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Multi-factor model of banking industry stock returns: Kazakhstani market perspective

Thesis submitted for

the degree of Bachelor

6B04101 - Accounting and audit

6B04104 - Finance

Supervisor: Kozhakhmetov Rustem

Nur-Sultan 2022

Abstract

The purpose of the provided research is to analyze the dependence of stock's profitability on certain macroeconomic and industry variables using a multifactorial model. We selected companies in the banking sector based on the availability of their data on the Kase Stock Exchange. These data were mainly taken with the maximum period from January 2017 up to December 2021 in order to capture as much time as possible. Further, to study this topic, the R programming language and several additional libraries for data cleaning were used. The results show that market returns account for variations in stock returns, but the inclusion of other economic variables increased the explanatory power of the model.

Key words: stock market, stock returns, macroeconomic variables, banking industry, multifactorial model.

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Chapter one Introduction

1.1 Background

1.11 Short introduction of multifactor

The securities market plays a valuable role in the country's economy. In addition to traditional models that were based on equilibrium, there is a multi-factor model for asset pricing. It is used to explain both a portfolio of securities and an individual security. It compares several factors to examine the relationship between variables and results. Models are evaluated by historical figures (Chen, 2020).

Multi-factor models fall into three categories: statistical models, fundamental models and macroeconomic models. Employment, inflation, and the interest rate are key factors in comparing security returns in a macroeconomic model. In fundamental models there is the analysis of the correlation between a security's return and also its earnings, debt levels and market capitalization. In statistical models the returns of different securities are differentiated based on the statistical execution of each security (Chen, 2020).

1.12 Short introduction of the Economy

Kazakhstan is the largest and developing state in Central Asia, possessing a significant reserve of natural resources. After the collapse of the Soviet Union, the country, having undergone a severe socio-economic crisis, was one of the first to form the national economy on the basis of market principles. To that end, a large-scale privatization program had been launched, involving enterprises in the commodity sectors. The main feature of the private sector and privatization is the dominant involvement of the central and regional bureaucracy, which reduces the importance of legal norms. The oil and gas sector is the main catalyst for strong economic growth that has attracted a large inflow of foreign capital. However, the speedy growth of the oil and gas industry has made

our economy highly dependent on oil exports and instability of the black gold price (Arnabekova, Temirkhanov, & Ibraimova, 2017). In order to reduce this dependency, measures have been taken to diversify the economy, with the key objective of accelerated industrialization through a shift away from the commodity sector. At the moment, Kazakhstan is on industrial and innovative development, where the main focus is on export-oriented economy with high added value. Given the increasing global economic competition, the new development path will make it possible to adapt to a rapidly changing environment. Today, Kazakhstan, as a country adhering to the principle of multi-vector, is an active participant in the leading international organizations. Overall, the country has been able to strengthen its position on the world stage, thanks to its resource potential and prudent economic policies. Also, Kazakhstan has set a goal to join the world's top 30 most developed states by 2050.

1.13 Background of banking system

The financial and banking system of Kazakhstan is recognized, according to countless experts, which bureaucrats and bankers love to brag about, as one of the most advanced and stable in the CIS. Banking reform originated in early 1991, when the Law "On banks and banking activities in the Kazakh SSR" was adopted.

The banking system of Kazakhstan experienced rapid growth and prosperity, and later suffered a crisis. The state presence in the economy and the monetary sphere was reflected in the form of predominance in the banking sector, and the state budget also depends on world energy prices, and this, in turn, shows a direct correlation. Just like in other countries of the world, a two-tier banking system is developing in Kazakhstan.

The first level is the central bank, which is responsible for monetary policy activities in a large country. Its main instrument is the base rate. This, in turn, allows the National Bank to keep

the tenge exchange rate under control and influence the economy. Today the base rate has exceeded 13.5% (Kapital.kz, 2022)

An increase in the base rate leads to an increase in the rate on deposits and loans. This makes loans less affordable, people borrow less and spend less, and food prices are starting to stabilize. The size of the base rate is also related to the level of economic stagnation in the country. A high rate strengthens the national currency and lures foreign investors into national debt. If compared with advanced countries, then the central bank rate and the level of economic stagnation are small, because these countries are investors themselves.

The second level is commercial banks, they provide a standard list of services, as well as most banks around the world. In our thesis, we selected three secondary banks that have been trading their shares in KASE over the past 5 years.

In 1993 Halyk Bank was reorganized from the Sbergatel'nyy Bank into an independent structure, which belonged to the government of Kazakhstan. In 1995, the Bank was transformed into a Joint Stock Company, at that time there was a radical change in leadership, which laid the foundation for the principle of universalism. From the end of 1995 to this day, Halyk Bank of Kazakhstan has been the largest operating bank in the republic and continues to operate in different sectors. (Amphibia, n.d.) Since 1998, the Bank has been listed on the Kazakhstan Stock Exchange. (Kazakhstana", 2002)

JSC Bank CenterCredit - is one of the first commercial banks in the country, which was implemented in 1988. The 5th largest bank in Kazakhstan, which began its activities. Net profit equals 8.57 billion tenge (Forbes, Bank CenterCredit)

Forte Bank is a modern financial institution that has been on the market of Kazakhstan for 8 years. In 2015, as a result of the merger of Soyuz Bank JSC, Temirbank JSC and ForteBank JSC.

Initially, the priority direction of the bank's activity was the provision of services by individuals. Currently, Forte Bank performs a full range of banking services for both individuals and commercial companies. In early December 2020, the renowned international publication *The Banker* awarded the Bank the Most Excellent Bank in Kazakhstan award for the 3rd time. Forte Bank's Net income was 53 billion (Forbes, Forte bank).

1.2 Purpose of the study

The purpose of this paper is to examine the dependence of stock returns on specific macroeconomic and industry variables using a multifactor model.

1.3 Literature review

Stock returns are extremely vulnerable to both basics and anticipations. According to research, the equity market is more responsive to external and internal forces because of financial deregulation (Saqib, Babar, & Kashif, 2011). The external factors include political condition, price controls, inflation, price of stocks, exchange rate etc. The internal factors influencing the profitability of the stock can be financial performance, quality of management, size of the company, type of funding etc. There are plenty of research studies related to the impact of intrinsic and extrinsic factors on stock return. This study will examine both of them.

A study by Tobias Olweny and Kennedy Omondi (2012) explored the effects of exchange rate fluctuations, interest rates, and the level of determination of the instability of stock return on the Nairobi Stock Exchange. They applied conventional data over a decade of empirical methods using EGARCH and TGARCH models (p. 34). Therefore, the result showed that the factors that arise on the volatility of stock profitability are the rate of interest and supply level. It turns out that after a price fall, volatility increases more than after a price increase of the same amount.

Javid, Attiya Yasmin & Ahmad Eatzaz (2008) took 49 stocks traded on the Karachi Stock Exchange over a ten-year period to examine the macroeconomic variables that explain fluctuations in expected stock returns. They used the CAPM-with-GARCH-M conditional multivariate model which showed that risk-reward ratios improved very little over the period. The results proved the conditional multivariate CAPM. Economic variables like return on assets, growth in consumption, inflation risk, interest rate considerably affects fluctuations in anticipated stock returns. But it also turned out that market returns, currency risk and oil price risk have a limited impact on asset pricing (p. 114).

Benakovic D., Posedel P. (2010) analyzed the performance of fourteen shares of the Croatian capital market over a five-year period. They bogged down 14 stocks to assess sensitivity to such impacts as supply, IPI, interest rate, the market index and the price of oil. The research showed that interest rate, oil price and IPI are more sensitive factors, while inflation does not matter much (p. 39). They then applied a cross-sectional regression with estimated sensitivity, which determined the most sensitive factor on stock prices. It turned out to be the market index.

Alexey Shabalin (2006) estimated the change in the value of securities of the Russian stock market with the help of the GARCH model using shares of the company traded on the MICEX stock exchange. The researcher drew attention to the following factors when forecasting the dynamics of the Russian stock market: cost, net profit, macroeconomic indicators, world stock indices, and European and American currencies. According to the results of identification of GARCH models with minimal balance sheet volatility, the most risky were ordinary shares of Sberbank, and the least risky - ordinary shares of JSC "Sverdlovenergo".

Wongbangpo and Sharma (2002) conducted a study to examine the role of specific economy-wide factors in explaining variations in stock returns in ASEAN stock markets (Indonesia, Malaysia, Philippines, Singapore and Thailand). Researchers observed relationships in the long and short-run among the price of stocks and variables like GNP, CPI, Money Supply, interest and exchange rate

(p. 27). Given that the stock return cooperates with main economic factors in the long and short perspective, adequate governmental policies in economy and finance can produce outstanding results in both of them.

Al-Tamimi, Alwan & Rahman (2011) observed the interaction between fluctuation in macroeconomic indicators and stock prices of UAE. They carried out a study on 17 companies from 1990 to 2005. The results of the regression model demonstrated a positive and insignificant connection with independent variables such as GDP, money supply, whereas the connection with CPI and interest rate was negative and substantial (p. 3).

Jareno and Negrut (2015) determined the impact of five macroeconomic factors like GDP, CPI, IPI, long-term interest rate and the unemployment rate by applying Pearson correlation coefficients. The results suggested that the equity market of the USA demonstrates a positive and significant linkage with GDP and IPI variables, as well as an inverse and material relationship with variables like unemployment and interest rate (p. 325).

A study was conducted in Kazakhstan(Kazakhstan Stock Exchange) examining the relationship of stock profitability, rate of exchange, interest rate, consumer price index, oil price(Brent) (Niyazbekova, Grekov, & Blokhina, 2016). According to the results of Engle-Granger Cointegration Test, the rates of exchange and interest, CPI and the price of Brent crude are interconnected with KASE, which means that there is a long-lasting relationship among the stock index and selected variables (p. 1265). Moreover, results showed that the stock index can be considered as the key benchmark of the economic climate in the country.

Rahman, Sidek & Tafri (2009) applied traditional and complementary tests to investigate the position of different economic factors of macro level in explaining variation in stock prices in the Malaysian stock market. The researchers found that all selected factors known as money supply, interest and exchange rate, IPI and reserves contribute in significant manner to this relationship (p.

95). Additionally, according to variance decomposition analysis, the stock market has stronger connection with IPI and reserves in contrast to money supply, exchange and interest rate.

Shohani Upeksha Badullahewage (2018) documented the macroeconomic determinants (inflation, GDP, interest and exchange rate) of Sri Lanka stock market volatility (p. 33). The analysis showed that all these factors substantially affect stock market indicators. Among all factors, inflation and exchange rates were found to have a relatively stronger effect on the stock market (p. 39). The Colombo Stock Exchange has undergone enormous changes in its operations over time when listed factors have crucially contributed to its performance (p. 41).

Muneer, Butt & Kashif (2011) analyzed the strong relationship between stock returns variation on Karachi Stock Exchange and 6 macroeconomic and 1 industry variables (p. 267). The study covers 10-year data for chosen firms and independent variables (p. 267). For the purpose of risk-return analysis, the descriptive statistics of time properties and the GARCH model were used (p.268). In order to summarize given results, checks were made on the yield of the shares of each firm and the totality of data for the entire industry. The results show that market returns are the most substantial and positively related variable and account for much of the stock return fluctuations, both at the bank and industry levels (p. 273). For the other variables, they occasionally explain fluctuations in banks' stocks and thus provide additional power in explaining the model.

It is important to note that the research above served as a model for our own thesis, because it was distinguished by its clarity and literacy. After reading and carefully studying the work of Pakistani researchers, we have a picture of what our work should look like. Our team followed a similar logic, and we used roughly the same methods for our research.

We have reviewed the stock exchanges of the following countries: Kenya, Pakistan, Croatia, Russia, Indonesia, Malaysia, Philippines, Singapore, Thailand, UAE, USA, Kazakhstan and Sri Lanka. Summing up the results of the literature review, we found that in all the works

macroeconomic factors to some extent explain the variation in the yield of shares on stock exchanges. For the most part we can observe frequent interaction with the following independent variables: market return, interest rate and exchange rate. In some of these papers, researchers have concluded that there is a relationship in the long and short run between macroeconomic factors and the stock market.

This study complements the existing writings by assessing the impact of macroeconomic and industry variables on the stock returns in the banking sector using the regression model in the developing market of Kazakhstan. Thus, it is essential to know how stock returns in Kazakhstan respond to these variables.

Chapter two- Methodology

2.1 Research Philosophy

Research Philosophy is the foundation of the research, because it tells about the system of beliefs that the researcher has about the phenomenon under study. According to Crotty (1998), the research paradigm you have chosen will show how deeply you understand research issues, applied methods and how you interpret obtained results. There are 2 major research philosophies known as positivism and interpretivism.

The positivist paradigm is based on the idea that only knowledge gained through direct observation is factual and reliable. Observations should be quantifiable to enable statistical analysis. Usually, positivists form a hypothesis that can be partially or fully proved or disproved. Positivism seeks to examine the presence of relationships between two variables rather than see what causes them.

A second main paradigm is interpretivism, also called anti-positivism. Interpretivists state that only through the subjective interpretation of and intervention in reality can that reality be fully

understood. In this case, the preference is given to qualitative methods, such as interviews or participant observation.

The most appropriate research philosophy for our research is positivism. We used the existing theory, known as the multifactor model, and further tested it in the banking industry of Kazakhstan. For this purpose, data on the profitability of shares of four banks and data on macroeconomic and industry variables were collected.

2.2 Research approaches: deduction and induction

Researchers typically use two widespread ways of reasoning termed inductive and deductive. Referring to Trochim (2006), induction is switching from individual to general, whereas deduction starts from the broad and ends with the specific.

Research with inductive reasoning commences with gathering data that is related to a subject of interest. As soon as a considerable amount of data has been collected, the researcher will back away and overview the data. At this point, the researcher searches for regularities in the data, working towards a theory that could clarify those regularities. Therefore, they move from a set of data to theory.

Researchers applying a deductive approach, use the same steps as the inductive one, but in the opposite order. As reported by Jones and Gratton (2009), this method of reasoning includes testing of a predefined theory. By applying this approach, the researcher makes a hypothesis based on existing theory. Also, use of only absolute facts makes this type comparatively more complex.

The main objective of our research is to test the stock returns variation to particular economy-wide and industry factors by using a multifactor model. Since, we will construct hypotheses from a multifactor model and then collect and study data to examine those hypotheses, the research would be in a deductive way.

2.3. *Quantitative choices*

Research can either be conducted with qualitative or a quantitative effort. The method chosen should mostly depend on what the research question was and what the researcher wants to know.

Qualitative research can be defined as research conducted in a natural environment. The researcher is essentially becoming a data collection tool. The research of this type should include the collection and analysis of the words of the participants (Cresswell, 2005). This incorporates working on complex and time-consuming data analysis and taking part in social research without clear guidelines (Cresswell, 2005). The results are constantly changing and evolving as more data is collected (Cresswell, 2005). According to Cresswell (2005), this research method applies inductive thinking, as it moves from observations of specific events to sweeping generalizations and theories.

Quantitative research often leads to the use of statistical analysis to connect what is already known and what can be obtained from research. Referring to Trochim (2006), this type of research requires an in-depth understanding of the relationships between variables employing descriptive or inferential statistics. The first type hinges on the utilization of descriptive statistics, where the researcher can make judgements about population and define its settings (Trochim, 2006). The second type of statistics is built on the first one and the assumptions that extend to the population from a particular sample (Trochim, 2006). By applying one of these types, the researcher can either reject the hypothesis or determine the effect size (Cresswell, 2005).

In this case, the quantitative method seems more suitable for research because it will give us the opportunity to study the relationship between the return of stocks and variables deeply. The data that we have are the monthly stock prices of 4 secondary banks listed in KASE and indicators of macroeconomic and industry variables such as CPI, IPI, market index, risk-free rate, money supply, exchange rate, oil price and credit portfolio during 01.01.2017-31.12.2021.

Chapter three- Theoretic framework

3.1 Theoretic framework - Multifactor

Minimizing the number of variables and determining correlations between them are the main goals of factor analysis. Among macroeconomic factors, interest rates, inflation risk and credit spreads were used. Multi-factor models provide increased flexibility and allow you to:

- create portfolios that modify, if necessary, the characteristics of a certain index;
- execute full risk and return distribution for actively managed portfolios;
- understand the relative risks associated with returns on equities, fixed income instruments and other asset classes;
- assure that the overall equity portfolio meets active risk and return which is comparable with active commissions (CFA Program Level II, 2022).

The most commonly used models for establishing a multi-factor model are the combined model, the sequential model, and intersection model. In a combined model, several single-factor models are integrated to make a multi-factor model. For instance, stocks can only be divided by momentum on the first pass. Other factors such as volatility on subsequent passes will be used to classify them. In the sequential model stocks are categorized by one factor in sequential order. Stocks for a particular market cap in sequence can be analyzed for various factors like cost and momentum. In the intersection model, stocks can be distributed based on the intersection of their value and momentum (Chen, 2020).

3.2 Data Selection

All the data used in this study were taken from various Internet sources, such as the websites of the National Bureau of Statistics, the National Bank of Kazakhstan, KASE and other reliable

sources. The data covers the period from January 2017 to December 2021, because full information is available only for these last 5 years. We also took data purely for 2021, because this year Kaspi Bank began listing on the Kazakhstan Stock Exchange. The reason for the separate inclusion of this bank is the fact that its shares are also listed on the London Stock Exchange in parallel. The R programming language and several additional data-cleansing libraries as well as data visualization packages were used to explore this topic. See package list in Annex 1 and core code in Annexes 2, 3, 4, 5.

Referring to the availability of data, the following second-tier banks were selected for the study: Bank CenterCredit, Forte Bank, Halyk Bank and Kaspi Bank. They are among the top 10 largest banks in Kazakhstan and are listed on the KASE stock exchange. Also, they are in the list of banks, which are not subsidiaries of foreign banks. For example, Jýsan Bank was dropped because it stopped listing from the beginning of 2019. Bank CenterCredit, Kaspi Bank and Forte Bank are about the same size, while Halyk Bank is the largest bank in Kazakhstan and occupies about 32% of all assets of the banking sector in the country. All the above-mentioned banks have their own share capital structure. As a result, it can be seen that more than half of the companies are occupied by individuals owning banks directly or through holdings.

The economic variables include Market Index (KSE 100 Index), Exchange Rate (Ex Rate), Risk Free Rate of Return (RFR), Money Supply (M2), Consumer Price Index (CPI), Industrial Production Index (IPI), Credit Portfolio and Oil Price.

In addition, for the purposes of this study, changes in returns on the KASE stock exchange on which these banks are quoted were used. The main idea is that the changes in the market are immediately reflected in the share price, as confirmed by some studies (Muneer, 2011). Additional data have been collected on the Consumer Price Index (CPI) and the Industrial Production Index (IPI), as the increase in these indicators leads people to feel money shortages and to withdraw money

from bank deposits or take out loans. Therefore, it causes changes in bank assets and serves as a signal to the market. By the same logic, the data were taken for the exchange rate (Ex Rate). We also used a risk-free rate, as the central bank influences the key rate through risk-free government bonds. When interest rates rise, banks start lending less, which reduces the bank's efficiency and can be a signal to investors. We took TONIA as a reasonable risk-free rate. Because it is the indicator of second-tier banks of the Republic of Kazakhstan and the foreign exchange market. For the same reasons, the money supply was chosen, which reflects the amount of money circulating in the country's economy. In addition, general changes in the loan portfolio of second-tier banks (CreditPortfolio) were taken into account. The credit portfolio is an important indicator, because it can be used to assess the effectiveness and future prospects of the bank. The last value was the change in the value of oil (the price of oil) due to the fact that Kazakhstan is an oil-dependent country. Since over a certain period of time in future periods, the price of oil affects the microeconomic and macroeconomic variables, we took real Brent oil in US dollars. The price of our oil is set based on reference grades, in our case it is Brent, since the quality of our black gold is similar to the quality of the Brent brand.

3.3 Regression analysis methodology

In this study, a regression model was used. A regression model is a statistical method that examines the influence of one or more independent variables on one dependent variable. This model, in addition to statistics, is also used in machine learning. As a dependent variable, the return on the share price was used instead of the share price itself, this is due to the fact that all banks have different stock price ranges at the moment. The final model as a whole looks like this:

$$\begin{aligned} Return_i = & \beta_0 + \beta_1 MarketIndex + \beta_2 CPI + \beta_3 RFR + \beta_4 ExRate + \beta_5 IPI \\ & + \beta_6 MoneySupply + \beta_7 OilRrice + \beta_8 CreditPortfolio \end{aligned}$$

$Return_i$ is the return on shares of bank;

$\beta_1 MarketIndex$ is the profitability of the exchange in our case KASE;

$\beta_2 CPI$ and $\beta_5 IPI$ are consumer and industrial inflation values;

$\beta_3 RFR$ is the risk free rate;

$\beta_4 ExRate$ is the difference between the rates for the period;

$\beta_6 MoneySupply$ is the money supply in circulation;

$\beta_7 OilRrice$ is the difference between oil prices over the period;

$\beta_8 CreditPortfolio$ is the change in the loan portfolio of second-tier banks.

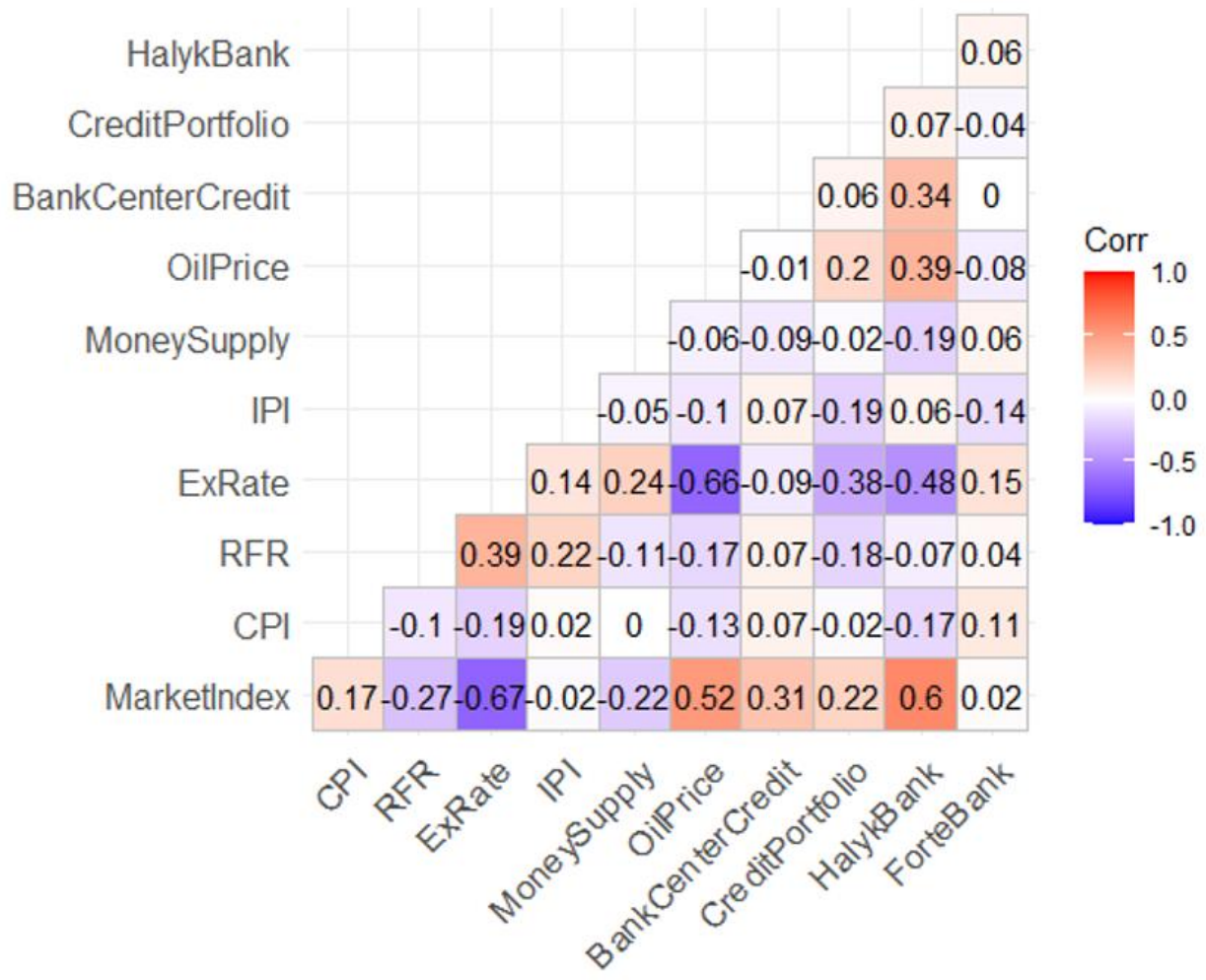
Once we get the results, we can not be 100% sure that these data are absolutely correct. For this purpose, so-called statistical hypothesis tests are carried out in statistics. Their point is that we are trying to disprove the null hypothesis. In turn, this zero hypothesis, to put it roughly, tells us that the data we get are equal to the data from our totality. In connection with all this, the Student's t-test was taken as the verification criterion.

Chapter four - Results and Discussion

4.1 Regression analysis results and discussions

For the purposes of this study, thermal correlation maps were first made to consider which variables strongly affect each bank. Table 1 shows the banks that have a research period from 2017 to 2021.

Table 1: Correlation of variables from 2017 to 2021.



As we can see, Bank CenterCredit has a very slight positive relationship with Market Index. In turn, the shares of Forte bank do not correlate with independent variables at all. As for Halyk Bank, you can observe a positive association with factors like Market Index and Oil Price and an average negative relationship with Exchange Rate.

Table 2: Regression results from 2017 to 2021

	Bank CenterCredit	Halyk Bank	Forte Bank
Market Index	0,817***	0,884***	0,820
CPI	-0,005	-0,102***	0,112
RFR	0,121	0,105	0,029
Exchange rate	0,135	-1,065**	2,509
IPI	0,001	0,002	-0,011
Money Supply	0,014	0,070	0,034
Oil Price	-0,146	-0,085	0,106
Credit Portfolio	0,059	-0,161	0,052
Constant	0,004	0,066***	-0,027
Observations	60	60	60
R²	0,163	0,494	0,101
Adjusted R²	0,031	0,415	-0,040
Note:	*p<0,1;	**p<0,05;	***p<0,01

Source: Author calculations

The first thing to notice from the results of the created regression is the difference in the obtained values of R^2 . R^2 is a value that shows how our chosen independent variables explain the changes in our dependent variable. As can be seen most of all our model explains Halyk Bank and a little Bank CenterCredit, but the practically does not explain Forte Bank values. It is important to note that R^2 has drawbacks. This value is very much affected by the number of selected variables. In other words, the more variables we take, the more R values there will be, which can lead to distorted results. To solve this problem, it is recommended to take adjusted R^2 , as it is not so affected by the number of selected variables. After that we can say that the variables chosen by us very poorly explain ForteBank.

The reasons may be different, but we assume the following:

In the case of Forte Bank, the cause could be that the profitability of the bank (our dependent variable) did not change at all in some periods (Annex 6). This may be explained by weak demand for the bank's shares.

We can also see that our chosen macro-economic factors do not explain the change in return of Bank CenterCredit shares. In turn, the changes of return on Halyk Bank's stocks respond significantly to the changes in independent variables. The reason for this may be that it is the largest second-tier bank in Kazakhstan.

If you go back to understanding the indicators on the table, then the stars next to the numbers mean whether the obtained values are significant, that is, shows how far the results are obtained randomly. For example, 3 stars tell us that we can get such results with a chance of less than 1% when using Student's t-test. In Figure 1 you can see what t-criterion values are obtained for ExRate in Halyk Bank. Also, in Figure 2 what is the chance of getting such values.

Picture 1

```
lm(formula = FormulaHalykBank, data = HalykBank)
```

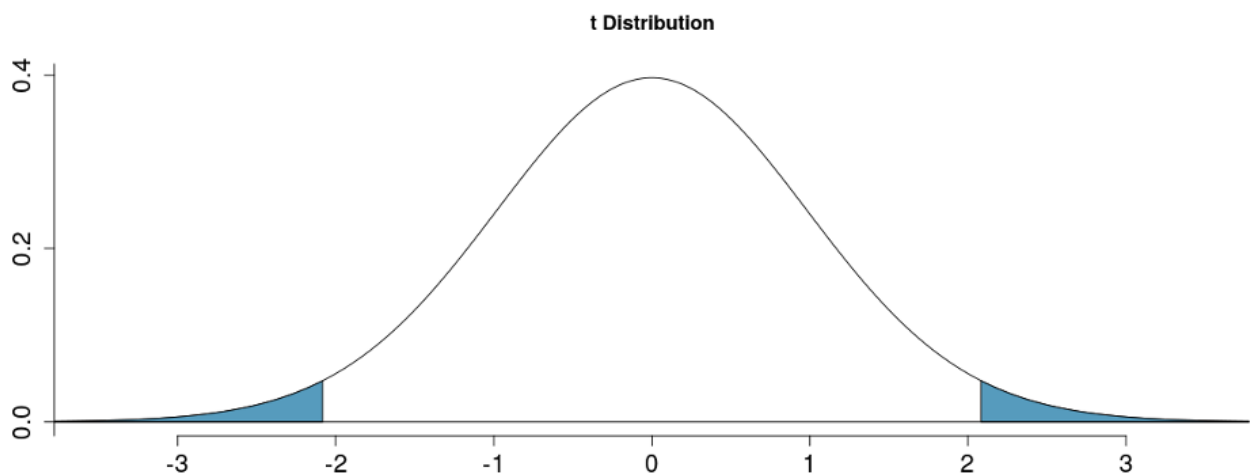
Residuals:

	Min	1Q	Median	3Q	Max
	-0.104529	-0.044370	-0.007247	0.024972	0.169545

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	0.066350	0.021044	3.153	0.002707	**
MarketIndex	0.884386	0.226097	3.912	0.000272	***
CPI	-0.101865	0.033296	-3.059	0.003531	**
RFR	0.105383	0.089147	1.182	0.242636	
ExRate	-1.065199	0.514445	-2.071	0.043478	*
IPI	0.001752	0.002750	0.637	0.526874	
MoneySupply	0.069732	0.268637	0.260	0.796235	
OilPrice	-0.085228	0.099832	-0.854	0.397255	
CreditPortfolio	-0.161171	0.133397	-1.208	0.232540	

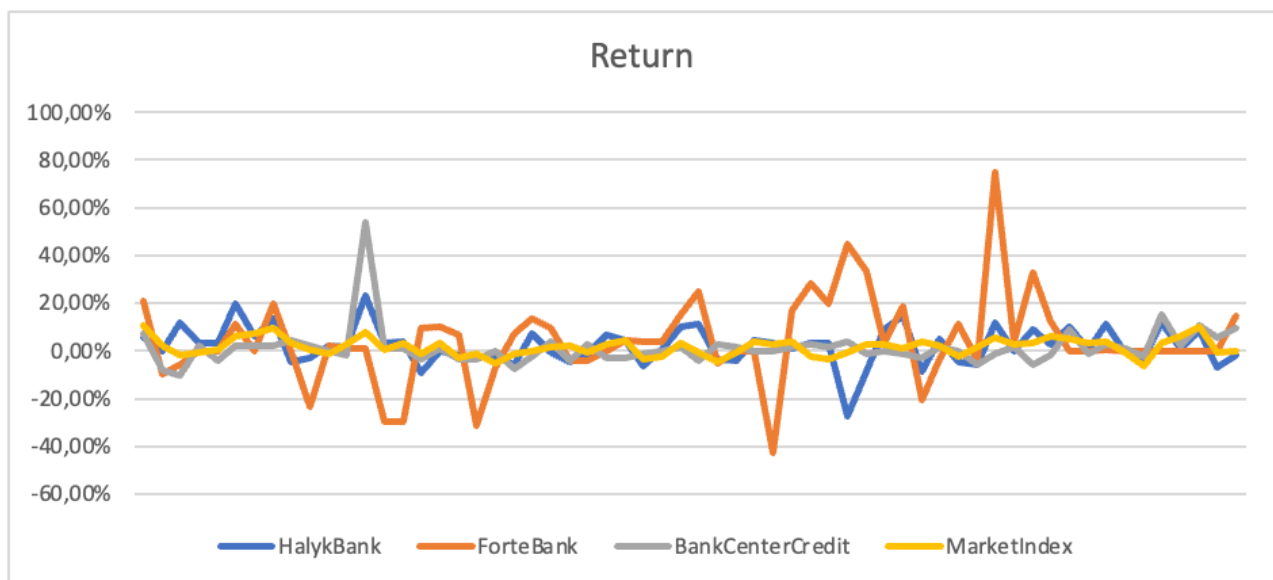
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1



$$P(X < -2.08 \text{ or } X > 2.08) = 0.0427$$

According to the results of this study it is clear that the price of oil is not a significant indicator that affects changes in the prices of banks' shares, which does not coincide with the results of other studies (Mohammed, S. S., Di Li, Akram, S. H., 2021). Also, such an indicator as the level of money supply is not material and influences the bank in absolutely different ways that differs from the data of other researchers (Hel Ajmi Jameel Al-Dhaimesh, 2020). In addition, it can be seen that changes in the risk-free rate does not have any impact on the price of shares of these banks.

Figure 3

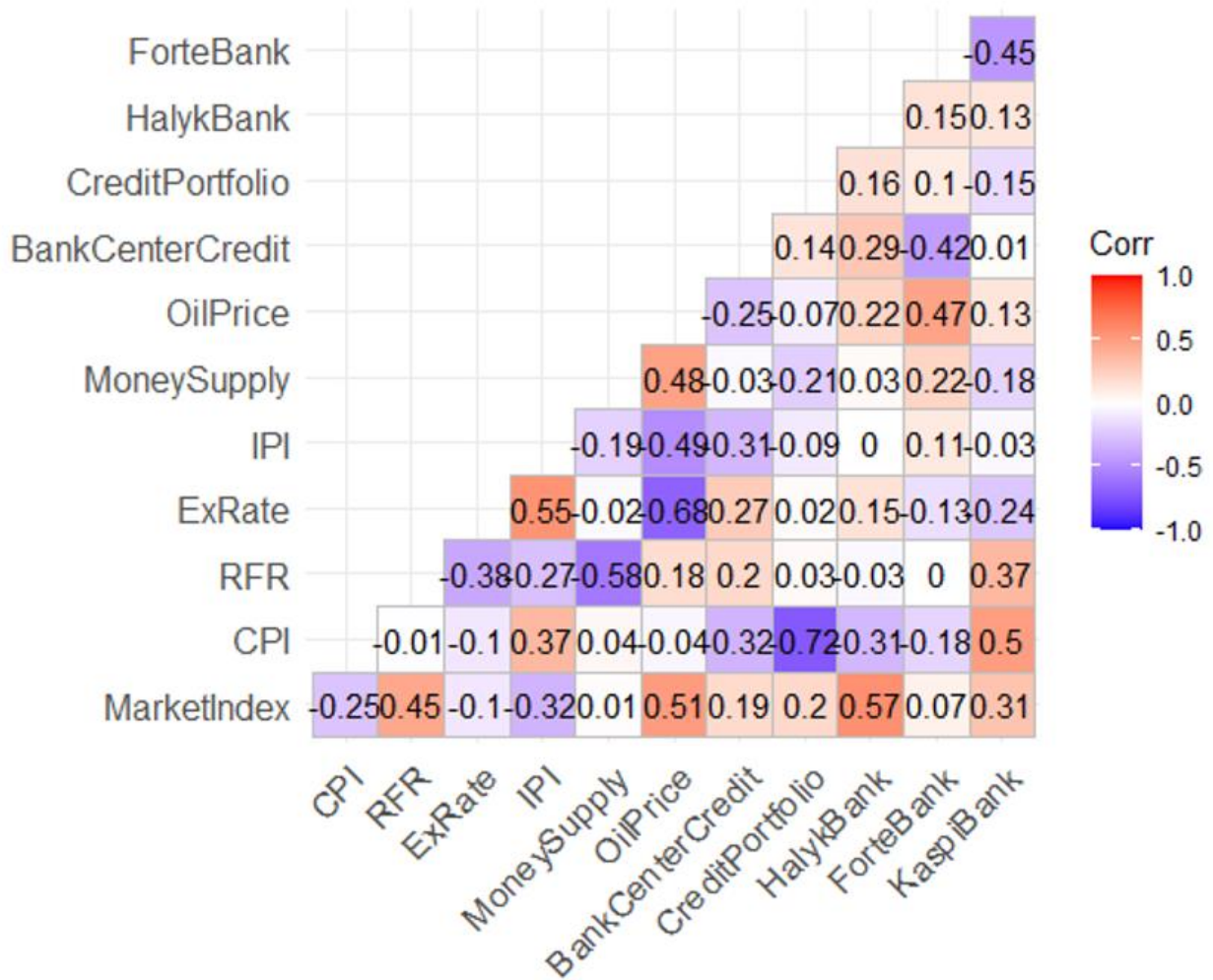


Let's now look at the results for Forte Bank. We can see that the bank has no significant data. This may be due to the fact that the stock prices of Forte Bank were unchanged at some points, as mentioned above. Also, a consequence of this may be the market value of the stock, which costs within 5 tenge and a slight change in this value has a very strong impact on the yield. All this can be seen in Figure 3 above. Another reason may also be that the majority of Forte Bank shares do not participate in the auction, but are held by a single large shareholder with a share of 90.6 percent.

The Bank CenterCredit results are broadly similar to Forte Bank, but the share price is affected by a fairly large change in the yield of the KASE stock exchange. Based on our table, the increase of KASE stock yield by 1 percent boosts Bank CenterCredit's yield by 0.817 percent.

Halyk Bank is the only bank among 3 banks whose shares are explained by independent variables in a significant manner. According to the table, the share price of the bank is influenced by positive changes in the yields of KASE exchange the same results were obtained from other researchers (Faff and Chan, 1998; Joseph and Vezos, 2006; Ibrahim, 1999; Saqib, Babar, Kashif, 2011). Thus, a 1 per cent increase in the yield of the stock exchange goes up the yield of Halyk Bank's shares by 0.884 percent. At the same time, the growth of consumer inflation negatively affects the stock price of the bank, to the same results came other researchers in their works (Cozier and Rahman, 1988; Ibrahim, 1999; Saqib, Babar, Kashif, 2011). Thus, the rise in inflation by 1 point reduces the yield of Halyk Bank shares by 0.102 percent. There is also a negative correlation between the exchange rate, which can be explained by the fact that people in Kazakhstan, due to several currency devaluations, usually go to cash their deposit accounts in order to convert them into foreign currency. In this regard, we can say that the boost of the exchange rate decreases the yield of Halyk Bank's stock by -1.065 percent.

Table 3: Correlation of variables for 2021



In addition, thermal correlation maps and regression were made, which included data for 2021 only. From table 3 above we can see that all banks except Forte Bank have a Market Index relationship. It is also noticeable that Halyk Bank, compared to previous years, lost its connection with the rest of the values. Among all banks, Kaspibank stands out, which has a positive correlation with CPI and RFR.

Table 4: Regression results for only 2021 year

	Bank CenterCredit	Halyk Bank	Forte Bank	Kaspi Bank
Market Index	0,445	1,290	-1,973	1,227
CPI	-0,066	-0,183	-0,149	0,779
RFR	0,426	-0,459	0,347	0,080
Exchange rate	0,142	-1,215	8,453	0,548
IPI	-0,012	0,010	0,020	-0,021
Money Supply	1,954	-1,031	-1,158	-0,634
Oil Price	-0,784	0,046	2,015	-0,123
Credit Portfolio	-0,012	-0,221	0,113	0,527
Constant	0,089	0,132	0,045	-0,421
Observations	12	12	12	12
R²	0,590	0,589	0,679	0,622
Adjusted R²	-0,502	-0,506	-0,175	-0,385
Note:	*p<0,1;	**p<0,05;	***p<0,01	

Source: Author calculations

As can be seen from the table above, the data showed no significant results for any bank, so their interpretation makes no sense. Then we can say that the variables chosen by us very poorly explain Kaspi Bank. We assume that the shortage of substantial data for Kaspi Bank can be explained by the fact that there is a small period for research, as mentioned above. The second reason could be that in addition to the Kazakhstan stock exchange, the bank is also listed on the London stock exchange. From this fact may follow that the shares of the bank depend to a large extent on the change in the foreign stock exchange rather than on KASE.

Chapter five - Conclusion and Recommendations

5.1 Conclusion

The results of the research are to provide a relationship between the dependence of stock returns on specific macroeconomic and industry variables using a multifactor model. In this study, a regression model was used, which was divided into 2 parts. The first part of the study consists of correlations of variables of 3 banks: Halyk Bank, Forte Bank and Bank CenterCredit, which were listed from 2017 to 2021, and in the second part of the research, data from Kaspi Bank for 2021 were additionally added. The conducted research allowed us to draw the following conclusions:

The profitability of Halyk Bank shares has a positive relationship with the Market Index and Oil Price, as well as an average negative relationship with the Exchange Rate. While Bank CenterCredit has a very small positive relationship with the Market Index, and in turn Forte Bank has no relationship at all. As you can see, most of our models explain Halyk Bank and a little bank CenterCredit well, but the practical one does not explain the values of Forte Bank and Kaspi Bank in any way.

However, the conducted research allowed us to find out that this is due to the fact that Kaspi Bank has only recently started listing, so we were forced to take a very short time in the second part

of the research. In the case of Forte Bank, the reason is the low growth in the profitability of shares, since in some periods the profitability of shares did not change. Another reason may be that most of the shares are owned by a large shareholder who owns 90.6% of the shares. Also, it follows from the above that a very large percentage of variables is explained by Halyk Bank, since it is the largest second-tier bank.

If we summarize the selected variables, the data found and analyzed allow us to reveal that of all the variables, the risk-free rate has no effect, while the price of oil is not a significant indicator that affects the prices of banks' shares. Most of all, variables such as Exchange Rate and Market Index were able to have the greatest impact in comparison with other variables. Thus, based on the results obtained, it is concluded that the profitability of the KASE exchange positively affects the share price, while the growth of consumer inflation negatively affects the value of the bank's shares. Consequently, an increase in the exchange rate by 1 percent reduces the profitability of the stock, and an increase in inflation by 1 point reduces the profitability of Halyk Bank shares.

In the course of an additional investigation, in which data from 4 banks were taken only for 2021, it was also concluded that the results did not show any significant results for any bank, unlike the first regression.

5.2 Recommendations

Based on the work done, and its conclusions and results, below are some recommendations that will be of interest to those involved in the Kazakh capital market. The study tests a multifactorial model at the firm and industry level, which is being tested by 4 secondary banks from one sector of the economy due to the lack of banks trading on the stock exchange over the past 5 years, but the work can be expanded by considering other banks.

The model of this study consists of 6 macroeconomic variables and two industry variables, but this list can be expanded by using some economic indicators that are not yet available. For example, you can add a banking spread, show the difference between the lending interest rate and the deposit rate, thereby showing the size of the bank's profit margin. In this study, the banking spread was not added due to the unavailability of information.

Also, the first regression covers the last 5 years, however, for a more detailed and accurate analysis, it is advisable to take the last 5-10 years, since information on banks accumulates and, in particular, it is possible to deduce an exact correlation between the profitability of shares of Kaspi Bank and other variables.

Appendix 3: Clean data

```

29 #       Clean Data|
30
31 BankCenterCredit <- BankCenterCredit %>%
32   rename(MarketIndex = 2, ExRate = 5, MoneySupply = 7, OilPrice = 8,
33         BankCenterCredit = 9, CreditPortfolio = 10) %>%
34   select(-1)
35
36 HalykBank <- HalykBank %>%
37   rename(MarketIndex = 2, ExRate = 5, MoneySupply = 7, OilPrice = 8,
38         HalykBank = 9, CreditPortfolio = 10) %>%
39   select(-1)
40
41 ForteBank <- ForteBank %>%
42   rename(MarketIndex = 2, ExRate = 5, MoneySupply = 7, OilPrice = 8,
43         ForteBank = 9, CreditPortfolio = 10) %>%
44   select(-1)
45
46 KaspiBank <- KaspiBank %>%
47   rename(MarketIndex = 2, ExRate = 5, MoneySupply = 7, OilPrice = 8,
48         KaspiBank = 9, CreditPortfolio = 10) %>%
49   select(-1)
50

```

Appendix 4: Make Regression

```

53 #       Formula
54
55 FormulaBankCenterCredit <- BankCenterCredit ~ .
56
57 FormulaHalykBank <- HalykBank ~ .
58
59 FormulaForteBank <- ForteBank ~ .
60
61 FormulaKaspiBank <- KaspiBank ~ .
62
63
64 #       Regression
65
66 RegBankCenterCredit <- lm(FormulaBankCenterCredit, data = BankCenterCredit)
67
68 RegHalykBank <- lm(FormulaHalykBank, data = HalykBank)
69
70 RegForteBank <- lm(FormulaForteBank, data = ForteBank)
71
72 RegKaspiBank <- lm(FormulaKaspiBank, data = KaspiBank)
73
74
75 #       Save
76
77 stargazer(RegBankCenterCredit, RegHalykBank, RegForteBank, RegKaspiBank,
78         type = "html", out = paste(dirname(rstudioapi::getActiveDocumentContext())$path)

```

Appendix 5: Make Correlation

```

L22 # Plotting the correlation heatmap
L23 |
L24 corr <- round(cor(KaspiBank), 2)
L25
L26
L27 ggcorrplot(corr, type = "lower",
L28             lab = TRUE)
L29

```

Appendix 6: Forte Bank stock change

● Архив В течение текущего дня



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