomic variables impact stock market performance. The impact of macroeconomic variables on the emerging stock market was tracked by both developing and developed nations. According to Muhammad's (2019) research, there was a negative association between the exchange rate and the stock return of the Shenzhen stock market from January 2008 to December 2018. According to the estimation results, the Shenzhen stock yield has a significant influence on inflation and interest rates.

Ozturk and Altnoz (2019) used the ARDL boundary test approach to examine the impact of the trade war on the Shanghai stock market index. The empirical results demonstrate that the tariff rate imposed by the US has a detrimental influence on the Shanghai stock market index in the long run. As a result, the United States' trade protectionist policies are detrimental to China. China's tariff rates on American imports, on the other hand, are both positive and negligible. They examined the broad money supply and the inflation rate and discovered that these variables had a favorable influence on stock indices. Maghayereh (2003) investigated the long-term connection between Jordanian stock value and selected macroeconomic variables using cointegration analysis and monthly time series data

from January 1987 to December 2000. According to research, macroeconomic variables are reflected in stock prices in Jordan's capital market.

Patra and Poshakwale (2006) investigated the short-run active changes and long-run equilibrium connection of various macroeconomic variables in the Greek financial exchange from 1990 to 1999, including trading volume and stock returns. Their findings indicate that there is a long-run equilibrium between the Athens stock market, inflation, money supply, trading volumes, and stock prices. There is no short-run and long-run equilibrium link between interest rates and stock prices. Abuguri (2006) investigated whether selected macroeconomic parameters such as currency rates, interest rates, industrial production, and money supply in four Latin American countries can successfully explain market returns. His findings demonstrate that global factors have always been significant in explaining returns in all market sectors. He discovered that the country's macroeconomic factors will have varying magnitudes and significance on the market.

According to Alam and Rashid (2014), stock market returns are the profits made by speculators from the securities exchange. Earnings can be derived via trading or from profits that businesses offer to investors regularly. The general characteristics or shortcomings of the economy are influenced by macroeconomic variables. GDP, inflation, money supply, interest rates, exchange rates, FDI (foreign direct investment), and the industrial output index are the major determinants. Maysami (2004) discovered that Singapore's financial exchange has a cointegration relationship with changes in the short- and long-term interest rate, price levels, exchange rate, money supply, and industrial production using similar research.

1.2.2. *Gross Domestic Product*

Gross domestic product (GDP) refers to the total production of all residents in a nation’s plus all taxes and subsidies will not include the value of the product. According to research and investigation by MSCI (2010), some nations pointed out that if the long-term GDP growth rate is high, the annualized rate of return of the stock market will decrease. Then again, scholars also likewise called attention that financial exchange is also related to real GDP growth. For investors, it is difficult to anticipate stock market returns in long-term investment. For speculators to anticipate the stock market return in long-run investment. As indicated by the investigation conducted by China news and U.S. news, four (4) of the eight (8) ASIAN stock indexes reacted to U.S. news, while just two (2) of the eight ASIAN stock indexes reacted to Chinese News. They additionally found that U.S. stock exchange compensation had no obvious response to U.S. news, MSCI (2010).

H1: GDP and the performance of the Kazakhstan stock exchange have a positive correlation and affect its stock returns.

1.2.3. Exchange Rate

The exchange rate is expressed as the price paid for comparing a country/region with the currency of another country/region. Olweny and Omondi (2011). Research has obtained a lot of evidence of the impact of exchange rates on emerging markets. The results of Okyere, Fosu, and Boakye (2014) have been verified to understand the direct relationship between stock prices and exchange rates and other

macroeconomic factors. If the decline in liquidity affects capital outflow and interest rates are lowered, currency devaluation will occur. For a country, the key factor in economic activity is foreign direct currency exchange. Exchange rate fluctuations have a positive and high impact on investors' investment frameworks.

H2: The exchange rate affects the stock market return of the Kazakhstan stock exchange.

1.2.4. *Interest Rate*

Interest rates influence the stock market by affecting the discount rate used randomly in techniques. On the other hand, the interest rate represents the cost of borrowing because it is one of the methods of predicting the cash flow of borrowing and one of the methods of predicting the cash flow of a specific company, Ferrer, Bolos, and Benitez (2014). In another study, scholars stated that in addition to other industries, the financial structure and framework of certain industries are also vulnerable to fluctuations in interest rates, Khan & Mahmood (2011). According to the neoclassical interest rate theory, if the cost of loans used by entrepreneurs for investment becomes expensive, then economic investment activities may decrease. Rising interest rates encourage investors to take the right decision about the investment structure of fixed income securities in the capital market, Syed and Anwar (2012).

H3: Interest rates have a significant effect on the stock market return of the Kazakhstan stock exchange.

1.2.5. *Foreign Direct Investment*

The net inflows of investment that obtain lasting management equity in the enterprise are called foreign direct investment. The investment will be equal to or greater than 10% of voting stocks. The investment will be made in the country outside the investor's economy. Foreign direct investment has a positive relationship with economic development and a variety of behaviors and has a significant positive impact on stock performance (Raza et al., 2012).

H4: FDI (Foreign direct investment) has a positive and significant impact on the stock market return of Kazakhstan stock.

1.2.6. *Inflation Rate*

The instability and economic collapse of the US stock in 2008 affected Asia, and the world financial system suffered a huge disaster. The impact of inflation on a country's economy may be negative or positive. Using bivariate correlation to understand the relationship between macroeconomic variables and stock market returns. We can draw a high degree of relationship between GDP and stock market returns, Raja and Kalyanasunmdaram (2010).

H5: The inflation rate is positively correlated with the rate of return on the stock market of the Kazakhstan stock exchange.

1.2.7. *Stock Market Return*

Stock market return generates return from the stock market enlisted into the exchange. In this article, the stock market return will be calculated from companies listed on the Kazakhstan stock exchange. In this study, the main index used as the market return indicator is the Kazakhstan stock exchange (KASE), which is composed of 189 companies listed in 2019, which indicates the full market value (KASE 2020). KASE is calculated from the prices of the 189 companies using the market capitalization weighting technique, which may find variance from the time to time.

Therefore, based on the results of these empirical investigations, we assume that stock macroeconomic variables significantly affect the performance of Kazakhstan's stock market. Specifically, we make the accompanying suppositions:

H6: Macroeconomic factors significantly affect the stock market return of the Kazakhstan stock exchange.

2. Methods and Materials

2.1. Data and Sample

This paper investigates the impact of macroeconomic variables on stock market returns evidence from stock market return performance in Kazakhstan from 2000Q1 to 2019Q4. Our sample consists of the KASE stock market exchange. In particular, we used 2020 data from World Bank. For the following reasons, we considered this sample and data period. First, our research follows a series of previous studies on the performance of the stock market (Naik and Padhi, 2012), because stock performance is more applicable for the Asian stock market. Secondly, we do not exclude macroeconomic variables obtained from WDI, and most of the data cover from 2000Q1-2019Q4. By using the VECM framework. As a result, our research used quarterly data from 2000Q1 to 2019Q4.

2.2. Description of Variables

We employed six (6) measures of macroeconomic variables on stock market return performance widely used in previous studies (Buyuksalvarci et al, 2010; Mohammad et al, 2008), namely, stock market return, gross domestic product, interest rate, inflation rate, exchange rate, and foreign direct investment.

2.3.Model Specification and Procedures.

In this section, we utilized VECM (vector error correlation model) to analyze the time-series data, VECM is found to be a suitable estimation technique. VECM (restricted VAR) is a very useful time series modeling technique that can be tested to analyze the short-run and long-run dynamics of the series if the non-stationarity time series are integrated of the first order, I(1) and found to be cointegrated. VECM model is quite possibly the most popular model utilized for multivariate time series investigation because of its adaptability and effective gauge capacity. This model sums the univariate autoregressive model are tested both on its lags and slacks of different factors.

As indicated by (Engel and Granger, 1987), if these factors are found to be cointegration, they would not float separated over time and a long-run combination between the non-stationary factors can be set up. In this part, we used the cointegration test as follows (Engel and Granger, 1987; Johansen and Jesulius 1990; Johansen, 1991) approach.

Johansen technique for cointegration is as follows:

$$\Delta X_t = D_0 + \sum_{j=1}^{p-1} \Gamma_j \, \Delta X_{t-j} + \Pi X_{t-p} + \epsilon_t$$

Where, Δ are the first difference operator, $\Gamma_j = -\sum_{i=1}^{p} E_j$ and $\Pi = -\sum_{i=1}^{p} E_j$, and I is and n×n identity matrix.

The rank of a matrix is equal to the number of its characteristic roots that are different from zero. The hypothesis is H0: $\Pi = \alpha\beta'$ where α and β are n× r loading matrices of eigenvectors. The matrix β gives the cointegration vectors, while α is known as the adjustment parameters that gives the amount of each cointegration entering each equation for VECM. The number of characteristic roots can be tested by considering the following trace statics and the maximum eigenvalue test.

$$\lambda_{trace}(r) = -T \sum_{i=j+1}^{p} ln(1 - \lambda_j \text{ and } \lambda_{max}(r, r+1) = -Tln(1 - \lambda_{r-1}$$

Where r denotes the number of cointegration vectors under the null hypothesis, T denotes the number of usable observations and λ_j is estimated as an incentive for the j denotes the eigenvalue from the Π matrix. A significantly non-zero eigenvalue demonstrates the effect of the cointegrating vector.

The presence of a cointegrating vector supports the utilization of dynamic VECM that portrays the criticism cycle and speed of change for short-run deviation towards the long-run equilibrium and uncovers short-run dynamic in any factor's comparative with others.

2.4. Descriptive statistics from 2000Q1-2019Q4

In this table, the descriptive statistics for the variable used shows that the average interest rate is 8.19% with a standard deviation of 2.38 and has a wide range from 4.91 to 16.46. This table shows that the average foreign direct investment is 7.46% with a standard deviation of 4.18, and ranged from -0.07 to 13.65. all the variables are asymmetric.

Table 1

Descriptive statistics from 2000Q1-2019Q4

	StockMarket Return	GDP	IR	INF	ER	FDI
Mean	1.4519	6.525	8.1968	12.2299	166.497	7.4679
max	8.9567	13.7312	16.4609	22.7861	408.2428	13.6599
Min	-0.1826	0.6531	4.9173	0.8392	-22.9274	-0.0758
Std. Dev	1.4519	3.5741	2.3892	6.2142	108.8161	4.1852

Next, we performed out extra analyses by changing the past models.

$$\Delta X_t = A_0 + \sum_{j=1}^{P-1} \Gamma_j \, \Delta X_{t-j} + \alpha\beta' \, X_{t-p} \; + \; \mu + \; e_t$$

Where, $\sum_{j=1}^{P-1} \Gamma_j \, \Delta X_{t-j}$ and $\alpha\beta' \, X_{t-p}$ are the vector autoregressive (VAR) in first difference,

X_t is a $\mathrm{P} \times 1$ vector of variables and is integrated of One. μ is $\mathrm{P} \times 1$ a vector of constants.

P is a lag structure, while e_t is $\mathrm{P} \times 1$ vector noise error terms. Γ_j is $\mathrm{P} \times P$ the matrix that represents short-term adjustments between variables across p conditions at the j the lag. β' represent $\mathrm{P} \times r$ the matrix of cointegrating vectors, and Δ means first differences. α represent the $\mathrm{P} \times r$ matrix of the speed of adjustment.

2.5. Empirical Procedures

In the first order, our empirical investigations began with descriptive statistics and correlation analysis to avoid issues of multicollinearity among factors. Next, we eliminated the highly associated factors from the model before the empirical analysis. Second, this investigation completed three units root tests on all the variables to evade misleading results and to approve our model's specification in the first difference. specifically, we utilized the augmented (Dickey and Fuller,1981) test (ADF), and the (Phillips and Perron, 1998) test (PP), which follows a typical unit root measure. We performed these tests under the null assumption (Ho) of non-stationary factors against the alternative assumption of stationary factors. Third, we estimate the equation by considering different econometric methods and choosing the most reasonable from the OLS (ordinary least squares model) overlooking the country-specific impacts. We used the VAR to choose with factors should be incorporated and what lag length is the best for the usage of the model.

3. Results

Table 2

Results of the Unit Root Tests.

Variables	ADF Unit Root Test	PP Unit Root Test	Decision
Log SM	-4.631	-5.7821	Stationarity
	(0.0000)	(0.0000)	
Log GDP	-3.937	-4.5777	Stationarity
	(0.0001)	(0.0003)	
Log IR	-3.203	-3.7874	Stationarity
	(0.0010)	(0.0045)	
Log INF	-3.203	-5.6664	Stationarity
	(0.0010)	(0.0000)	
Log ER	-3.826	-4.7315	Stationarity
	(0.0001)	(0.0002)	
Log FDI	-4.498	-5.2609	Stationarity
	(0.0000)	(0.0000)	

Not: ADF: Dickey and Fuller; PP: Phillips and Perron; The null hypothesis Ho: I(0) assumes a unit root process at the level, whereas Ho: I(1) supposes a unit root process at the first difference

This table (3) analysis on the long-run and short-run coefficient between variables at a 5% level.

Table 3

Autoregressive Distributed lag Mode

Variable	coeff	Std.Error	T.statistic	Prob
ΔLSM_{t-1}	0.775512	0.1540611	0.4735578	0.000
ΔLSM_{t-2}	0.2476328	3.469902	-0.6553249	0.943
ΔLSM_{t-3}	0.1413879	0.3588922	-0.5620279	0.694
ΔLSM_{t-4}	-0.1037231	0.1526947	-0.4029993	0.933
ΔLSM_{t-5}	0.8001809	0.5270173	-1.833116	0.129
ΔLSM_{t-6}	0.0889807	0.0795901	-0.0670129	0.264
ΔLER_{t-1}	0.003538	0.0044071	-0.0121758	0.422
ΔLER_{t-2}	0.5540068	0.992613	0.3594583	0.000
ΔLER_{t-3}	0.0051442	0.0102666	-0.014978	0.616
ΔLER_{t-4}	0.0047752	0.004368	-0.003786	0.274
ΔLER_{t-5}	0.0101478	0.0150761	-0.0194008	0.501
ΔLER_{t-6}	0.0028936	0.0022768	-0.0015688	0.204
$\Delta LFDI_{t-1}$	-0.0394831	0.0523218	-0.1420319	0.450
$\Delta LFDI_{t-2}$	0.4723574	1.178438	-1.837339	0.689
$\Delta LFDI_{t-3}$	0.4406733	0.1218859	0.2017812	0.000
$\Delta LFDI_{t-4}$	-0.0033176	0.0518578	-0.1049569	0.949

$\Delta LFDI_{t-5}$	0.0491993	0.1789841	-0.3016032	0.783
$\Delta LFDI_{t-6}$	0.0028936	0.0270302	-0.0477126	0.846
$\Delta LGDP_{t-1}$	-0.1932012	0.1139905	-0.4166184	0.090
$\Delta LGDP_{t-2}$	-0.9744738	2.567395	-6.006476	0.704
$\Delta LGDP_{t-3}$	-0.0708664	0.2655459	-0.5913268	0.790
$\Delta LGDP_{t-4}$	0.6413535	0.1129795	0.4199177	0.000
$\Delta LGDP_{t-5}$	0.7180965	0.3899424	-0.0461766	0.066
$\Delta LGDP_{t-6}$	-0.0252189	0.058889	-0.1406393	0.668
$\Delta LINF_{t-1}$	0.0882472	0.0429643	0.0040387	0.040
$\Delta LINF_{t-2}$	0.0592108	0.9676808	-1.837409	0.951
$\Delta LINF_{t-3}$	0.0236728	0.1000873	-0.1724947	0.813
$\Delta LINF_{t-4}$	-0.0356998	0.425833	-0.1191615	0.402
$\Delta LINF_{t-5}$	0.2584218	0.1469738	-0.0296416	0.079
$\Delta LINF_{t-6}$	0.0256027	0.022196	-0.0179005	0.249
ΔLIR_{t-1}	-0.0825487	0.1799539	-0.4352519	0.646
ΔLIR_{t-2}	5.093381	4.053082	-2.850514	0.209
ΔLIR_{t-3}	0.010166	0.4192106	-0.8114717	0.981
ΔLIR_{t-4}	-0.1131122	0.1783579	-0.4626872	0.526
ΔLIR_{t-5}	-0.1968279	0.6155923	-1.009711	0.749
ΔLIR_{t-6}	0.6795887	0.0929666	0.4973775	0.000

Significant a 5% level

Table 4

Correlation between variables

Variables	SM	IR	INF	GDP	FDI	ER
SM	1.0000					
IR	0.0511	1.0000				
INF	0.2045	0.3268	1.0000			
GDP	0.0423	0.3797	0.4105	1.0000		
FDI	0.4042	0.1611	0.2574	0.2609	1.0000	
ER	-0.2380	0.0019	-0.2226	-0.5650	-0.5035	1.0000

3.1. Regression results

3.1.1. Johansen Cointegration

For testing cointegration, all the series need to be stationary at the same level and non-stationarity at the level. All the series are taken at a level using the log transformation of the variables. Cointegration is tested at two levels Trace and Max statistics at a 5% level of significance. The test specification for cointegration was applied to test the linear deterministic trend with intercept (no trend). In particular, the trace tests are advantageous if there are at least two more or more cointegrating relations in the process (Lutkepohl et al 2000).

Table 5

Cointegration

Hypothesized	eigenvalue	Trace statistic	Critical value	Prob
Non*	0.04941	59.1349	29.68	0.0000
At most 1*	0.04374	43.1788	24.31	0.0210
At most 2	0.01588	38.2656	39.89	0.2839

Denotes * rejection at 0.05 level

Table 6

Normalized cointegration coefficients (standard error)

LnSM	LnIR	lnINF	lnGDP	lnFDI	lnER
1.0000	-2.02	-4.41	6.72005	3.90774	-0.81
	(0.1928)	(0.5320)	(0.53406)	(0.5195)	(0.2328)
T.satistic	-10.4733	-8.2888	12.5829	7.5206	-3.4793

The table indicated the normalized cointegrating coefficients, following the normalization process, the T. statistic for the indices lnIR, lnINF, ln ER with response to lnSM are statistically significant and this the sign is reserved. While for the remaining variables in GDP and lnSM the T.Statistic is insignificant and thus the signs of the coefficient are taken as appeared.

The cointegration equation and the value of T. Statistic enable research to identify the direction and degree of impact created by the stock market on the Kazakhstan stock market.
At a 1% increase in life, an INF, lnER, leads to an increase of respectively 2.02%, 4.41%, 0.81% in the long run. The variable is significant at a 5% level for T-statistic.

3.2. VECM MODEL

Here VECM approach is used in the selected economies to investigate the possibility of an increasing market cointegration.

ECT is the variable of lagged OLS residual from the long-run cointegrating equation and measures the rate of convergence to the long-run equilibrium. ECT identifies with the real last period deviation from equilibrium impacts the short-run elements of the dependent variables (Engle, R.F. and Granger, 1987). The coefficient of ECT is the speed of change because it measures the speed at which dependent factors return to equilibrium after a change in explanatory factors. The error coefficient in VECM model should be negative and less than one but the other coefficients are not limited to any sign or amount. In the present study VECM approach is used the selected economies to investigate the possibility of an increasing market cointegration.

VECM

$$\Delta lnSM_t = -0.0018ECT_{t-1} - 0.0048\Delta lnSM_{-1} + 0.0015\Delta lnIR_{-1} + 0.0066\Delta lnGDP_{-1} - 0.0109\Delta lnINF_{-1} + 0.2069\Delta lnFDI_{-1} - 0.06\Delta lnER_{-1} + 0002$$

$$ECT_{t-1} = 1.0000lnSM_{-1} - 1.9733lnIR_{-1} + 6.5642lnGDP_{-1} - 4.3080lnINF_{-1} - 0.7718lnER_{-1} + 3.7495lnFDI_{-1} + 9.8259$$

Table 7

Forecast Error Variance Decomposition

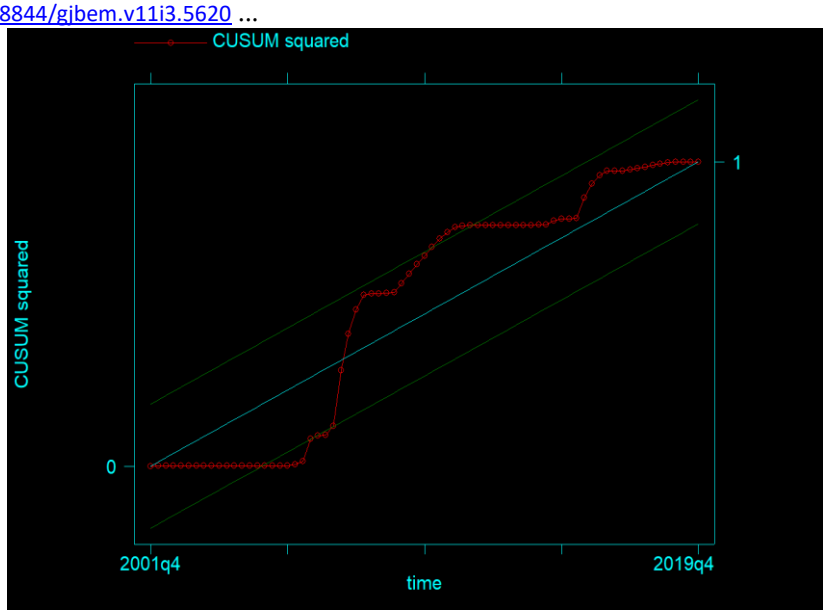
Period	lnSM	lnIR	lnINF	lnGDP	lnFDI	lnER
1	77.0962	3.1343	9.8553	0.3920	8.9517	3.7046
2	43.13519	1.3714	24.7849	0.2515	5.6761	26.1521
3	16.8477	44.5123	38.5405	3.8165	6.59874	34.19638
4	10.31674	7.0171	44.9152	14.9668	4.2546	25.5446
5	6.1602	43.9646	46.3766	30.8636	2.3714	14.2249

VECM is interpreted through variance decomposition. Variance decomposition is a technique to establish a relationship between the quantum of variability in the target variable and its dependency on its own lagged variance and which of the independence factors is stronger in clarifying the inconstancy in the target after some period. The Forecast Error Variance Decomposition examines how much of the future vulnerability of one-period series is due to future shocks into the other series of the period in the framework.

We observe a quick reaction of the stock market to advancement in the exchange rate. The reaction of interest rate, inflation rate, growth rate, and foreign direct investment is in line with our research finding for both progressed and emerging economies. The table shows that the variance decomposition in the stock market is mainly due to its variations at the end of the first quarter while the stock market and FDI, 77.09% and 3.13% respectively. After the third quarter's interest rate was 44.51% and inflation, 38.54% become dominant factors through four-quarter explaining inflation 44.91% and 25.54% of exchange. The interest rate and GDP rate prove to be the most significant factors for stock price movement respectively 43.93% and 30.86% at five-quarter. This implies that the Kazakhstan value market reacts well to shock in real financial activities.

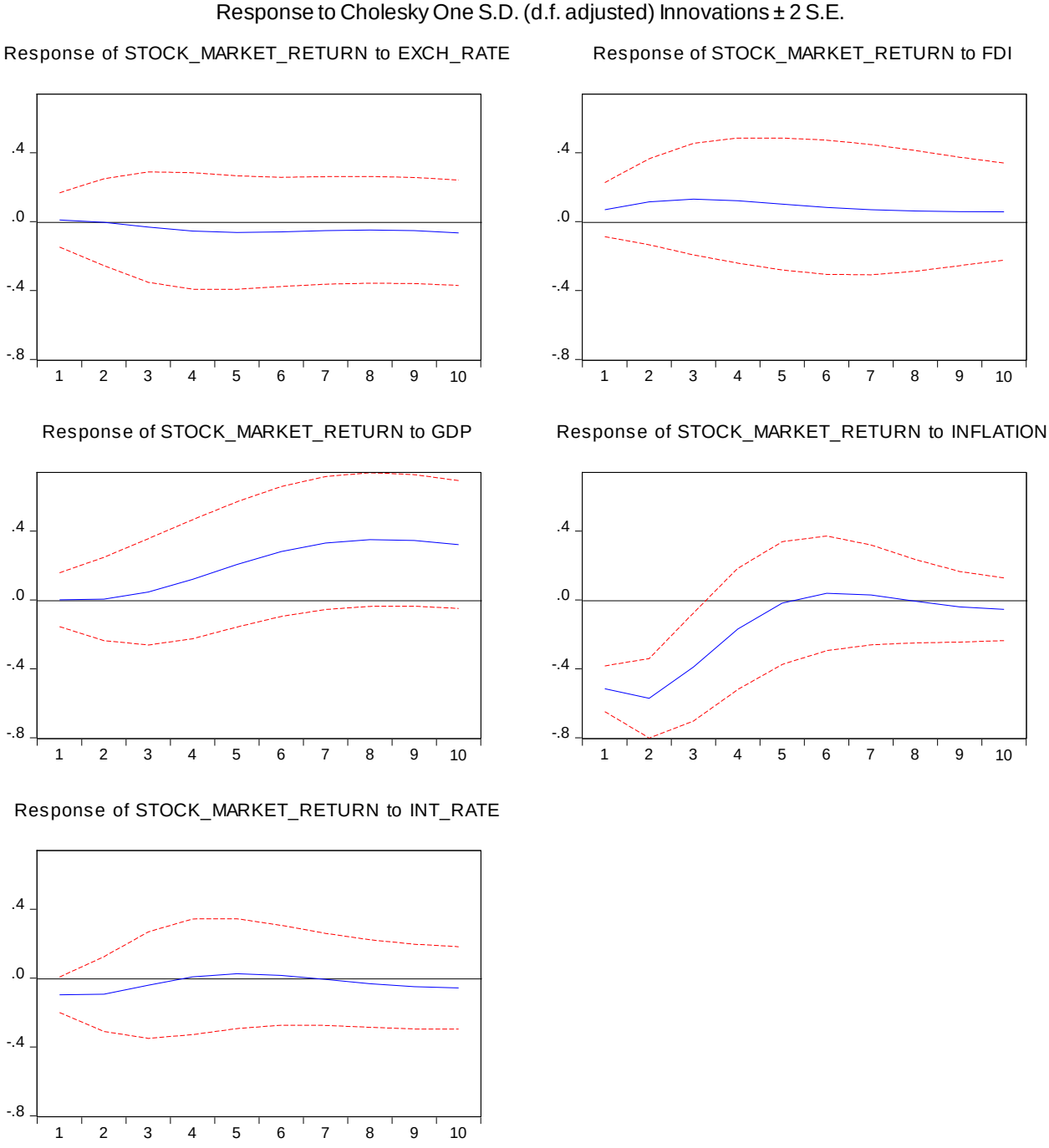
Figure 1m

CUSUM of squares of Recursive residuals



Significance at 5% at the level.

The cumulative sum of the residual stability technique is checking whether regression coefficients of the tested model are systematically changing. The result of cusum PLOT has been in the graph. The green line is located within the red bound, and it can be concluded that the model is dynamic and stable, and without structural damage. The cointegration analysis only captures the long-run relationship among variables. Since it does not provide information on the response of the variables to shocks in other variables, we adopt the impulse response function to investigate how the stock market responds to the shocks in the other variables. We observe an immediate response of the stock market in inflation rates. The rise in stock market indices implies that the market efficiently allocates resources by adjusting to the general increase in value in the long run. The response of stock market indices to ER and GDP is in line with other study finding for both advanced and market. A shock in FDI leads to a sharp reduction in the stock market, this explains the strong inverse relationship between interest rate and stock market investment in Kazakhstan.



4. Discussion

Having recognized the relevance of macroeconomic variables and the nation's stock market returns, the current study has been conducted to assess the impact of macroeconomic factors on financial exchange in Kazakhstan. This article found different economic variables that have a long-run equilibrium influence on the Kazakhstan stock market using the Johansen technique for multivariate cointegration investigation using quarterly time-series data. According to the forecast error variance decomposition, interest rates and exchange rates explain a tiny fraction of the volatility in the share price. The reason for the beneficial effect is the government's support for industrial growth and pushing poverty to the wall by providing new jobs (Koijen & Yogo, 2020). According to Philips' (1989) hypothesis, when unemployment rises, inflation will fall and have a detrimental influence on a country's economy, making it difficult for the community to finance and demand to fall despite the price trend. As a result, relatively controlled inflation pushes up stock market returns.

Increasing interest rates have a negative substantial influence on Kazakhstan stock market return by pushing up the price of stock firms in the stock market exchange return. Interest rates influence macroeconomics since they provide investors with accurate information for investing in the price of a stock market share. According to the study, the exchange rate has a negative influence on Kazakhstan's stock return. According to this study, an increase in the value of the currency would most likely result in a decrease in the stock return of the Kazakhstan stock market. The public authority may manage the whole monetary policy or balance sheet of Kazakhstan's commercial investment (Blokhina et al., 2020).

5. Conclusion

FDI contributes to capital inflows in economic growth by bridging the gap between capital, technology, management competence, human capital accumulation, and a more competitive business environment. A cursory review of the study's findings reveals significant investment and portfolio diversification possibilities for foreign investors.

Finally, given the KASE's lack of openness and accounting disclosure, Kazakhstan's policymakers should enact rules to enhance these efficiencies. This method would allow them to gain a better understanding of how KASE works, which may lead to legislative changes that would enhance the efficiency of the KASE stock market. The findings may help regulators develop better regulations governing the price discovery mechanism.

The current analysis might be expanded to include volatility spillover between the sample nations. High-frequency data might be utilized in future studies. Our research focuses on a particular type of macro-data in Kazakhstan. Other data kinds may have their distinct methods. More study is needed to understand the roles and functions of various forms of macroeconomic data on stock market returns.

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