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**The effects of monetary policy on Inflation in Kazakhstan**

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## **Abstract**

This study examines the impact of monetary policy on inflation in Kazakhstan. To evaluate the model, annual data for 2013-2022 were used. The study was limited to these variables, the interest rate, the exchange rate, and the money supply versus inflation. In the research, we used the FDL multiple linear regression model with time series data. Main variables of the model, which used by the national bank to control inflation, are the discount rate, money supply, and exchange rate. Also, to achieve correct results, the model has been improved by “lag”, i.e. to determine which subsequent periods are affected by the discount rate increase. The results of our study showed that in order to reduce the growth of inflation, an increase in the interest rate and a decrease in the money supply is followed by a decline in the inflation rate in the next quarter, but the exchange rate does not have a significant impact on the inflation rate. Economic and geopolitical shocks also have a substantial impact on inflation. Therefore, in our study, it is recommended to use not only monetary policy to control inflation but it is also required to use fiscal and other non-monetary measures.

**Key words:** *Monetary Policy, Inflation, Money supply, Interest rate, Exchange rate*

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## **1. Introduction**

Today, inflation is one of the most discussed economic terms in the media and public. Like Lekachman (1973), many economists have used different definitions of inflation, but there is a common theme. Inflation is usually defined as a continuing or sustained upward trend in the overall price level. According to economists similar to Friedman (1963), inflation is the result of the state's monetary policy, represented by the regulator.

It is widely believed in the economic community that monetary policy, by controlling the money supply in the economy and influencing interest rates, can help maintain price stability, creating an enabling environment for sustained economic growth. Numerous detrimental effects of inflation include reduced purchase power of money, which might result in a drop in living standards for those on fixed incomes or with savings. Due to inflation, prices for products and services may grow quicker than the earnings of the most disadvantaged people, resulting in an unfair distribution of wealth and income among different demographic groups. A worsening of the economy and a rise in uncertainty are caused by unanchored inflation expectations, which can result in unstable prices for goods and services and make it challenging for businesses to plan and invest.

Monetary policy in Kazakhstan is aimed at curbing inflation, which has a significant impact on the economy. The National Bank of Kazakhstan implements monetary policy through various instruments, such as adjusting the required reserves for commercial banks, setting a discount rate for loans to commercial banks, or engaging in open market operations to buy or sell government securities. The specific goal of monetary policy may vary depending on the economic and financial conditions of the country. Still, its overarching goal is to maintain price stability, full employment, and economic growth. Inflation is a word that is very common in everyday life. Everyone describes inflation in their way; Amadeo (2012) cited it as when the prices of most goods and services continue to creep upward, leading to a low standard of living (p.10). Due to inflation, there is uncertainty and difficulty in predicting the relative prices of goods and services, which constitutes an obstacle to making financial decisions in everyday life. Most people strongly dislike high and variable inflation, which causes many economic

distortions (Agarwal & Kimball, 2022, p.123).

According to information taken from the official website of the NBK ([www.nationalbank.kz](http://www.nationalbank.kz)), inflation can be caused by various factors, both internal and external. Internal factors include the velocity of money in the economy, the output gap, inflationary expectations of the population, labor productivity, the level of employment, competition in the markets, and the per capita income. External factors affecting inflation are prices on world commodity markets, exchange rates, international trade relations, and other economic events.

The Consumer Price Index (CPI) is the most widely used measure of inflation. CPI is a consumer basket of goods and services, thus measuring the average cost of living. The percentage change in the CPI over a given period is consumer price inflation.

## **2. Literature review**

Inflation often leads to a rise in poverty from loss of purchasing power (Cardoso, 1992). This leads to social tensions and high inflationary expectations, as it causes many economic distortions and uncertainties. The study of inflation and monetary policy is essential for economic analysis, and Kazakhstan is no exception. This literature review will look at existing articles and studies on this topic, focusing on Kazakhstan.

One of the critical conclusions of the article by Kadirbekov and Kazieva is that inflation is a multifactorial problem, and its solution requires a comprehensive approach (Kadirbekov & Kazieva, 2019). This article considers the main factors influencing inflation in Kazakhstan and proposes a strategy to combat inflation. According to the authors, one of the leading causes of high inflation is a weak link between monetary policy and the real sector of the economy.

The main idea of Mukhamediev's article (Mukhamediev, 2018) is that price stability and inflation persistence in the economy of Kazakhstan directly depend on properly organized monetary policy and the balance between fiscal and budgetary policies. The author also points out the importance of money supply management and price control of goods and services in the economy. It analyses how fiscal policy can play a role in controlling inflation.

Naroziev (2007) provides an overview of the world's experience in regulating inflation and inflation expectations, including the experience of developed countries such as the USA, EU, and Japan and the experience of developing countries such as Brazil, Mexico, and India. Special attention is paid to the experience of Central Asian countries, including Kazakhstan. According to the article, Kazakhstan has pursued several initiatives to control inflation in Central Asia, including adopting inflation targeting, enhancing fiscal restraint, and carrying out structural reforms. The efficacy of these efforts in recent years in keeping Kazakhstan's inflation rate low is highlighted in the article. Overall, the paper offers a helpful summary of international techniques for controlling inflation and emphasizes the significance of controlling inflation expectations.

Key factors such as central bank independence, transparency policy, monetary instruments, and sustainable fiscal policy are the foundations for confidence in the monetary policy conducted (Bems et al., 2021). The main conclusion is that an integrated approach, which should include monetary policy and fiscal, monetary, and structural policies, must be used to manage inflation effectively. It is also necessary to consider the peculiarities of Kazakhstan's economy and the international experience in regulating inflation. When administering strategies to control inflation, it is vital to consider the unique characteristics of the Kazakhstan economy. For instance, its material reliance on commodity exports, particularly oil, and the extent to which the financial system laboriously dollarized. Additionally, the nation confronts considerable external shocks and has a relatively high level of economic openness, which can affect inflation.

Thus, scientific research shows that monetary policy plays an essential role in combating inflation in Kazakhstan, but it is necessary to consider various factors and features of the national economy in its implementation.

## **2.1 Conceptual Framework**

The money supply, inflation, and monetary policy are closely related.

The money supply is the sum of money in the economy. Altogether, the monetary policy is a set of measures.

The central bank takes to manage the money supply and inflation. The central bank, “the Bank’s Bank,” uses numerous appliances to collect the money supply and inflation. For instance, it can affect interest rates through its discount rate, reserve requirements, and mind-open market operations.

Inflation can increase if the money supply is prospering than the accurate volume of consumption in the economy. Given this, the central bank may react to reduce the money supply, such as by uplifting interest rates. If the money supply grows more slowly than the natural volume of goods and services, then this can lead to deflation or low inflation. In the case that the central bank may take a move to display the money supply, such as dropping interest rates.

However, in practice, the effectiveness of a monetary policy depends on a variety of factors, including the state of the economy, the behavior of households and businesses, and various external shocks, such as a sudden increase in the world commodity prices.

## **2.2 Theoretical Framework**

Inflation has always been the subject of in-depth research for economists, with different schools interpreting inflation differently. For a long time studying this process, many theories and guesses voiced that tried to explain the factors that strongly influence the inflation process—several main provisions related to the primary factors performed in several schools of thought.

For example, adherents of *monetarism* believe that central banks' main task should be to maintain stable money supply growth and not to keep specific interest rates or various economic indicators. One of the scientific works on monetarism is the book "Monetary History of the United States" (Friedman & Schwartz, 1963). This book is in particular because the authors consider the history of money in the example of the United States and how specific processes affected the country's economy. For instance, the book indicates that the money supply changed crucially in the late 90s and early 00s. Due to this, inflation increased. Another important aspect of this school of thought is the concept of the velocity of money circulation - the average number of revolutions made by a monetary unit during the year. Monetarists say that changes in the speed of money circulation are less significant than changes in the amount of money in the economy (Friedman, 1956).

The *quantitative theory of money*. This theory forms on the fact that there is a direct and proportional relationship between the money supply and the price level, with the obligatory condition that other factors will remain unchanged. According to this theory, a unique equation defines these statements:

$M * V = P * Y$ , where

- M is the money supply;
- V is the velocity of money circulation;
- P is the price level;
- Y is the level of actual output.

This equation demonstrates the same connection when, with an increase in the money supply, the price level or the production volume will increase, depending on the speed of response.

**Keynesian theory.** Another macroeconomic theory indicates state intervention's high role in the country's economy. According to the votary of this theory, this is necessary to maintain the country's economy in a stable state. It is leading to long-term economic growth.

One of this theory's central ideas is that aggregate demand plays a significant role in determining the level of economic activity.

Keynes proclaimed that insufficient aggregate demand could inspire prolonged unemployment and low economic growth. By addressing this issue, Keynes advocated for government intervention through fiscal policy, such as increasing government spending or cutting taxes, to stimulate aggregate demand and promote economic growth (Keynes, 1936).

In addition to addressing recessions, it is significant to note that the Keynesian approach also offers insights into inflation. According to Keynesian economics, inflation can occur when aggregate demand exceeds the productive capacity of an economy. Keynesians argue that fiscal and monetary measures are plausibly transformed to manage and control inflationary pressures in such a situation. By regulating government spending, taxation, and monetary policy, policymakers can direct to strike a balance between stimulating aggregate demand to combat recessions and controlling inflationary pressures within an economy.



Keynesian economists suggest that the government can implement contractionary fiscal measures, such as reducing government spending or increasing taxes. Diminish aggregate demand and mitigate inflationary pressures.

Furthermore, the central bank can use monetary tools, such as raising interest rates or tightening the money supply by controlling inflation. The Keynesian method emphasizes the weight by carefully managing twain aggregate demand and inflationary pressures to achieve stable and sustainable economic growth.

### **2.3 Empirical review**

Over the years, the Kazakhstan economy has undergone several changes, and one of the valuable areas that politicians have focused on is inflation. The National Bank of Kazakhstan (nowadays - NBK) is promptly pursuing a monetary policy to maintain a stable inflation rate. This section examines the impact of monetary policy rates on inflation in Kazakhstan. The Central Bank of Kazakhstan used monetary policy instruments to control the degree of inflation in the country. Several studies have examined the impact of this policy on inflation. Multiple studies have examined the impact of monetary policy on inflation in Kazakhstan. Kalyuzhnova et al.(2016) analyzed quarterly data from 2003 to 2013 and found a significant relationship between inflation and interest rates. They indicated that the monetary policy successfully controlled inflation in the country. Kasymova and Suleimenova (2019) used monthly data from 2001 to 2017 and found that monetary policy rates considerably impact inflation in Kazakhstan. They used a vector autoregressive model (VAR) to calculate the bank rate and stock connection.

Similarly, Esenova and Baymukhanova (2018) used monthly data from 2001 to 2017 and found that monetary policy rates substantially impact inflation in Kazakhstan. They used a structural vector autoregression (SVAR) model to determine the relationship between fiscal policy and diffusion. The study showed that fiscal policy has a limited effect on stock and requires the central bank to adjust bank rates regularly to maintain an inflation balance.

Tolegenova et al. (2021) reviewed monetary policy's impact on Kazakhstan's inflation using monthly data from 2008 to 2019. The study found a permanent relationship between monetary policy rates and inflation

in Kazakhstan. Additionally, the authors discovered that changes in interest rates have a fascinating impact on inflation. These studies demonstrate a significant connection between monetary policy rates and inflation in Kazakhstan. They also reveal that the Central Bank of Kazakhstan has successfully controlled inflation through its monetary policy measures.

The results also indicate that the central bank needs to continue adjusting interest rates to maintain a stable inflation rate. These findings are important for policymakers in Kazakhstan and can serve as a basis for future monetary policy decisions.

## **2.4 Overview of Kazakhstan banking sector: National Bank, inflation, strategy 2030**

**History.** The collapse of the Soviet Union in 1991, gaining independence, and the subsequent transition from a planned economy to a market economy - dispersed inflation in Kazakhstan. Until the end of the 1990s, inflation in the country had unpredictable trends. The previously unexplored market economy, involving free pricing, led to a sharp price rise. As a result, at the end of 1992, inflation in Kazakhstan amounted to 2962%. The Kazakhstan government introduced reforms to counteract inflation and stabilize the economic situation.

The introduction of its currency, the tenge, in 1993, the low level of foreign exchange reserves, insufficient political stability, and high inflation, which increased the likelihood of massive currency speculation, made it impossible for Kazakhstan to introduce a fixed exchange rate. In this regard, the government of Kazakhstan has taken measures to strengthen tenge while maintaining a freely floating rate. According to Kazbekov (2021), the reasons for ineffectiveness lie in the breakdown of existing markets and value chains within the CIS countries, especially with Russia, and limited access to foreign markets. At the same time, the cost of imports increased, which led to adverse shifts in the current account balance, a decrease in production volumes, a reduction in gold and foreign exchange reserves, and an increase in the country's external and internal debt. Distrust in the new currency, hyperinflation, and general economic instability - led to the depreciation of the tenge, increased inflation expectations, and, as a result, an even more significant increase in inflation. The devaluation of the tenge was so rapid that it limited the ability to use various monetary policy instruments to combat inflation.

As a result, from the second half of 1994, the exchange rate's policy changed from floating to "managed" floating. Between 1995 and 1999, inflation was high but stabilized at about 30%.

In 2000, the period of stabilization of the economy of Kazakhstan began. During this period, inflation decreased from 6% to 10%. In 2007, inflation reached 18.8% due to rising food and energy prices amid the global financial crisis.

From 2008 to 2014, inflation was relatively low and did not exceed 8%. In 2015 it increased to 13.6% due to the fall in oil prices and the ruble. In addition, this year, the tenge goes into the so-called "free float", and the NBK switches to the inflation-targeting regime. With the transition to a floating exchange rate, the National Bank keeps inflation within the target corridor by changing the discount rate. Since 2015, the NBK's increased attention to domestic price stability and the emphasis on exchange rate flexibility helped to anchor inflation expectations and absorb external shocks. Generally, the National Bank does not intervene in the exchange rate but can carry out interventions to smooth out market volatility. In 2016, inflation decreased to 8.5%, and in 2017 to 7.1%.

In 2018, inflation in Kazakhstan was at the level of 5.3%. In 2019, it decreased to 4.6%, but in 2020 it rose to 7.4%, associated with the COVID-19 pandemic and the global value chains crisis. At the end of 2021, inflation reached 8.4%. The Russian invasion of Ukraine in 2022 impacted economic activity in Kazakhstan. Inflation rose to 20.3%, reflecting global inflation and local shocks.

From 2016-2019, the discount rate had a downward trend. In 2020, there was some tightening due to the pandemic. Due to the risks amid the uncertainty of the geopolitical situation, starting from February 2022, the monetary policy tightened in response; the rate rose from 10.25% to 16.75% over the year.

**National Bank.** Before the creation of the National Bank in 1993, the Central Committee of the Communist Party of Kazakhstan and the Council of Ministers of the Kazakh SSR made decisions on the money supply. In those years, Kazakhstan was part of the Soviet Union, and the national currency - the Kazakh tenge - had not yet been introduced. Central planning was the primary tool for regulating the economy in those years, which determined the prices of goods and services and the money supply.

After Kazakhstan gained independence in 1991, the economic situation in the country began to change,

and it became necessary to create new institutions to regulate the economy. As a result, the National Bank - the central bank representing the first level of the banking system, the primary purpose of ensuring price stability in the country – has appeared (NBK Annual Report, 2022). Broadly understood, the tasks of the NBK include:

- Improving the welfare of the population of Kazakhstan through managing economic fluctuations.
- Ensuring low inflation.
- The financial system's stability.

The National Bank of Kazakhstan is engaged in the development and implementation of the monetary policy of the state. The main instrument of this policy is the manipulation of the discount rate. In addition, per the law, it ensures the functioning of payment systems and carries out currency regulation and control. For example, the NBA implements macroprudential policies to maintain the financial system's stability. This policy aims to reduce the financial sector's systemic risks and minimize the likelihood of a liquidity loss risk for a significant part of financial market participants, i.e., financial crisis. The NBK collects and analyzes monetary, financial market, and external sector statistics.

**NBK's Monetary Policy Strategy up to 2030.** The Strategy seeks to improve the transparency of the NBK's policy to ensure price stability and strengthen the foundations of the inflation-targeting regime in Kazakhstan. Inflation targeting is a monetary policy aimed at controlling the inflation rate by targeting a target value. This approach has been used in Kazakhstan since 2015, when the tenge moved to the so-called free float. As part of this policy, the NBK annually sets inflation targets. For example, by 2023, the target value is 4-5%. Inflation targeting allows investors and businesses to analyze and plan their investment decisions well in advance – increasing the predictability of monetary policy. One of the main difficulties that can be encountered in implementing inflation targeting is the discrepancy between inflation targets and actual economic conditions.

The NBK's Monetary Policy Strategy 2030 defines the main priorities and principles of conducting monetary policy, which will increase public awareness and understanding of the policies of the National Bank. The key initiatives in the Strategy are divided into three areas: 1) strengthening the monetary bases;

2) increasing the efficiency of the financial market; 3) strengthening the macroeconomic policy framework (National Bank of Kazakhstan, 2021).

### **3. Methodology**

#### **3.1 Regression model**

In this study, we replicate an econometric model from Ahiabor's paper "The effects of monetary policy on inflation in Ghana" (2013) to identify the relationship between the inflation rate (measured by CPI) and the NBK's monetary policy tools to reduce the inflation rate. Also, this model is the most suitable for our study, since the economy of Ghana is developing and the main part of GDP is agriculture and mining, likewise in Kazakhstan. The key instruments of the National Bank for reducing the inflation rate are:

- Discount rate which is the interest rate charged to commercial banks (second-tier banks) for the short-term loans they take from the National Bank;
- Money Supply (M1) which indicates the quantity of money on the market including currency, deposits and savings;
- Exchange rate. Actually, this is not the direct instrument of the National Bank. However, the National Bank can affect the exchange rates by providing currency interventions to control inflation.

In addition, we will be able to predict the value of the dependent variable (CPI Growth) assuming any changes in monetary policy.

The purpose of our study is to determine the dependence of the CPI growth rate on the monetary policy of Kazakhstan using quarterly data for 2013-2022 (40 quarters). The model is as follows:

$$\text{CPI Growth rate} = b_0 + b_1 * \text{Discount rate growth} + b_2 * \text{Exchange rate growth} + b_3 * \text{M1 growth} + b_4 * \text{Discount rate growth lagged}_1 + b_5 * \text{Discount rate growth lagged}_2$$

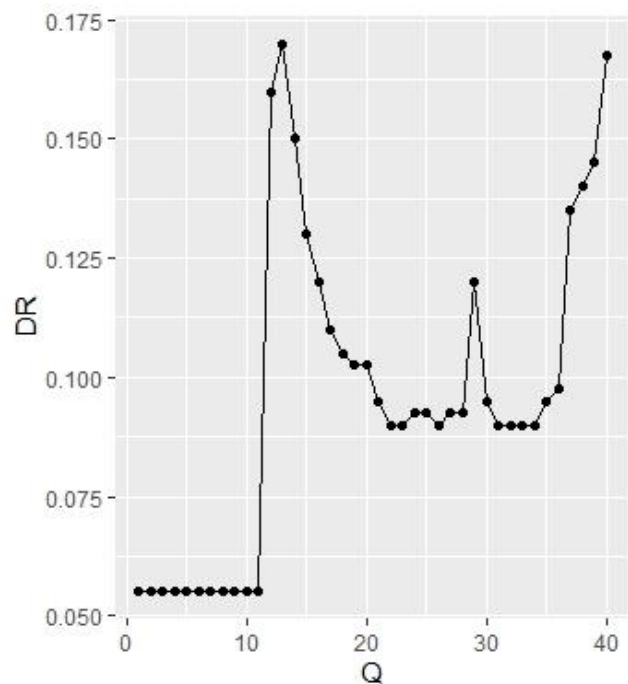


Figure 1 – Discount rate dynamics

The discount rate in Kazakhstan is the main instrument for controlling inflation, therefore, in cases of inflation spikes caused by political shocks, the national bank raises the rate significantly both in 2015 and 2016 after sanctions against Russia and in 2022 due to the war in Ukraine, as it is seen from figure 1.

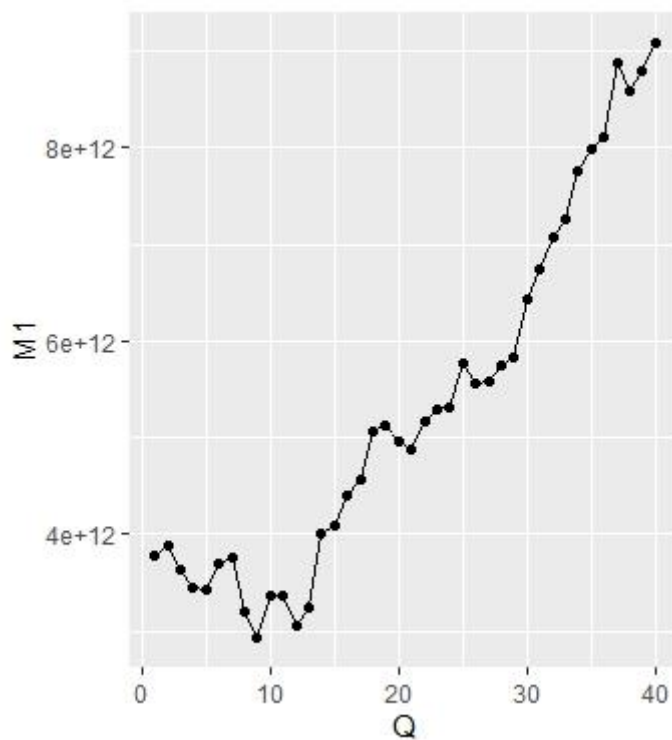


Figure 2 – Money supply dynamics

In Kazakhstan, where inflation is historically high, the money supply has had a positive trend over 10 years under analysis. When the national bank of Kazakhstan increases the money supply to stimulate the economy, then prices also increase.

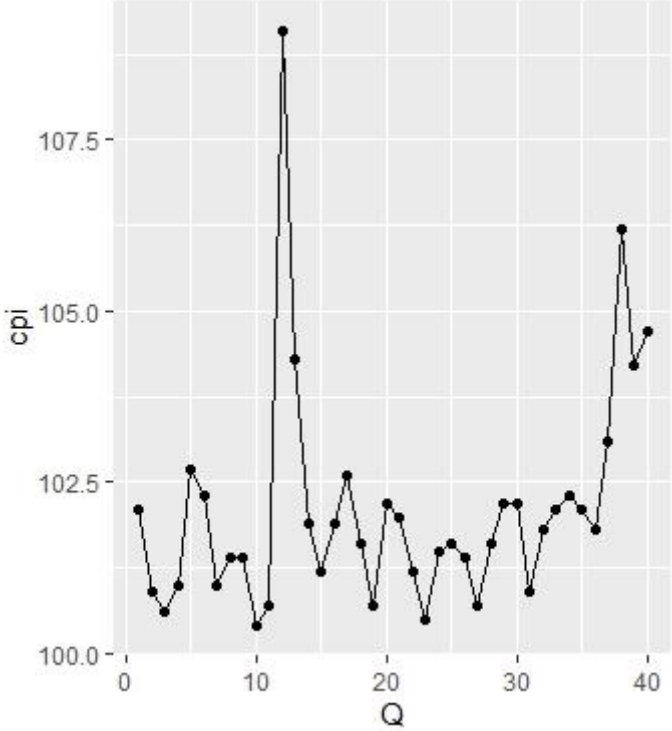


Figure 3 – CPI dynamics

Kazakhstan is a developing economy, where inflation has been high since independence. Political shocks also have a negative impact, such as the sanctions imposed on Russia, which is the main economic partner of Kazakhstan in 2014, and the war in Ukraine, which has been going on for more than a year.

Until 2015, Kazakhstan had a fixed exchange rate, which is typical for countries with developing economies, where the state allocates money from the budget to maintain the exchange rate of the national currency. The maximum exchange rate was observed in February – March 2022 when Russia invaded Ukraine.

To accommodate possible non-instant effects of the change in the discount rate on CPI growth, so we add lagged discount rate growth for one and two years as additional regressors to estimate its effect on current inflation. Thus, our model is the finite distributed lag (FDL) model.

Additionally, we employ all variables in their growth rates to show the effect of the change in the independent variables on the change in our dependent variable.

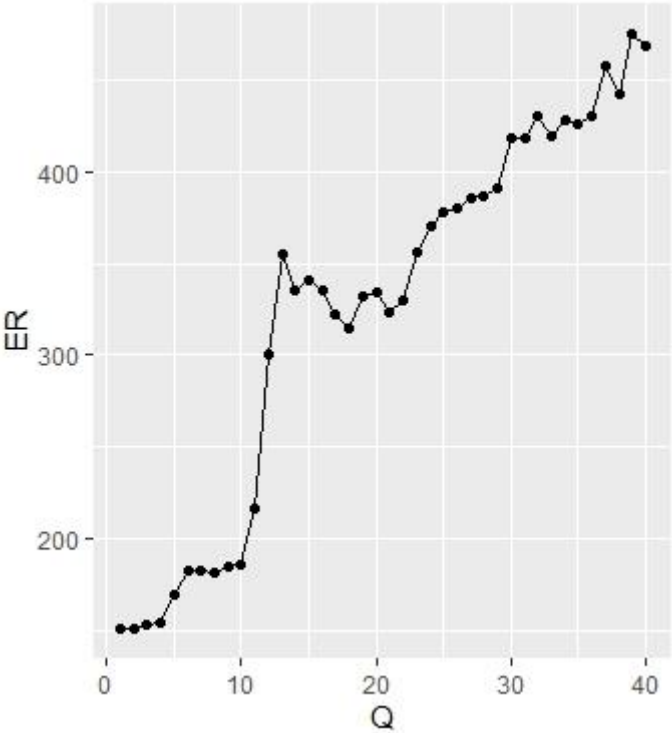


Figure 4 – Exchange rate dynamics

Data on Kazakhstan’s M1, discount rate, exchange rate, and CPI were taken from the following sources for the period from Q1 2013 to Q4 2022:

- Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan;
- National Bank of the Republic of Kazakhstan;
- Refinitiv.

**3.2 Results**

To estimate the effect of monetary policy on inflation, we used the FDL multiple linear regression model with time series data. The National Bank increases the discount rate during periods of high inflation, so the results of the rate increase have an impact on subsequent periods, while in the current period, we expect a positive correlation between CPI and the discount rate ( $b_1$  coefficient). To determine which



subsequent periods are affected by the discount rate increase, we used “lag” in relation to the discount rate.

The regression showed the following results:

```

=====
                        Dependent variable:
                        -----
                        cpi_growth
                        -----
DR_growth                0.044***
                        (0.009)

ER_growth                -0.027
                        (0.038)

M1_growth               -0.038
                        (0.030)

DR_growth_lagged        -0.016***
                        (0.006)

DR_growth_lagged2       -0.009
                        (0.006)

Constant                 0.196
                        (0.207)

-----
Observations              37
R2                       0.736
Adjusted R2              0.693
Residual Std. Error      1.036 (df = 31)
F Statistic              17.244*** (df = 5; 31)
=====
Note:                    *p<0.1; **p<0.05; ***p<0.01
=====

```

It was found that the discount rate growth is highly statistically significant only for the first subsequent quarter. Other variables show insignificant results. The R<sup>2</sup> equals 0.736, which means that 73.6 percent of the total variation in the dependent variable can be explained by the variation in independent variables. The increase in discount by one percentage point reduces inflation by 0.016 percentage points. For determining the impact of the exchange rate and money supply on subsequent periods, we conducted an additional regression. The model defined is as follows:

$$\text{CPI Growth rate} = b_1 * \text{Discount rate growth} + b_2 * \text{Exchange rate growth} + b_3 * \text{M1 growth} + b_4 * \text{Discount rate growth lagged}_1 + b_5 * \text{M1 lagged}_1 + b_6 * \text{Exchange rate lagged}_1$$

This regression shows the following results:

```

=====
                        Dependent variable:
-----
                        cpi_growth
-----
DR_growth                0.040***
                        (0.009)

ER_growth                -0.002
                        (0.042)

M1_growth               -0.058*
                        (0.031)

DR_growth_lagged        -0.018***
                        (0.006)

ER_lagged                0.001
                        (0.004)

M1_lagged                0.000
                        (0.000)

Constant                 -0.409
                        (0.700)

-----
Observations              38
R2                        0.719
Adjusted R2               0.665
Residual Std. Error      1.068 (df = 31)
F Statistic               13.252*** (df = 6; 31)
=====
Note:                    *p<0.1; **p<0.05; ***p<0.01
=====

```

This regression shows statistically significant results for the lagged discount rate growth and money supply growth in the current quarter, however, the results for the exchange rate are insignificant in the current and subsequent quarters. Thus, our results do not confirm the effect of the exchange rate on inflation in Kazakhstan. An increase in inflation in the current quarter causes a decrease in the money supply in the current quarter as a result of the contractionary monetary policy (an increase in the discount rate). This, in turn, decreases inflation slightly in the subsequent quarter. Therefore, our analysis confirms the effect of the monetary policy on inflation one quarter later, though this effect is found to be very modest. The  $R^2$  of 0.719 indicates 71.9 percent of the total variation in the dependent variable is explained by the variation in independent variables.

#### **4. Conclusion**

The impact of the discount rate on inflation in the Republic of Kazakhstan has a delay of one quarter. This means that changes in the discount rate begin to affect the inflation rate only after a certain time. This is probably due to the fact that monetary policy requires time to implement its impact on the economy.

The regression results did not show a significant effect of the exchange rate on the consumer price index. This may indicate that other factors, such as changes in world trade, changes in supply chains, and domestic factors, impact inflation in Kazakhstan more than the exchange rate.

Inflation in Kazakhstan is highly dependent on external factors, such as economic and geopolitical shocks. This may mean that changes in the international environment, prices on world markets or political events may have a significant impact on the inflation rate in the country.

For a more accurate analysis and forecasting of inflation in Kazakhstan, it may be necessary to take into account not only internal factors, such as the discount rate but also external factors, such as the exchange rate and global economic trends. This can help to more fully and accurately assess the relationship and predict future changes in the inflation rate in the country.

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