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The Interrelation between Stock Prices and the Exchange Rate in Kazakhstan

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Abstract

A strong economical link has arisen between stock markets and exchange rates as a consequence of increased capital flows between international financial markets. This correlation between stock returns and exchange rates is particularly intriguing for developing countries such as Kazakhstan, whose economies are quite sensitive to capital flows. In the evolving global financial system, comprehension of the correlation between exchange rates and stock prices is vital for policymakers and investors. Knowing this relationship enables the manager to manage risk effectively, contrariwise, it is applied by investors to predict future trends. However, economic and financial policymakers and regulators need to know the interrelation between conversion rate and asset prices, such as stock markets, in order to articulate respective policies. Nevertheless, there are plenty of empirical studies on the interrelation between exchange rates and the stock market in developed and developing countries. This correlation has not been explored in Kazakhstan. The purpose of this study is to explore the correlation between stock prices and exchange rates in Kazakhstan. The relationship between the variables was analyzed via Johansen Cointegration Test and the VECM model. Upon the results of the analysis, the presence of a long-term correlation between the variables is proved. According to the results of the causality test, the Granger exchange rate is the reason for stock prices in Kazakhstan. There is no causality from stock prices to exchange rates. The results of the study also have a guiding quality in guiding investment decisions for both equity market and foreign money exchange market investors.

Keywords: Stock Price, Exchange Rate, Stock Market, KASE, Exchange Strategy, Cointegration, Causal Relationship

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Қазақстандағы акция бағасы мен валюта бағамының байланысы

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Түйін

Халықаралық қаржы нарықтары арасындағы капитал ағындарының ұлғаюы нәтижесінде қор нарықтары мен айырбас бағамдары арасында тығыз өзара байланыс пайда болды. Акциялардың табыстылығы мен айырбас бағамдарының арасындағы өзара байланыс, экономикасы капитал қозғалысына өте сезімтал Қазақстан сияқты дамушы елдер үшін ерекше қызықты. Айырбастау бағамдары мен акциялар бағалары арасындағы өзара байланысты түсіну жаһандық қаржы жүйесінің өзгеруі жағдайында саясаткерлер мен инвесторлар үшін маңызды. Бұл қатынасты білу менеджерге тәуекелдерді тиімді басқаруға мүмкіндік береді, екінші жағынан, инвесторлар оны болашақ үдестерді болжау үшін пайдаланады. Алайда, экономикалық және қаржылық саясатты анықтайтын адамдар мен реттеуші органдар тиісті саясатты жасау үшін валюта бағамдары мен қор нарықтары сияқты активтердің бағалары арасындағы байланысты білуі керек. Осы зерттеудің мақсаты Қазақстандағы акциялар бағалары мен айырбас бағамдары арасындағы өзара байланысты зерттеу болып табылады. Айнымалылар арасындағы байланыс Йохансен коинтеграциялық тестімен және VECM моделімен талданды. Талдау нәтижелері бойынша айнымалылар арасындағы ұзақ мерзімді қарым-қатынастың бар екендігі дәлелденді. Себеп-салдарлық байланысқа тест нәтижелеріне сәйкес, айырбас бағамы Қазақстандағы акциялар бағасының өсуінің негізгі себебі болып табылады. Акциялар бағасы мен валюта бағамдары арасында себеп-салдарлық байланыс жоқ. Зерттеу нәтижелері қор нарығының инвесторлары үшін де, валюта нарығындағы инвесторлар үшін де инвестициялық шешімдер қабылдау үшін өте маңызды болып табылады.

Түйін сөздер: акция бағасы, валюта бағамы, қор нарығы, KASE, биржа стратегиясы, коинтеграция, себептілік

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Взаимосвязь цен акций и обменного курса в Казахстане

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Аннотация

В результате увеличения потоков капитала между международными финансовыми рынками возникла тесная взаимосвязь между фондовыми рынками и обменными курсами. Взаимосвязь между доходностью акций и обменными курсами особенно интересна для развивающихся стран, таких как Казахстан, экономика которого очень чувствительна к движению капитала. Понимание взаимосвязи между обменными курсами и ценами на акции важно для политиков и инвесторов в условиях изменения глобальной финансовой системы. Знание этого отношения позволяет менеджеру эффективно управлять рисками, с другой стороны, инвесторы используют его для прогнозирования будущих ускорений. Тем не менее, существует множество эмпирических исследований взаимосвязи валютных курсов и фондового рынка в развитых и развивающихся странах. Эта корреляция не исследовалась в Казахстане. Целью настоящего исследования является изучение взаимосвязи между ценами акций и обменными курсами в Казахстане. Связь между переменными была проанализирована с помощью коинтеграционного теста Йохансена и модели VECM. По результатам анализа доказано существование долгосрочных отношений между переменными. Согласно результатам эста причинно-следственной связи, обменный курс является основной причиной роста цен на акции в Казахстане. Причинно-следственная связь между ценой акций и курсами валют отсутствует. Результаты исследования имеют решающее значение как для инвесторов фондового рынка, так и для инвесторов на валютном рынке для принятия инвестиционных решений.

Ключевые слова: цена акций, обменный курс, фондовый рынок, KASE, стратегия биржи, коинтеграция, причинно-следственная связь.

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Introduction

In the developing global financial system, policymakers and investors need to understand the relationship between exchange rates and stock prices. Understanding this connection is advantageous in several ways. First and foremost, knowing this relationship allows the manager to properly manage risk [1]. Second, the link between exchange rates and stock prices is crucial to the growth of developing market capital markets, particularly in countries that are expanding corporate sectors with publicly traded businesses and growing tradable sectors that are sensitive to exchange rate policies. Third, investors frequently utilize the relationship between exchange rates and stock prices to forecast future trends. Finally, in order to establish appropriate regulations, economic and financial policymakers and regulators must understand the relationship between exchange rates and asset prices, such as stock markets[2].

In the literature, there are two fundamental theoretical approaches to the link between exchange rates and stock prices. The two techniques are “traditional” and “portfolio balancing.” While the “traditional” models of exchange rates established by Dornbusch and Fisher argue that a fluctuation impacts the level of income or output in the economy and thus is effective in stock prices, the “portfolio balance” models of exchange rates developed by Branson [3]. He claims that fluctuations in the stock market have an impact on currency rates because of the capital account. The classic method assumes that the performance of a country’s current account or international trade balance determines the exchange rate in major part. Changes in exchange rates affect the portfolio values of national and international enterprises, as well as stock prices, according to this model. According to Jorion [4]. As the exchange rate rises (the national currency depreciates), the firm’s profits rise along with its stock values. According to this idea, exchange rate appreciation disturbs the competitive structure of export markets and has a detrimental impact on the national stock market. The appreciation of the currency rate in an import-dependent economy, on the other hand, lowers the firm’s input costs and raises earnings, resulting in a positive influence on the stock market [5]. In contrast to the goods market hypothesis, the portfolio balance theory claims that causality goes from the stock market to currency rates. As a result, a rising stock market will draw money to a country, increasing demand for local currency and resulting in an increase in the local currency’s value (reduction in exchange rates) [6]. A drop in the stock market, on the

other hand, will reduce the wealth of domestic investors, resulting in lower demand for money and interest rates, and eventually a drop in the value of the local currency (rise in exchange rates) due to capital outflows[7].

Even though there have been several empirical research on the relationship between exchange rates and stock markets in industrialized and developing nations, Kazakhstan has yet to be explored. As a result, this research will serve as a model for future research. The empirical investigations on the subject are presented in the study’s next section. The second section contains general information on the Kazakhstan stock market. The data and procedure used in the study are detailed in the third chapter. The empirical findings of the relationship between stock prices and exchange rates in Kazakhstan are discussed in the fourth chapter. The study came to a close with the concluding section.

Literature Review. Although there is significant literature on the connection between exchange rates and stock prices, there is no theoretical or empirical agreement on how these two variables interact. Furthermore, there is uncertainty about the direction of causality between the two financial factors. The dynamic relationship between exchange rates and stock prices have been studied extensively in industrialized countries rather than developing countries, and the conclusions are complex. Although some research has determined that there is no long-term association between exchange rates and stock prices, others have pointed out that there is a positive and negative relationship.

Frank and Young conducted the first empirical study on the link between exchange rates and stock prices, and they discovered that the variables had no meaningful association [8]. Later, using regression analysis, Agarwal discovered that between 1974 and 1978, there was a positive association between US stock prices and the US dollar, with the short-run influence being greater than the long-run effect [9].

For the period April 1985-August 1991, Ajayi and other used daily data on stock indices and exchange rates from 7 developed European countries, as well as Canada, the United States, and Japan, and 8 developing Asian countries for the period December 1987-September 1991. While a bidirectional causation link is identified in the causality analysis using daily data for rich nations, the causality relationship in developing countries is complicated. The causation link was shown to be more nonsensical when weekly data was employed[10].

Using the Granger causality approach and data from 1993 to 2002, Nath and Samanta (2003) investigated the link between exchange rate and stock prices in the Indian financial industry. They determined that there is no causal association between the factors based on the study's findings.

Between exchange rates and stock indices, no long-run Granger causation link was seen. There was a favorable relationship between exchange rates and US stock prices with domestic equities in the 1990s. As a result, the importance of exchange rate and stock markets as well as the existence of worldwide financial integration is underlined.

Using data from 1991 to 2005, investigated the relationship between stock prices and exchange rates in Thailand, Indonesia, Malaysia, Hong Kong, Japan, Korea, Malaysia, Philippines, and Singapore using the Gregory and Hansen cointegration test and the Westerlund panel Lagrange Multiplier [11]. They discovered that the variables are cointegrated in the long term as a consequence of the research.

Tsai looked at how these variables interacted in six Asian nations (Singapore, Thailand, Malaysia, Philippines, South Korea, Taiwan) [12]. According to the findings, there is a causal relationship between stock prices and exchange rates in the six nations studied. He claims that when exchange rates are extremely low or high, the direction of the link becomes more obvious.

In their study, Delgado and other looked at the link between the Mexican economy's exchange rate (US Dollar) and stock index (MEXBOL) [13]. They conducted a VAR analysis of the monthly data from 1992 to 2017. According to the findings, the exchange rate has a negative and considerable impact on the stock index. They explained that the scenario is due to an increase in the stock index as a result of the exchange rate appreciation.

Using monthly data from the Pakistani economy from 2001 to 2014, Akbar et al. (2019) investigated the link between stock prices and currency rates. As an analytical approach, they employed the VAR model and the Bayesian VAR model. Despite the fact that there was no long-term association between the variables in the research's conclusions, they concluded that negative exchange rate swings induce a drop in stock values[14].

In his analysis for India, Kumar and Gopalsamy looked at the link between the actual effective exchange rate and the S&P BSE Sensex stock index. Nonlinear Granger causality and the nonlinear ARDL test were used in the study using monthly data from 1994 to 2015. As a consequence of the research, it was discovered that there is one-

way non-linear causation in the Indian economy between the exchange rate and the stock index[15].

The influence of oil price and exchange rate on two Vietnamese stock market indices was researched by Nguyen and Bhatti [16]. (VN index and HXN index). Daily data from August 1, 2000 to October 25, 2019 was used in the study. According to the data, the price of oil has a considerable beneficial impact on two Vietnamese stock market indexes. The oil price recovery has a detrimental impact on both the VN and HNX index volatility. The influence of the oil price was constant across all three robustness tests, whereas the impact of the exchange rate on the Vietnamese stock market indexes was inconsistent. Changes in the USD/VND exchange rate have a substantial effect on the HNX index's return and volatility.

As can be seen, there are several studies in the literature analyzing the link between exchange rate and stock returns, and there is no agreement on the nature and direction of the relationship, as well as if there is a long-term relationship between these variables. This suggests that further empirical research is needed in this area.

The novelty of the study. The study's findings have demonstrated the presence of a long-term association between the variables. The exchange rate is the Granger cause of stock prices in Kazakhstan, according to the results of the causality test. There is no relationship between stock prices and currency rates. The study's findings can also be used to guide stock market and foreign currency market participants in their investing selections.

Materials and Methods

The Kazakhstan Stock Exchange (KASE) was founded in 1993 and is now Central Asia's largest and most structured financial market. Foreign investors are interested in Kazakhstan's substantial mineral resources, including uranium and gold, as well as oil and gas. The oil industry, in particular, plays a significant influence in Kazakhstan's financial sector.

The Committee for Control and Supervision of Financial Markets and Financial Organizations of the National Bank of the Republic of Kazakhstan has granted KASE the following licenses:

- for banking operations in national and foreign currencies (January 30, 2020 No. 4.3.8);
- to carry out activities in the securities market (including activities related to the organization of trading in securities and other financial instruments and clearing activities in transactions with financial instruments in the securities market) (July 19, 2012 No. 4.2.3/1).

-

Banks, broker-dealer groups, asset management businesses, JSC “Unified Accumulative Pension Fund,” and other organizations were among KASE’s 52 owners as of January 28, 2019. Kazakhstan Stock Exchange JSC has declared a total of 5,000,000 shares, of which 974,373 have been put. According to the Resolution of the Government of the Republic of Kazakhstan, the State Institution “National Bank of the Republic of Kazakhstan” owns 49.1% of the total number of outstanding shares. On various issues of the Joint-Stock Company

“Regional Financial Center of Almaty” No. 134, dated January 19, 2012. The National Bank of the Republic of Kazakhstan is the owner of a “golden share,” according to KASE’s charter. It grants the right to veto KASE decisions on currency control and the regulation of the Republic of Kazakhstan’s government securities market.

The capitalization value of KASE was 28 952.59 billion tenge on December 28, 2021, and the number of firms registered in KASE was 234. The KASE stock exchange is expected to contribute for around 26.5 percent of Kazakhstan’s GDP in 2020. (Graph 1).

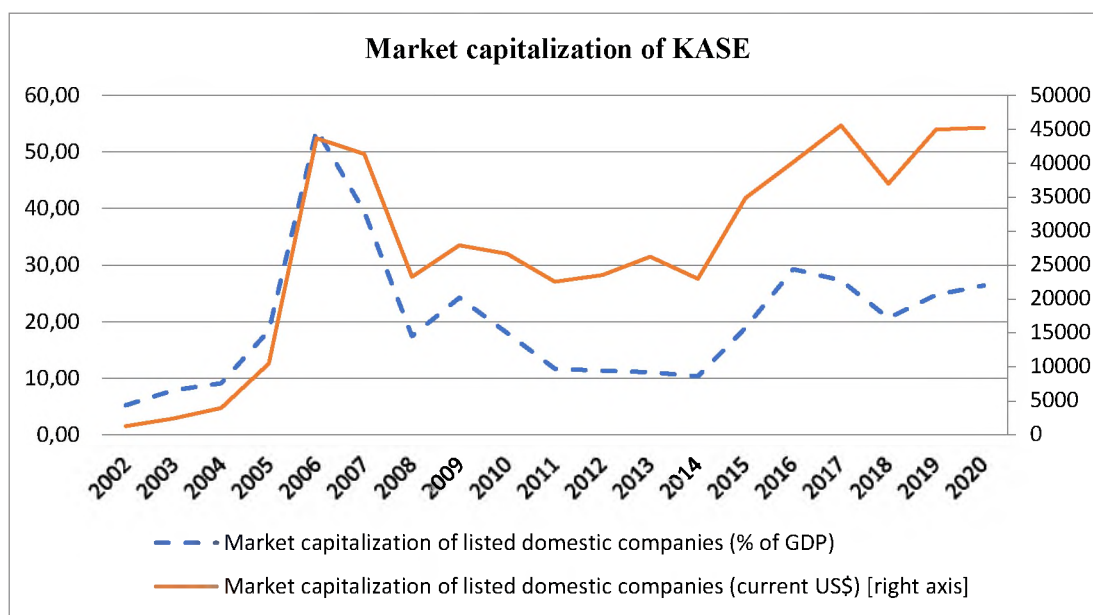


Figure 1 - Market capitalization of the KASE exchange

On August 20, 2015, Kazakhstan became the first country in the world to implement a floating currency rate regime. Fundamental elements impact the formation of the exchange rate. The key underlying variables influencing the fluctuations of the Kazakh tenge are global oil prices, as well as the currency rates of the country’s main trading partners, most notably Russia. The tenge’s free floating exchange rate system enables effective absorption of external shocks. The advantages of a floating exchange rate system include market-determined real exchange rate equilibrium, preserving local producer competitiveness, avoiding significant current account deficits, and avoiding a drop in international reserves. The National Bank does not engage in the establishment of exchange rates, although it reserves the right to do so to prevent excessive movements in the tenge exchange rate and to guarantee the financial system’s stability. Interventions, in general, are not

incompatible with a floating exchange rate policy and can be taken out by central banks, for example, to replenish a country’s overseas reserves [17].

Dataset and method. The data following the floating exchange rate was used in the research. In this case, the data utilized in the study comprises daily data from August 20, 2015, through December 23, 2021. The currency rate data comes from the National Bank of Kazakhstan’s official website, while the closing values of the KASE index come from kase.kz (official website). In the analytical section of the study, the Eviews ten package application was employed [18].

Nonstationarity of the series produces false regression in time series analysis, and the series is made stationary via difference taking to eliminate spurious regression. Taking the difference not only eliminates the influence of previous shocks, but it also eliminates the series’ long-term associations. A cointegration test is an analytical approach

for determining if non-stationary variables have a long-term connection after differencing. The cointegration test, established by Johansen (1988), was used to investigate the connection between the variables in this study. The finding of a cointegration connection between the variables, according to Johansen, indicates a true long-term link and that the variables work jointly in the long run. Using the maximum likelihood estimation approach, Johansen (1988) devised a cointegration analysis to evaluate the existence of cointegrating vectors. The VAR analysis underpins the Johansen test[19]. The model's set of equations is as follows:

$$Y_t = \sum_{i=1}^p A_i Y_{t-1} + \beta X_t + u_t. \quad (1)$$

The level values of X_t and Y_t in this equation should be I(1) series that become stationary when their first difference is calculated rather than static. When the first difference of the equation is taken and rearranged, it becomes as follows.

$$\Delta Y_t = \pi Y_{t-1} + \sum_{i=1}^{p-1} \tau_i Y_{t-1} + \beta X_t + v_t, \quad (2)$$

where π and τ_i . It is expressed as α . It represents two matrices with p and p (kxr) dimensions and rank r . α is the rate of adaptation, that is, the coefficient of the error correction term, β is the matrix of long-run cointegration coefficients, and r is the rank of the matrix. If the rank is equal to 1, it is concluded that there is one cointegration relationship between the variables, and if it is greater than 1, there is a cointegration relationship as much as the value of the rank. In the Johansen approach, two different tests, the Trace Test and the Maximum Eigen Value Test are used to reveal the cointegration relationship, and it is decided whether there is a cointegration relationship by comparing the calculated statistics with the critical values.

Results

Below are graphs of the variables data collection method and data. Since 2015, it has been found that the variables have been growing in trend (Figure 2).

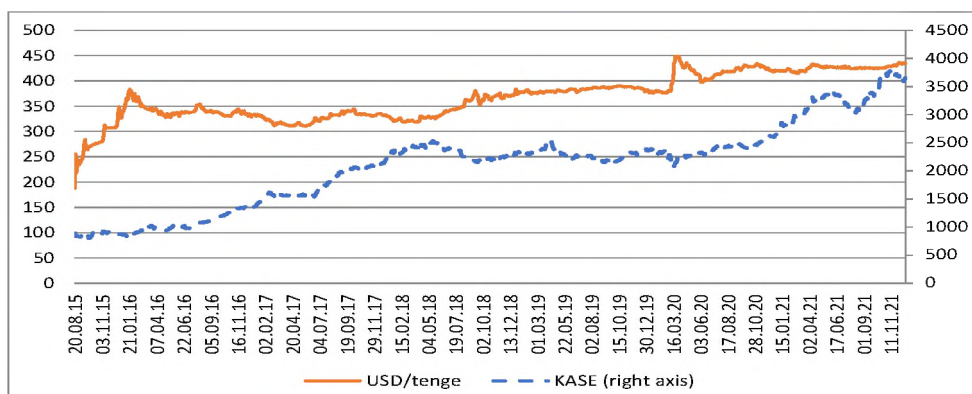


Figure 2 - Trends of variables over time

First and foremost, descriptive statistics and a correlation matrix of the variables were discovered in the investigation. Table 1 shows some descriptive data for the variables.

It is clear from Table 1 that both variables are biased to the left. When the kurtosis coefficient is equal to 3, the closing prices of the KASE stock market and the exchange rate are considered to be flat. The null hypothesis of “data have a normal distribution” for all series is rejected at the 0.05 significance level when using the Jarque-Bera statistic, which examines skewness and kurtosis

at the same time. The correlation link between the variables can be seen in Table 2. As a result, the correlation link between the Kazakhstan stock market and the exchange rate may be regarded to be significant.

It is critical to perform a stationarity test in time series analysis in order for the findings to represent a true connection[20]. The presence of a unit root in the series was studied as a result, and the Generalized Dickey Fuller (ADF) Unit Root Test was utilized to do so. Table 3 shows the findings of the stasis analysis.

Table 1 - Descriptive Statistics

	KASE	USD/TENGE
Mean	2104.079	367.2169
Median	2254.325	370.5200
Maximum	3810.700	448.5200
Minimum	799.2500	188.3800
Std. Dev.	731.9298	44.28573
Skewness	-0.015568	-0.155677
Kurtosis	2.544067	2.457711
Jarque-Bera	13.55748	25.38360
Probability	0.001138	0.000003
Sum	3278155.	572123.9
Sum Sq. Dev.	8.34E+08	3053629.
Observations	1558	1558

Table 2 - Correlation matrix

	KASE	USD/TENGE
KASE	1	0.75
USD/TENGE	0.75	1

Table 3 - Results of Unit Root Tests

Variables	Deterministic components	Augmented Dickey Fuller	
		Level	1st difference
USD TENGĒ	Intercept	-2.431168 [-2.863193]	-33.73684 [-2.863193]
	Trend and intercept	-3.283396 [-3.412702]	-33.75786 [-3.412702]
	None	1.874574 [-1.941027]	-33.62617 [-1.941027]
KASE	Intercept	0.075582 [-2.863208]	-9.890487 [-2.863208]
	Trend and intercept	-1.314771 [-3.412725]	-9.906458 [-3.412725]
	None	2.915694 [-1.941029]	-9.374503 [-1.941029]

Note: Values in parentheses give Mckinnon critical values at 5%.

Table 3 shows the results of the ADF unit root test. The exchange rate and the stock market variable, both with and without a trend, have a unit root in the level value, according to the ADF test. It becomes stationary when the first order difference of both variables is considered. In order

to analyze the cointegration connection, the first-order difference values of the variables will be employed. The proper number of delays, according to the Akaike information criterion, is two. Table 4 shows the results of the Johansen cointegration test.

Table 4 - Johansen Cointegration Test Results

Null Hypothesis	Eigenvalue	Trace Statistics	Critical Value (5%)	Maximum Eigenvalue Statistics	Critical Value (5%)
$r=0$	0.273012	116.6937*	15.45706	68.72783*	14.20478
$r \leq 1$	0.203108	47.91387*	3.801879	47.91089*	3.804569

Note: * indicates rejection of the null hypothesis at the 5% level

The null hypothesis that there is no cointegration connection between the variables is rejected, according to the Trace and Maximum Eigenvalue test data in Table 4. In other words, it has been established that the variables have a long-term connection. Granger causality test based on VAR model cannot be used when there is a

cointegration connection. The VECM (6) model will be estimated first, followed by the causality test. The results of the causality test predicted using the error correction model are presented in Table 5. The exchange rate is the Granger cause of stock prices in Kazakhstan, according to the findings of the causality test. There is no relationship between stock prices and currency rates.

Table 5 - Short-Term Error Correction Model Causality Test Results

Null Hypothesis	Test Statistics		
	χ^2	Possibility	Result
Exchange rate is not the Granger cause of stock prices	33.953072	0.0000	H_0 Rejected
Stock prices are not the Granger cause of exchange rate	7.5367809	0.1098	H_0 Not rejected

Discussion and Conclusion

The establishment of capital markets, the gradual removal of capital entry obstacles, and the adoption of more flexible exchange rate arrangements are all examples of recent trends. Along with these changes, after the 1990s, the close interactions between foreign currency markets and stock markets drew the attention of many economists for both theoretical and empirical grounds, since they play an essential role in the country's economic growth. Because these two markets are such a sensitive element of the financial sector, every policy change has a swift influence on them. Because all of these factors make studying the relationships between the foreign exchange and stock markets more difficult and intriguing, researchers have begun to look into dynamic relationships between the two markets. However, there is neither theoretical or empirical agreement on whether or not there is a link between exchange rates and stock prices, or which way it should go. The existing finance literature on the links between exchange rate fluctuations and macroeconomic factors is equivocal.

The impact of the exchange rate on the Kazakhstan stock market was explored in this study. In terms of targeting a developing market, the research is crucial. This study used daily data in order to acquire more consistent results, as many prior studies in this field have advised. Cointegration was discovered in non-stationary series, leading to the conclusion that stocks and exchange rates have no long-term link. The causality test revealed that there is a link between exchange rates and stock prices. In this instance, using the information from one market, it is feasible to make predictions about the other market. Finding a one-way causation link between the variables may demonstrate that exchange rate market information may be utilized to construct stock market forecasts and that exchange rate market movement can be interpreted as an indication of stock market movement. This finding suggests that investors who want to invest in the stock market should consider the exchange rate while making their decisions.

This research is significant in terms of adding to the literature by demonstrating the link between stocks and currency rates and providing guidance to stock market investors. It may be advised that in future investigations in this field, analytic approaches that account for structural leaps be used, as well as impulse-response analysis. Furthermore, the impact of the exchange rate on other industry indexes may be investigated.

The study of the relationship between foreign exchange markets and stock markets aims to demonstrate that stock market volatility has a

direct impact on exchange rates following the "January events" in Kazakhstan, the stabilization of the country's economy and the cessation of inflation, as well as the population's socioeconomic and financial literacy.

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