

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economic Theories



Bachelor Thesis

**Analysis of the Effect of Monetary Policy on
the Russian Federation**

Salik Saliakhov

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BACHELOR THESIS ASSIGNMENT

Salik Saliakhov

Business Administration

Thesis title

Analysis of the Effect of Monetary Policy on the Russian Federation

Objectives of thesis

The goal of the bachelor thesis is to analyze the effect of monetary policy on the Russian Federation's economy. In order to reach the objective, a linear regression model is created, where the dependent variable is the GDP of the country and independent determinants are variables associated with the monetary domain of the country, such as the exchange rate and interest rate. Additionally, other variables are also included into the model. Apart from the main objective, the thesis is also concerned with the analysis of the recent performance of the Russian economy from the monetary perspective. Following the formulation of the main objectives, a series of research questions of the bachelor thesis are formulated as well, which are:

- 1) What are the main determinants of Russia's GDP?
- 2) What is the performance of the main macroeconomic and monetary indicators in the past 25 years?
- 3) What was the main kind of monetary policy tools utilized by the Russian government?

Methodology

The thesis consists of two main parts – a literature review and an empirical part. The aims (goals), tools and specific ways (means) of monetary policy, including opinions how the goals can be achieved and whether the tools and means really have a desirable impact. The techniques used in the empirical part is also introduced.

The empirical part is based on three separate techniques – descriptive analysis, time series analysis and linear regression analysis. Descriptive and time series analyses help to answer the second and the third research questions, thus addressing the development of the Russian economy and the monetary policy exercised by the country's Central Bank. Furthermore, the econometric analysis with the creation of a pertinent linear regression model is performed in order to answer the first question and identify the most important factors influencing the Russian GDP.

The proposed extent of the thesis

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Keywords

Russia, monetary policy, interest rate, recession, economy, sanctions

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The Bachelor Thesis Supervisor

doc. Mgr. Ing. Petr Wawrosz, Ph.D.

Supervising department

Department of Economic Theories

Electronic approval: 30. 11. 2023

prof. Ing. PhDr. Lucie Severová, Ph.D.

Head of department

Electronic approval: 9. 2. 2024

doc. Ing. Tomáš Šubrt, Ph.D.

Dean

Prague on 12. 03. 2024

Declaration

I declare that I have worked on my bachelor thesis titled "Analysis of the Effect of Monetary Policy on the Russian Federation" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 15.03.2024

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Analysis of the Effect of Monetary Policy on the Russian Federation

Abstract

The goal of the bachelor thesis is to analyze the effect of monetary policy on the Russian Federation's economy. In order to reach the objective, a linear regression model is created, where the dependent variable is the GDP of the country and independent determinants are variables associated with the monetary domain of the country, such as the exchange rate and interest rate. The empirical part is based on three separate techniques - descriptive analysis, time series analysis and linear regression analysis. Descriptive and time series analyses help to answer the second and the third research questions, thus addressing the development of the Russian economy and the monetary policy exercised by the country's Central Bank. Furthermore, the econometric analysis with the creation of a pertinent linear regression model is performed in order to answer the first question and identify the most important factors influencing the Russian GDP. Based on the performed analysis, it is possible to suggest that the main determinants of the Russian real GDP are the inflation rate (the most influential one out of the selected three for the study) and the exchange rate. The effect of the exchange rate's depreciation on the real GDP is positive and the effect of surges in the inflation rate is negative.

Keywords: Russia, monetary policy, interest rate, recession, economy, sanctions

Analýza vlivu měnové politiky na Ruskou federaci

Abstrakt

Cílem bakalářské práce je analyzovat vliv měnové politiky na ekonomiku Ruské federace. Za účelem dosažení cíle je vytvořen lineární regresní model, kde závislou proměnnou je HDP země a nezávislé determinanty jsou proměnné spojené s měnovou doménou země, jako je směnný kurz a úroková sazba. Empirická část je založena na třech samostatných technikách-deskriptivní analýze, analýze časových řad a lineární regresní analýze. Popisné analýzy a analýzy časových řad pomáhají odpovědět na druhou a třetí výzkumnou otázku, čímž se zabývají vývojem ruské ekonomiky a měnovou politikou vykonávanou centrální bankou země. Dále je provedena ekonometrická analýza s vytvořením příslušného lineárního regresního modelu s cílem odpovědět na první otázku a identifikovat nejdůležitější faktory ovlivňující Ruský HDP. Na základě provedené analýzy lze naznačit, že hlavními determinanty ruského reálného HDP jsou míra inflace (nejvlivnější z vybraných tří pro studii) a směnný kurz. Vliv znehodnocení směnného kurzu na reálný HDP je kladný a vliv nárůstu míry inflace záporný.

Klíčová slova: Rusko, měnová politika, úroková sazba, recese, ekonomické, sankce

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List of abbreviations

GDP	Gross Domestic Product
USD	United States Dollar
RUB	Russian Ruble
OLS	Ordinary least Squares

1 Introduction

Monetary policy holds significant power and authority in the field of economic policy. The regulation and handling of a nation's currency supply, interest rates, and other financial tools are essential for maintaining economic stability and fostering growth. Monetary policy's impact is of special relevance in the Russian Federation, a country with a rich and complex economic history. This dissertation explores the complex relationship between monetary policy and the Russian economy, aiming to understand its subtleties, evaluate its effectiveness, and illuminate its influence on economic growth.

This thesis's theoretical foundation is rooted in the monetary policy framework, Russian economic dynamics, and the comprehensive idea of economic growth. The author aims to explore the theoretical underpinnings of monetary policy to comprehend its core principles, methods, and significance in influencing economic outcomes. Studying the Russian economic landscape is essential for analyzing how policy measures interact with economic performance.

The author will thoroughly analyze major economic metrics such as GDP, inflation rate, and other significant factors in a practical manner. The author analyzed empirical indicators to investigate how monetary policy activities affect the Russian economy, identifying trends, patterns, and anomalies that may occur.

2 Objectives and Methodology

2.1 Objectives

The goal of the bachelor thesis is to analyze the effect of monetary policy on the Russian Federation's economy. In order to reach the objective, a linear regression model is created, where the dependent variable is the GDP of the country and independent determinants are variables associated with the monetary domain of the country, such as the exchange rate and interest rate. Additionally, other variables are also included into the model.

Apart from the main objective, the thesis is also concerned with the analysis of the recent performance of the Russian economy from the monetary perspective. Following the formulation of the main objectives, a series of research questions of the bachelor thesis are formulated as well, which are:

- 1) What are the main determinants of Russia's GDP?*
- 2) What is the performance of the main macroeconomic and monetary indicators in the past 25 years?*
- 3) What was the main kind of monetary policy tools utilized by the Russian government?*

2.2 Methodology

The thesis consists of two main parts - a literature review and an empirical part. The aims (goals), tools and specific ways (means) of monetary policy, including opinions how the goals can be achieved and whether the tools and means really have a desirable impact. The techniques used in the empirical part is also introduced.

The empirical part is based on three separate techniques - descriptive analysis, time series analysis and linear regression analysis. Descriptive and time series analyses help to answer the second and the third research questions, thus addressing the development of the Russian economy and the monetary policy exercised by the country's Central Bank. Furthermore, the econometric analysis with the creation of a pertinent linear regression model is performed in order to answer the first question and identify the most important

factors influencing the Russian GDP. The econometric estimation is based on the OLS estimation approach.

3 Literature Review

3.1 Monetary Policy

Monetary policy is a set of government measures to manage financial flows in the country. It allows you to regulate the state of the credit market, control the activities of commercial banks, influence business activity and aggregate demand (Aysan et al., 2014). The main goal of monetary policy is to ensure price stability and low inflation. The lower the inflation rate, the more favorable the conditions for living and doing business (Borio, 2014). Maintaining price stability helps solve several pressing problems for the state:

- protect citizens' savings in national currency from depreciation;
- increase the availability of credit financing for legal entities;
- simplify strategic planning for business;
- increase confidence in the national currency;
- protect low-income citizens (Chand, 2012).

Special financial organizations are responsible for the implementation of the state's monetary policy - they are called regulators. In Russia this is the Central Bank, in the USA – the Federal Reserve System, in the European Union (eurozone)– the European Central Bank. They have a certain autonomy and are therefore protected from pressure from government agencies and political institutions (Verdier, 2013). Monetary policy is carried out in line with the economic strategy of the state and should not contradict it. The monetary policy affects all subjects of financial relations: the banking sector, business structures, ordinary citizens. This influence is not always obvious and understandable to the latter (Brown & Marsden, 2023).

In other words, monetary policy is about controlling the amount of money available in the economy and the channels through which new money comes in. Economic statistics such as gross domestic product (GDP), inflation rate, sectoral and sectoral growth rates influence monetary policy strategy (Woodford, 2000). The central bank may revise the interest rates it charges to lend money to the country's banks. When rates rise or fall, financial institutions adjust rates for their clients, such as businesses or home buyers. It can also buy or sell government bonds, target exchange rates, and revise the amount of cash banks must hold as

reserves (Friedman, 2000). But it is certainly important for the author to highlight the types and types of instruments used by central banks of states.

The central bank conducts monetary policy to provide economic stability, minimize unemployment, safeguard currency value, and sustain economic growth. The central bank affects borrowing, spending, and saving rates by adjusting interest rates, reserve requirements, or through open market operations. Fiscal policy is a supplementary instrument utilized by governments, apart from central banks (Moenjak, 2014). The Federal Reserve can impact the money supply in the economy, whereas the US Treasury has the authority to generate new money and establish new tax policies. It injects funds into the economy to boost expenditure and promote growth, either directly or indirectly (Labonte, 2015). Monetary and fiscal measures have been synchronized through various government and Federal Reserve initiatives in reaction to the COVID-19 crisis (Ferrero et al., 2022).

3.1.1 Types

Macroeconomic policy aims to mitigate unemployment and inflation, promote economic growth, avert economic crises, and maintain the stable operation of the economy. The state's macroeconomic policy is typically determined by the country's economic condition, namely whether it is in a phase of growth or recession. During a recession, the state implements a stimulating policy, followed by a restraining policy during the recovery period to prevent high inflation rates. Macroeconomic policy encompasses fiscal policy, monetary policy, and social policy. Budgetary and tax policy encompass government actions aimed at managing the national economy through the regulation of government spending and taxation (Stiglitz et al., 2006).

It is crucial to highlight specific aspects of these policies:

- Stimulating and contractionary monetary policies are differentiated based on their effects on the economy (Coenen et al., 2012).
- Expansionary monetary policy is employed during an economic downturn to stimulate production by increasing the money supply or lowering interest rates (Surjaningsih et al., 2012).

Contractionary monetary policy is implemented during periods of inflation by reducing the money supply and raising interest rates. Discretionary monetary policy and automatic

monetary policy, often referred to as the policy of built-in stabilizers, are distinguished based on the level of involvement of the country's central bank in addressing macroeconomic issues (Gravelle & Hungerford, 2012).

Automatic monetary policy relies on built-in stabilizers, which are measures that help the economy self-regulate. Automatic stabilizers adjust to economic shifts without requiring central bank intervention. Inherent stabilizers consist of automatic adjustments in interest rates, modifications in the unemployment benefits system, and social transfers (Saraceno, 2016). Therefore, lowering interest rates during an economic recession will stimulate economic activity due to a rise in aggregate demand. An increase in interest rates during an economic expansion will decrease aggregate demand. Unemployment benefits and social transfers help maintain aggregate demand during economic recessions. When the economy is growing and unemployment is decreasing, the cessation or reduction of certain benefits can limit aggregate demand (Gorn & Trigari, 2024). Nevertheless, intrinsic stabilizers are insufficient to counteract cyclical variations in the economy. The central bank implements discretionary monetary policy by deliberate and specific adjustments in the money supply and interest rates. The primary tools of discretionary monetary policy include increasing or decreasing the money supply and adjusting interest rates (Serra & Stiglitz, 2008). An increase in the money supply boosts aggregate demand, while a decrease reduces it. Raising interest rates results in higher borrowing costs for businesses, companies, and individuals, leading to reduced spending and overall demand. Lowering interest rates increases aggregate demand (Parui, 2022).

The core objective of monetary policy is to regulate the money supply. The regulator prevents an excessive amount of money from entering the economy. When this occurs, the demand for goods exceeds their production capacity. In the future, market imbalance can result in severe consequences. Inflation is simply one factor. To mitigate such occurrences, the state employs two distinct strategies: direct and indirect. These strategies serve as indicators of the extent of regulatory control banks exercise over their operations (Jędruchiewicz, 2014). The documents issued by the Central Bank, acting on behalf of the government, encompass directives and regulations. These encompass various measures, including:

- Regulation of interest rates for loans and deposits,

- Imposition of limits on loan volumes extended to banks,
- Provision of loans to priority industries at discounted rates,
- Granting preferential treatment to specific banking institutions,
- Imposition of currency restrictions (Gluch et al., 2012).

While these strategies are commonly observed in centrally planned economies like Russia, they are less prevalent in advanced nations. Typically, developed countries resort to such measures as a last resort. Direct interventions, although capable of yielding swift and tangible outcomes, often disrupt market processes and dampen inherent competitiveness. Stringent regulation serves to deter the diversion of financial resources to unregulated markets or foreign jurisdictions. In contrast, developed countries tend to influence the financial industry indirectly, utilizing market instruments outlined in the preceding paragraph. Under this approach, each credit institution devises its own autonomous financial strategy, resulting in a subtler and less intrusive impact on the market compared to direct interventions. Moreover, methods can be adjusted during implementation to optimize outcomes (Si et al., 2020).

3.1.2 Instruments

General and selective monetary policy instruments are the two categories that make up the policy instruments. There are three different kinds of instruments that fall under the category of general ones, which are designed to regulate the overall state of the credit system (Bernanke, 2020).

1. Open market operations are the first. This is the most important operational tool that the central bank may use to impact the quantity of free reserves that are accessible to commercial banks, and consequently, the amount of money that is available. The buying and selling of government securities is the core activity that constitutes these commercial transactions. If the central bank purchases securities from commercial banks, it will boost the required reserves of such institutions by the amount that corresponds to the purchase (Buiter, 2008). Because of this, their opportunities to lend money grow, and the amount of money available to them also grows. On the contrary, when the bank sells government assets on the open market to reduce the amount of money that is in circulation. The sum that

corresponds to the purchase of these assets by commercial banks is deducted from the reserve accounts of these banks when they are purchased by these banks. The central bank's reserves are consequently reduced, and as a result, their capacity to generate new money through lending is additionally diminished (De Grauwe, 2013).

2. Changes in the norm of required reserves are second instrument in this segment. When it comes to exerting influence over the money supply, it is the most effective tool. Reserves are the portion of a commercial bank's assets that it is required to hold in the accounts of the central bank. The number of reserves is a significant factor in determining the commercial bank's ability to lend money. Because of this, the central bank can either restrict or encourage the lending activities of commercial banks by either increasing or decreasing the required reserve ratio (Resano & Ramon, 2004).

3. Alterations to the discount policy or the discount interest rate may occur. In the context of the granting of loans by the central bank to commercial banks, this instrument is of particular significance. Discount rate, also known as refinancing rate, is the name given to the interest rate that is applied to these loans when they are granted. It is the responsibility of the central bank to adjust the discount rate by either raising or lowering it (Goodhart, 2011).

The policy of "cheap" money, also known as expansionary monetary policy, is implemented by lowering the discount rate. This policy is carried out in accordance with the following scheme: because of the decrease in the discount rate, loans become more affordable, and more businesses and enterprises take out loans. The amount of money that is now in circulation grows. When it is required to slow down the fall in production and assist businesses, particularly during periods of structural adjustments, the policy of "cheap" money is implemented. This is especially true during times of transition (Bernanke, 2020).

Increasing the discount rate is referred to as a policy of "tight " money or a policy of credit limitation. Both terms use the same meaning. The goal is to decrease the amount of money in circulation. The following is the plan for the completion of its implementation: An increase in the discount rate, an increase in the cost of loans, a decrease in the number of loans taken out by businesses and enterprises, The total amount of money that is in

circulation drops. In pursuit of inflation reduction goals, policymakers often resort to implementing a "dear" money policy. This approach involves the selective utilization of monetary policy instruments, albeit with a lack of standardization typically observed in advanced economies. These instruments are tailored to regulate the availability of credit and lending to various sectors, including industries, major companies, and firms. Additionally, they aim to oversee the provision of different types of loans, such as consumer lending, among other objectives (Yifu & Wang, 2022).

3.2 Russian Economy

Starting in the late 1980s, significant transformations took place in Russia (then the USSR), leading to several changes in the country (Lisovskaya & Karpov, 2020). The most notable aspect of the initial phase of change was the democratization of the country, which had been rigid under a totalitarian, and later, authoritarian rule, setting the stage for future reforms. Since 1992, economic reforms have been initiated with the goal of shifting from a planned economy to a market economy. Significant political events such as the dissolution of the USSR, the Chechen War, and leadership changes since the early 2000s have significantly influenced the destiny of New Russia. Since the early 21st century, the country has experienced a period of political stability (Kramer, 2022). There were both advantages and disadvantages to this situation, which grew increasingly evident as time passed. Following the crisis of 2008–2009, which exemplified the global financial crisis in Russia, together with the events of 2011–2012. The country has transitioned into a new phase of its development. The diminishing rate of economic growth and the decrease in well-being levels have prompted inquiries over Russia's future development (Rochlitz et al., 2020). It is crucial to comprehend the current state's features and the factors that have led the economy to its present condition. The phases of economic evolution and its primary outcomes have significance. The changeover period is concluded. The economy saw benefits and expenses linked to the shift to a market-based system. The decline of the transformation process and the emergence of the "new normal" provide problems that necessitate a new agenda to replace the depleted crisis-focused one. The necessity to move towards sustainable development results in a gradual change in the focus of decisions towards refinement. This specifically necessitates an enhancement in the quality of institutions. But in any case, it is also important to highlight the dynamics of changes in the country's GDP from 2011 to

2018, since it is indicative of the importance of all the changes that were adopted (Salimova et al., 2021).

Russia experienced a profound transitional recession that persisted until 1998. A period of recovery commenced, spanning from 1999 to 2008. With a market economy and the advantage of the oil boom in a politically stable environment, the new Russia successfully boosted its economy and greatly enhanced the standard of living (Zhuravskaya et al., 2021).

In recent decades, there has been a lot of speculation and superficial judgment regarding the Russian economy and the connection between economic issues and political actions. Misconceptions and superstitions have oversimplified the understanding of the Russian economy, society, and political decision-making both domestically and internationally. Understanding the fundamental features of the Russian economic situation is necessary to grasp the intricate reality (Vos et al., 2020).

In recent years, the Russian economy has undergone a typical resource cycle and Dutch disease, which are common and extensively researched phenomena. The increase in oil prices in the early 2000s led to a significant boost in budget revenues, enabling the authorities to forgo efforts to extend the tax base (Barinova & Zemtsov, 2020). Additionally, by regulating oil distribution, the authorities strengthened their influence over the hydrocarbon sector, banking industry, and consequently, the overall economic and political landscape of the nation. This adversely affected the growth of non-oil businesses and the efficiency of economic and budgetary choices (Cheng et al., 2023).

By 2008, more than a half of Russia's budget was funded by earnings from hydrocarbon exports, and the relationship between GDP growth rates, federal budget revenues, and reserves with oil price variations was as high as 90–95% (Connolly, 2020). Due to many petrodollars entering the economy, the ruble became highly overvalued. In 2006–2007, its market rate was 35% higher than the measured inflation rate. The economic development of Russia was impacted by three adverse factors: The government intentionally exacerbated the investment climate by neglecting to safeguard the rights of investors and entrepreneurs, and even discriminating against them, to regulate money flows. As a result, there was a decrease in investment flow, a rise in the cost of capital, a decline in entrepreneurial activity, and a

significant loss of financial and human capital. Over \$1 trillion was withdrawn from Russia, leading to the departure of top businesspeople and experts from the nation (Saul, 2021).

Converting extra revenues into reserves raised the cost of capital, reducing the appeal of investments and hindering the growth of capital-intensive or slow-expanding sectors. The ruble's overvaluation, coupled with populist government policies to artificially raise wages and heavy taxes, significantly raised production costs, rendering domestic industry unfeasible (Wolnicki & Piasecki, 2021). Russia's economy has deteriorated in various sectors despite a rise in income from hydrocarbon exports and rapid consumer growth, as it has failed to establish a competitive production sector. Hydrocarbon production contributes 20% to the Russian GDP, trade accounts for 30%, the domestic energy market and infrastructure make up 15%, government projects contribute another 15%, and the banking sector adds 9% (Simola & Solanko, 2021). Only up to 10% of GDP is accounted for by independent services and non-resource production.

Russia's socio-economic situation has always been complex, characterized by multifaceted challenges and intricate dynamics. The evaluation of its economic landscape often yields conflicting perspectives, making policy discussions inherently challenging. To provide a comprehensive understanding of the current scenario, it is imperative to consider developments spanning the last five years (Nosova et al., 2021), including subsequent events in 2022 and 2023.

Following a robust rebound from the pandemic-induced recession, the global economy has encountered deceleration. This trend persisted into 2021, primarily attributed to additional COVID-19 outbreaks, which hindered the pace of recovery witnessed in the latter half of 2020. Furthermore, international commerce expansion slowed down due to global economic growth constraints and persistent supply chain disruptions. In the specific context of Russia, the first half of 2021 saw a significant economic resurgence, marked by a projected growth rate of 4.3% (Belev et al., 2020). However, this momentum was anticipated to wane in the latter half of the year. Moreover, it is essential to address the ramifications of geopolitical events, such as the Russian-Ukraine conflict, which has had profound implications on the region's socio-economic landscape. The escalation of tensions and subsequent military

actions have undoubtedly exerted pressure on Russia's economy, influencing various sectors and potentially altering growth trajectories (Nyekwere & Duson, 2022).

In subsequent years, the socio-economic outlook of Russia remained influenced by both internal and external factors. The repercussions of the Russian-Ukraine war continued to reverberate, affecting diplomatic relations, trade dynamics, and investment climates. Additionally, geopolitical uncertainties and fluctuating commodity prices contributed to the intricacy of Russia's economic trajectory in 2022 and 2023 (Chenaker, 2022).

Consumer demand soared in the second quarter of 2021 due to savings accrued during 2020 and increasing credit expansion, following the partial lifting of coronavirus restrictions. Investment activity was robust in the second quarter of 2021, leading to a multi-year high current account surplus of US\$82 billion at the end of September 2021. This was driven by high commodity prices and reduced outbound tourism (Wiharja & Siregar, 2024). At the start of autumn, a new harmful wave of the COVID-19 outbreak emerged, along with a poor vaccination rate, posing a threat to the economy and public health. During the third quarter, economic development decelerated due to the implementation of additional coronavirus measures and a diminishing increase in consumer activity. In 2021, inflation in Russia has increased due to efforts to control strong demand, escalating commodity costs, and supply issues (Prohorovs, 2022). In 2021, the Bank of Russia was among the first central banks to implement a contractionary monetary policy due to inflation surpassing its objective in December 2020. Since March, the key rate has been raised six times, for an increase of 325 basis points, reaching 7.5% by the end of October. This allowed for the maintenance of real market interest rates near zero and transition from an expansionary monetary policy to a neutral one (Evdokimova et al., 2023).

The Russian banking system has demonstrated resilience to the effects of the COVID-19 pandemic. The economic recovery is currently aiding banks in fortifying their balance sheets as rapid loan expansion starts to decelerate (Batten et al., 2023). During the initial nine months of this year, federal budget revenues saw a significant rise: oil and gas earnings surged by 60%, while receipts from VAT, personal income tax, and corporate income tax each grew by over 30%. The fiscal deficit decreased from 3.8% at the end of 2020 to around 1% in the third quarter of 2021, based on a four-quarter moving average. The Bank of Russia,

on behalf of the government, bought US\$35 billion in foreign currency from January to November 2021 using oil and gas profits. This currency will be added to the National Wealth Fund in 2022. Labor markets have also improved. In Q2 2021, firms increased job posts by 24% compared to the previous year, leading to a decrease in the ratio of unemployed individuals to job openings. Real salaries increased by 2% in 2020 and continued to grow at an average rate of 2.5% from January to August this year (Yarovaya & Mirza, 2022).

Forecast indicates that inflation will progressively decrease in 2022, however it is expected to stay above the target for most of the year. Russia is expected to have economic growth of 2.4% in 2022 due to robust activity in the oil sector, followed by a slowdown to 1.8% in 2023. Intermittent actions to address the pandemic could hinder growth dynamics if the vaccination rate stays low. Inflation uncertainty is elevated. If inflation proves to be more persistent than anticipated or if the economy encounters obstacles due to the US reducing quantitative stimulus, it may be necessary to prolong the implementation of stricter monetary policy, which might adversely affect the economic growth forecast (Irtysheva et al., 2022).

Long-term development of the Russian economy will rely on various things. Russia's growth potential remains low, which could hinder the country's capacity to meet its development goals and enhance the living conditions of its population. Success hinges on enhancing economic policies and market incentives to encourage businesses to compete, develop, and generate value, both nationally and in global value chains (Pereira et al., 2022). The Russian economy in the long run will be influenced by the new Strategy for the long-term growth of the Russian Federation with minimal greenhouse gas emissions, released by the Russian Government on October 29, 2021. The proposal aims to speed up green economic growth by setting a more aggressive climate change goal of reducing net greenhouse gas emissions by 70% by 2050 and reaching net carbon neutrality by 10 years after that. This approach intends to increase economic growth while also focusing on environmental sustainability, with a target of achieving an average growth rate of at least 3% per year. To achieve both faster economic growth and environmental sustainability, we need to address obstacles to growth, enhance economic competitiveness, minimize the expenses of transitioning to a green economy, and capitalize on the opportunities it presents (Fekete et al., 2021).

4 Practical Part

4.1 Models and Variables

In order to properly define the effect of the monetary instruments on the Russian economy, it is downright essential to select variables that will simultaneously cover the dimension of the economic growth and the dimension of monetary policy. Consequently, 4 variables, where 1 is endogenous and 3 are exogenous were selected. These variables are:

- 1) **Real GDP (expressed in trillion 2015 USD)**. This variable is traditionally regarded as one of the most fundamental indicators describing one's country economic growth. Despite some criticism, there is still no universal alternative to this indicator, which is selected in real terms, meaning that it is adjusted to inflation. This is the dependent variable for the study.
- 2) **Inflation (expressed in %)**. This variable represents the monetary or price level stability and it is directly related to the extent to which the Central Bank is able to maintain the price level and the extent to which monetary policy (the price-stabilization, to be more specific) is successful.
- 3) **Interest rate (expressed in %)**. This variable represents the rate set by the Russian Central Bank and this is one of the most effective tools of the monetary policy. This variable represents the monetary domain, and this is regarded as the main way of intervening into the economy. The negative effect of the increase of the interest rate for the case of the Russian Federation was highlighted by Bolatbayeva & Tolepbergen (2020), which implies that the country will focus on keeping the interest rate as low as it is possible.
- 4) **Exchange rate (expressed in RUB/USD)**. Exchange rate is one of the most important variables from the balance of payment because it affects both the internal potential of the country and its competitiveness. The variable represents the monetary domain and the effect of its changes on the real GDP is evaluated. The idea behind the implementation of the exchange rate variable in the context of the

study of the effect of monetary policy on the economy of the Russian Federation is justified by the fact that the Russian Federation actively intervenes with the exchange rate in order to boost their exports (using reserves), which, in turn, positively effects the GDP of the country that draws a significant amount of its budget from oil revenues. The suggestion is justified by Kaitila (2016).

Undeniably, the selected fit of variables is dubious in terms of its direct association with monetary policy, but this was the closest and the most available set of variables (given the data availability) that could be achieved within the setting. Consequently, the economic model used in the study is introduced in formula (1):

$$GDP = f(r; i; EX) \quad (1)$$

The second step is represented by the selection of an appropriate structural form for the model and transformation of the economic model into an econometric one. The GDP variable is often viewed as a one experiencing an exponential kind of growth, practically meaning that the econometric model used in the thesis will be of the exponential kind. Based on those considerations, the econometric model is introduced under the formula (2):

$$GDP = \gamma_1 r_t^{\gamma_{11}} i_t^{\gamma_{12}} EX_t^{\gamma_{13}} + \varepsilon_i \quad (2)$$

where $\gamma_{1...n}$ are parameters of regressors, r is the inflation rate of Russia, i is the interest rate of Russia, EX is the exchange rate and ε_i is an error term. Annual time series data is used for the estimation. In addition to the formulation of the model, there are important assumptions. The first series of assumptions concerns the signs of parameters. Parameters of all variables are believed to have a negative sign due to the adverse effect of an increase in those variables on the Russian GDP. It is expected that the error term will be distributed normally with constant variance (no heteroscedasticity) and without serial correlation (no autocorrelation) – this is verified in accordance with econometric tests. No multicollinearity is expected – this is checked with the help of a correlation matrix.

4.2 Data

In this sub-chapter, the data is explained and the development of variables over time is discussed. The dataset used in the thesis is presented in Table 1.

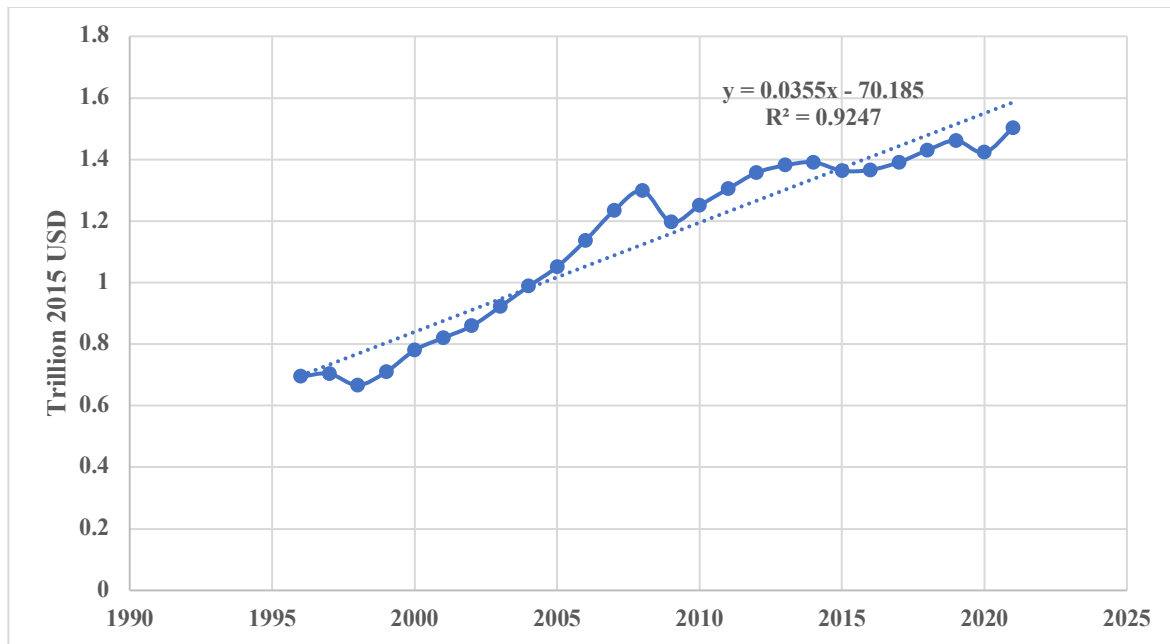
Table 1, the variables

Year	Real GDP trillion \$	Inflation %	Interest Rate %	Exchange rate RUB per USD
1996	0.69	47.75	23.13	5.12
1997	0.70	14.76	25.38	5.78
1998	0.67	27.69	29.88	9.71
1999	0.71	85.75	22.97	24.62
2000	0.78	20.80	12.83	28.13
2001	0.82	21.48	9.98	29.17
2002	0.86	15.79	12.39	31.35
2003	0.92	13.66	8.13	30.69
2004	0.99	10.89	7.11	28.81
2005	1.05	12.69	5.84	28.28
2006	1.14	9.67	6.04	27.19
2007	1.23	9.01	6.66	25.58
2008	1.30	14.11	10.77	24.85
2009	1.20	11.65	13.05	31.74
2010	1.25	6.85	5.16	30.37
2011	1.30	8.44	5.49	29.38
2012	1.36	5.07	7.29	30.84
2013	1.38	6.75	7.49	31.84
2014	1.39	7.82	9.44	38.38
2015	1.36	15.53	14.76	60.94
2016	1.37	7.04	11.60	67.06
2017	1.39	3.68	9.12	58.34
2018	1.43	2.88	7.56	62.67
2019	1.46	4.47	7.69	64.74
2020	1.42	3.38	4.99	72.10
2021	1.50	6.69	6.41	73.65

Source: Russian Statistical Office, 2023

After the introduction of the dataset, it is the time to discuss the way how variables were developing over time. The first variable that is discussed is the real GDP. Its behaviour is introduced in Figure 1.

Figure 1, the real GDP (1996-2021)



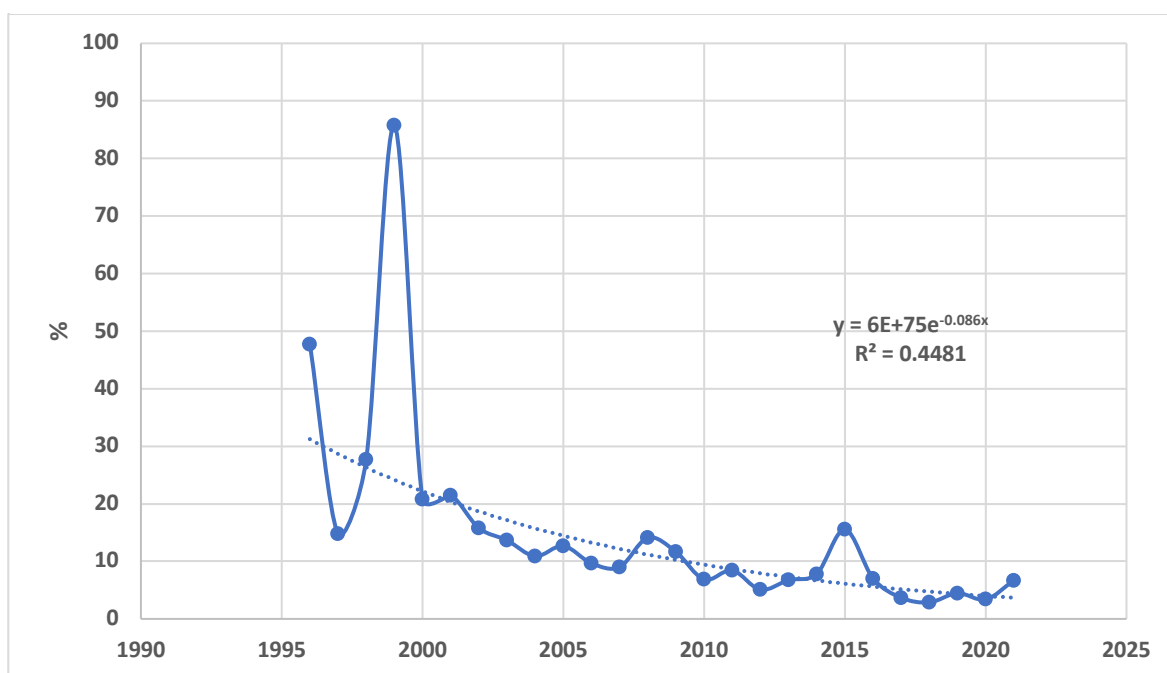
Source: own analysis

Along the projection of the real GDP's behaviour, the trend function is also estimated in order to understand the future development of the indicator. As things stand by the end of 2021, it is possible to highlight that the development of the Russian GDP over the last 25 years was positive. The dynamic of the Russian economy took a new turn in the 2000s, when the crisis of the 90s were overcome and the pace of development of the indicator became extremely high. However, it is pretty visible that the positive dynamic was overrun by a small decrease in 2008-2009, which is an obvious consequence of the Great Recession or the World Financial Crisis that hit the whole world after the collapse of the banking system in the US.

In the period that followed, the economy was developing moderately until 2014-2015, when it took another blow. This time, the reason for the decrease in the real GDP almost entirely lies in the sanctions that the country faced after the events of March 2014 and

enlargement of Russian territory at the expense of Crimea. Nevertheless, the economy did continue to grow even after the unfortunate events and by the end of 2021, the economy has reached its absolute maximum. The trend function suggests that an annual increase in the value of the real GDP was 0.03 trillion per annum – this is a great result. Figure 2 offers the overview of the inflation rate.

Figure 2, the inflation rate (1996-2021)



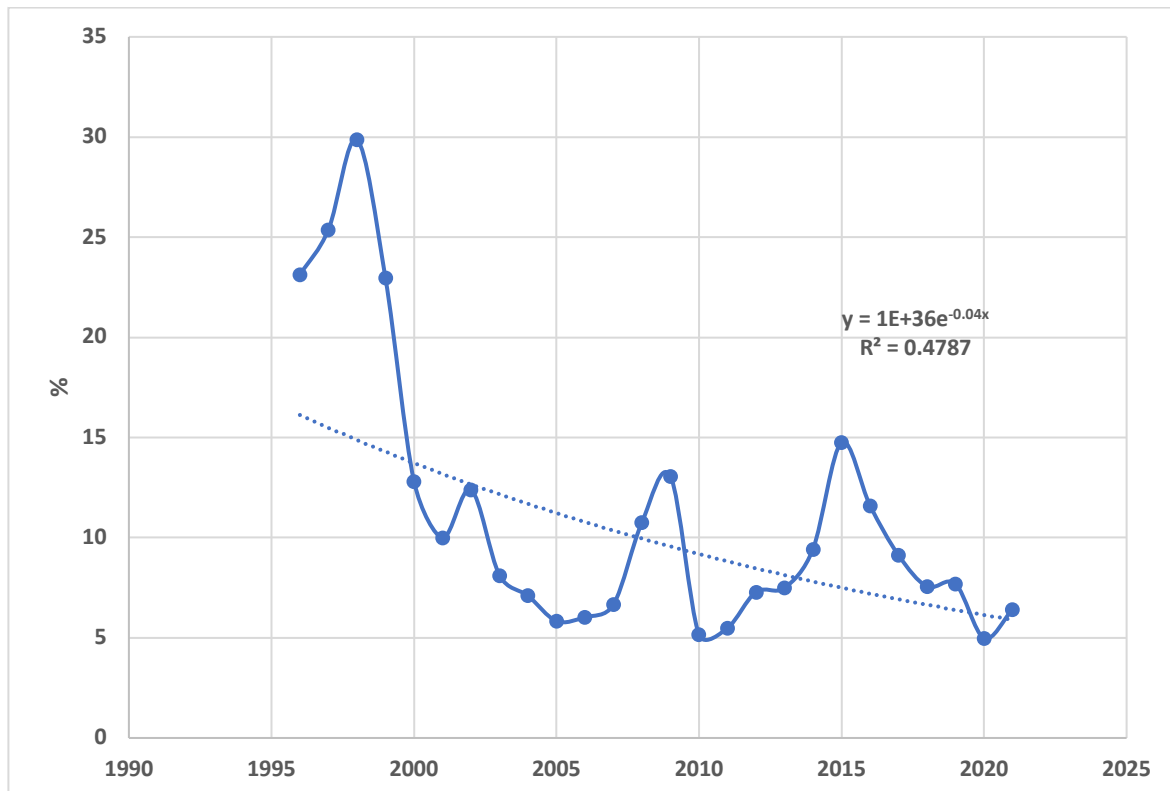
Source: own analysis

The development of the Russian inflation rate can be split into 2 periods – the period prior to 2000 and the period after the year 2000. Before the year 2000, the price stabilization policy of the government was definitely not successful as the country’s prices were going rapidly up and down. On the other hand, this is explained by the ongoing economic transition that resulted in the default and devaluation of the domestic currency.

However, after the year 2000, the government was able to stabilize the whole situation and there were seemingly no periods of huge surges in the inflation rate with the exception of the period right after the World Financial crisis in 2008-2009 and in the period that followed the imposition of the first sanctions in 2014-2015. Overall, the price stabilization function of the Russian government can be classified as beneficial and should be appraised since the country’s inflation rate was following a very smooth path. The exponential trend

suggests that the annual decrement in the value of the inflation rate was equal to 8.6% annually. Figure 3 offers an overview of the average annual interest rate.

Figure 3, the interest rate (1996-2021)



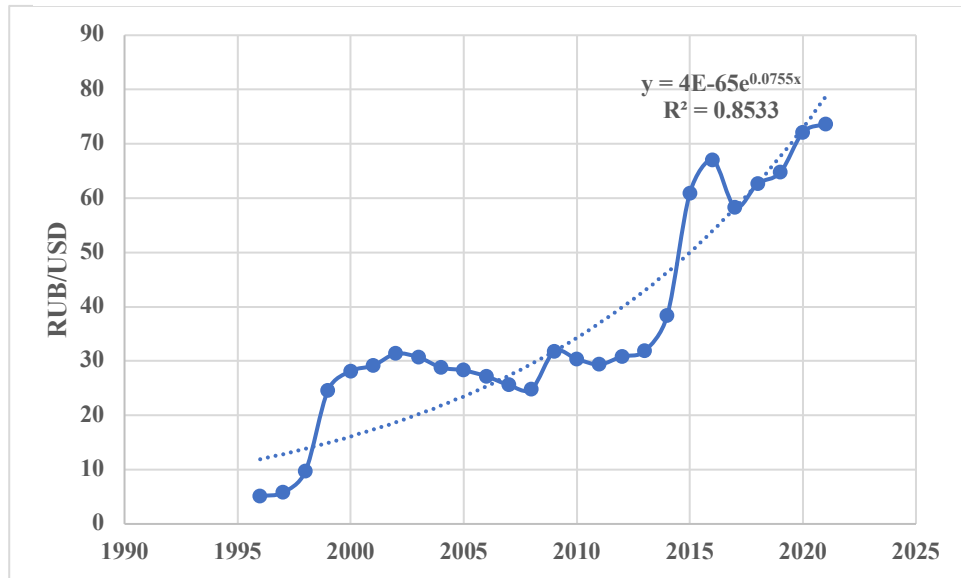
Source: own analysis

The development of the Russian interest rate follows a somewhat similar path as the inflation rate introduced slightly earlier. Yet, it is important to notice that the overall level of interest in Russia was always relatively high, which can serve as a piece of evidence for the fact that the country is actively keen on following a contractionary or restrictive kind of monetary policy. This is, after all, pretty logical, especially when considering that the country's exchange rate is extremely vulnerable to fluctuations due to the fact that it is significantly correlated with the price of oil that has a tendency to change its value very fast.

As such, it is visible that the periods when the Central Bank had to intervene really fast were 2 particular crises – the period that followed the World Financial crisis and the period

after many sanctions were imposed in 2014-2015. According to the trend function, the annual decrement in the value of the interest rate was equal to 4%. This indicates that there

Figure 4, the exchange rate (1996-2021)



was an overall less restrictive pattern than in the period in the 90s preceding the analysis. Figure 4 offers an overview of the exchange rate of RUB to USD.

Source: own analysis

The picture with the Russian exchange rate to the US dollar, compared to the previously discussed monetary and economic indicators, does not look good at all. On one hand, the rapid depreciation of the domestic currency can have its positive implications on the export competitiveness of the country, but it does certainly influence the purchasing power of local individuals within the country.

According to the exponential trend, it can be said that the local currency has been depreciating by 7.5% annually and this is a very bad sign. Given that the country does already have a relatively high interest, this suggests that the currency is rapidly losing its attractiveness in the eyes of foreigners that do not want to make any deposits in Russia and the currency is rapidly depreciating. Figure 5 presents an overview of the descriptive statistics of the selected indicators.

Figure 5, the descriptive statistics

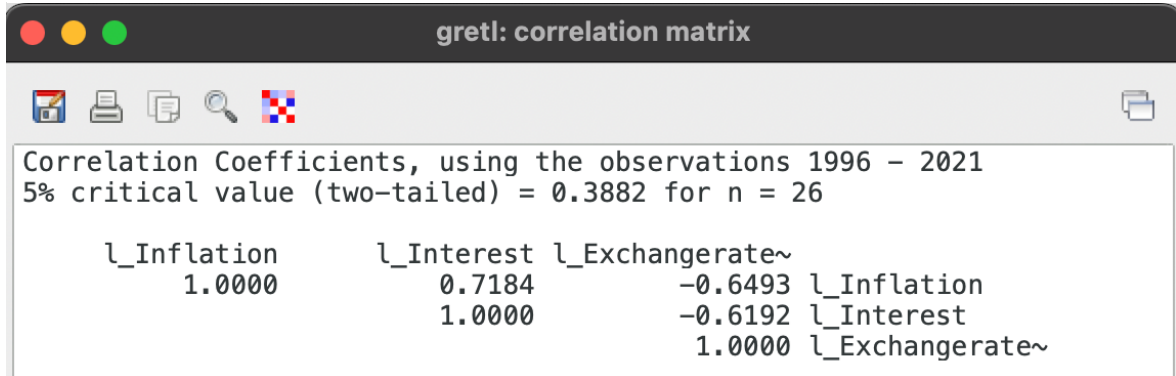
	Mean	Median	Minimum	Maximum
GDP2015trillionU~	1.1416	1.2423	0.66681	1.5026
Inflation	15.166	10.279	2.8783	85.746
Interest	11.197	8.6229	4.9867	29.875
ExchangerateRUBU~	36.590	30.530	5.1208	73.654
	Std. Dev.	C.V.	Skewness	Ex. kurtosis
GDP2015trillionU~	0.28246	0.24742	-0.48069	-1.3030
Inflation	17.200	1.1341	3.0289	9.3984
Interest	6.7743	0.60502	1.4822	1.1333
ExchangerateRUBU~	19.744	0.53960	0.52999	-0.67430
	5% perc.	95% perc.	IQ range	Missing obs.
GDP2015trillionU~	0.67647	1.4883	0.53415	0
Inflation	3.0545	72.448	8.8591	0
Interest	5.0467	28.300	6.2831	0
ExchangerateRUBU~	5.3532	73.112	32.203	0

Source: own analysis

The average inflation in Russia for the analyzed period was 15.166 per cent, its lowest figure was 2.87 per cent and the absolute maximum was 85.74 per cent, which is really high. The variable is extremely volatile, according to the coefficient of variation. The average value of the real GDP was 1.14 trillion USD, the absolute lowest was 0.66 trillion USD and the maximum was 1.5 trillion USD. The GDP is also highly volatile, and it is explained by its ascending pattern. The average interest rate in Russia was 11.19 per cent, the absolute low was 4.98 per cent and the highest was 29.87 per cent. The interest rate is also highly volatile, according to both the standard deviation and the coefficient of variation. The average exchange rate of RUB to USD was 36.590 with the absolute low equal to 5.12 and the absolute maximum being equal to 73.65. Exchange rate of Russia is extremely volatile according to the standard deviation and the coefficient of variation.

Overall, the situation on the surface seems to be stable and under control, especially in the period after the events of the 90s. At last, the correlation matrix is projected that will help to identify if there is a problem of multicollinearity or no – see Figure 6.

Figure 6, the correlation matrix



Source: own analysis

No multicollinearity is identified in the dataset because the correlation between the inflation and interest, and exchange rate is lower than 0.8. Consequently, the correlation between the interest and the exchange rate is also lower than 0.8. Therefore, the OLS technique can be applied to this dataset.

4.3 Estimation

Econometric estimation's output is introduced in Figure 7.

Figure 7, the estimation output

Model 6: OLS, using observations 1996-2021 (T = 26)
Dependent variable: l_GDP2015trillionUSD
HAC standard errors, bandwidth 2 (Bartlett kernel)

	coefficient	std. error	t-ratio	p-value	
const	0.119716	0.248003	0.4827	0.6341	
l_Inflation	-0.176358	0.0469188	-3.759	0.0011	***
l_Interest	-0.0587367	0.0586599	-1.001	0.3276	
l_ExchangerateRU~	0.155149	0.0430671	3.603	0.0016	***
Mean dependent var	0.098817	S.D. dependent var	0.273484		
Sum squared resid	0.364329	S.E. of regression	0.128687		
R-squared	0.805155	Adjusted R-squared	0.778585		
F(3, 22)	60.50053	P-value(F)	8.65e-11		
Log-likelihood	18.58894	Akaike criterion	-29.17788		
Schwarz criterion	-24.14549	Hannan-Quinn	-27.72873		
rho	0.590298	Durbin-Watson	0.776191		

Source: own analysis

Subsequently, the econometric model is introduced in formula (3):

$$GDP = 0.119r_t^{-0.17}i_t^{-0.05}EX_t^{0.15} + \varepsilon_i \quad (3)$$

- When the inflation rate in Russia increases by 1 per cent, the real GDP falls by 0.17 per cent, *ceteris paribus*.
- When the interest rate in Russia increases by 1 per cent, the real GDP falls by 0.05 per cent, *ceteris paribus*.
- When the exchange rate increases by 1 per cent, the real GDP increases by 0.15 per cent.

Based on the economic interpretation of the model, it is possible to highlight that the most influential determinant of the real GDP in Russia is the inflation rate. Furthermore, the exchange rate's hypothesized sign is different from what has been assumed earlier. This serves as a piece of evidence for the fact that Russia is an export-oriented country, and a depreciation of the domestic currency leads to higher volume of exports, thus driving the economy up. When it comes for the other variables, their relationship with the real GDP is fully logical and the magnitude seems to be absolutely correct. Now, it becomes quite clear why the government had to stabilize the situation with the price level in the country – in case of high rates of inflation, the economic growth in the country is almost impossible, according to the created model. Other steps entail a statistical verification of the model.

R² (coefficient of determination) is equal to 0.80 or 80%. Adjusted R² is equal to 0.77 or 77%. Both results are quite good, and the model fails to explain approximately 20% of the variation. Given that the goal of the thesis was not to make a prediction but to describe relationships, the quality of the model is satisfying. F value indicates that the whole model is significant due to two facts – F value is extremely high (60) and certainly higher than the critical value and the P value is significantly smaller than the significance level of 5 per cent. However, the same is not applied to the significance of the constant and the significance of the interest rate, which both are categorized as non-significant predictors of the Russian real GDP. Furthermore, there are 2 variables which are significant – the exchange rate and the inflation rate.

The last step involves the econometric verification. For this purpose, Figure 8 introduces the results of three econometric tests.

Figure 8, the econometric verification

White's test for heteroskedasticity –
Null hypothesis: heteroskedasticity not present
Test statistic: LM = 12.9498
with p-value = $P(\text{Chi-square}(9) > 12.9498) = 0.164891$

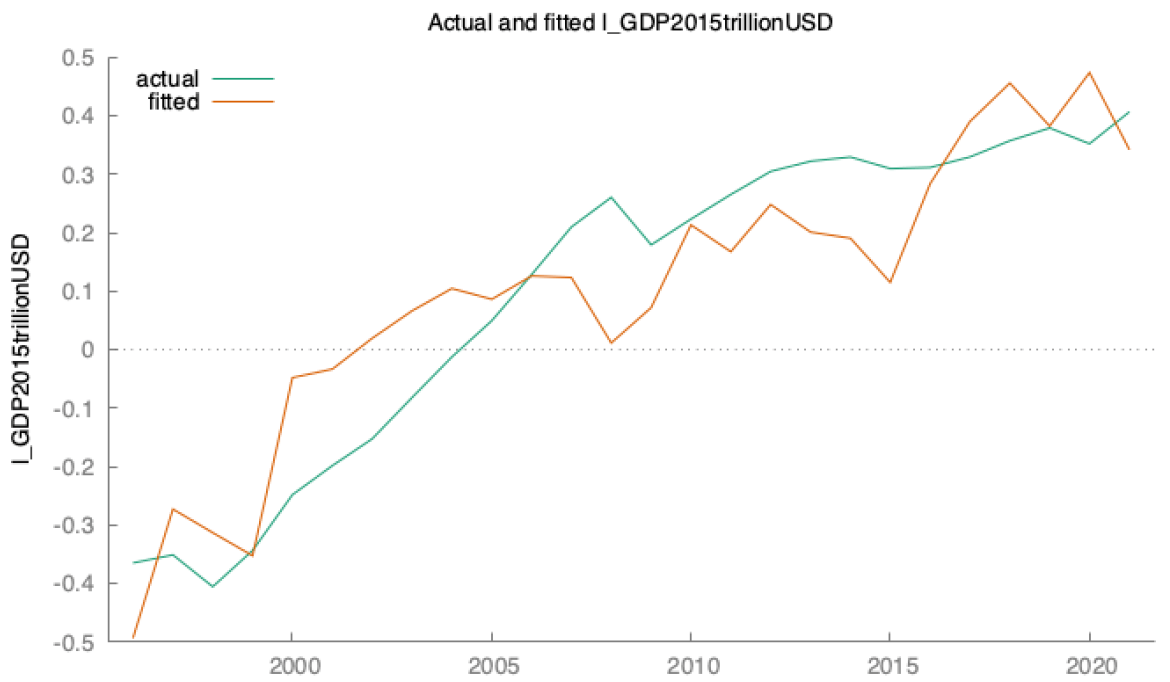
LM test for autocorrelation up to order 1 –
Null hypothesis: no autocorrelation
Test statistic: LMF = 15.9459
with p-value = $P(F(1, 21) > 15.9459) = 0.000660313$

Test for normality of residual –
Null hypothesis: error is normally distributed
Test statistic: Chi-square(2) = 0.625055
with p-value = 0.731595

Source: own analysis

On one hand, the results show a somewhat good dynamic – there is no heteroscedasticity (the variance is constant) and there is normality of residuals. On the other hand, there is a problem of serial correlation, which was also pretty apparent after looking at the DW statistic from Figure 7. This piece of evidence leads to the suggestion that the standard errors are potentially distorted, which is a bad sign but does not prevent the researcher from employing the model as he is optimistic about the results of the inference which are underpinned by relevant economic theory discussed in the literature review of the thesis. The final aspect of the practical part introduces the comparison of the fitted value versus the observed of the Russian real GDP – this is shown in Figure 9.

Figure 9, the actual and the fitted real GDP



Source: own analysis

Despite the fact that the original purpose of the model was to describe the existing links between the variables, the model performs quite well in terms of its precision despite not being able to fully capture negative moments of the Russian economy's development since the fitted line shows recessions in a somewhat lagged manner.

5 Results and Discussion

The results of the practical part suggest that the Russian economy is mainly dependent on two out of three selected determinants in a significant manner – the inflation rate and the exchange rate. Furthermore, it is important to highlight that there is no significant association between the interest rate and the real GDP, which is rather an interesting finding, and it partially violates the fundamental economic theory suggesting that any surges in the interest rate tend to lead to drops in the speed of economic growth. However, the researcher believes that the reality is somewhat different, and the interest rate and the real GDP are not related directly, i.e., there is an indirect association between them through the inflation rate in the country.

In other words, the inflation rate was categorized as the most important and influential determinant of the Russian economy, which, in turn, is influenced by the interest rate and the association between them is a negative one, meaning that whenever the interest rate increases, the inflation falls. In case with the Russian economy, the correlation between the two was positive and this is a sign that the Central Bank was actively using the interest rate as an instrument to fight high rates of inflation.

When it comes to the overall characterization of the development of the Russian economy, it can be said that the economy has definitely been performing well from many perspectives, but there are also some pessimistic considerations that are mainly related to the negative effect of sanctions. Of course, the time period not covering the year 2022 and 2023 was selected purposefully since the main objective was to evaluate the monetary policy of the country under regular circumstances and not in circumstances of extreme economic volatility and pressure from the outside.

However, even based on the selected period, it is pretty visible that the sanctions stalled the growth of the Russian economy in a very serious way, whose severity can be compared to the toll of the World Financial Crisis of 2008-2009. Apart from those negative considerations, it can be surely concluded that the Russian economy was able to rise from ashes and reach considerable success, especially in the middle of the 2000s and the period

prior to 2014. Overall, the role of monetary policy on the Russian Federation, according to the performed analysis, is likely to be high.

6 Conclusion

The bachelor thesis was dedicated to the study of the effect of monetary policy on the Russian Federation, where the real GDP was selected as a variable representing the economic growth and exchange rate, inflation rate and interest rate were selected as determinants of the variable. The objectives of the thesis were largely based on the goal of answering three research questions, which were successfully addressed with the empirical analysis in the practical part of the work. Research questions are answered in individual paragraphs below.

What are the main determinants of Russia's GDP?

Based on the performed analysis, it is possible to suggest that the main determinants of the Russian real GDP are the inflation rate (the most influential one out of the selected three for the study) and the exchange rate. The effect of the exchange rate's depreciation on the real GDP is positive and the effect of surges in the inflation rate is negative.

What is the performance of the main macroeconomic and monetary indicators in the past 25 years?

According to the time series and descriptive analyses, it is concluded that the performance of the Russian economy in the period between 1996 and 2021 was positive – the dynamics of the Russian GDP was good, and the country reached a substantial increase in the overall size of the economy. When it comes to the price stability, the country managed to get inflation under its control. However, the country presumably followed a contractionary monetary policy in order to reach this goal, which is explained by the country having a relatively high interest rate of approximately 5 per cent on average.

What was the main kind of monetary policy tools utilized by the Russian government?

As it was already mentioned in the previous paragraph, the Russian Federation has almost certainly used a contractionary monetary policy expressed in raising its interest rate quite often in order to tackle surges in the exchange rate and the inflation rate. On the other

hand, increasing interest rate became less effective for controlling the exchange rate that is mainly subject to fluctuations due to political instability and prices of oil.

Finally, it is recommended to improve research in a few ways. The first would be employing a more complex approach of estimation that will help to project not just direct effects of variables on the real GDP but will also show indirect effects with more variables included as a whole. Furthermore, the problem of serial correlation should be tackled, which can be done through including more variables or introducing robust standard errors to the model. At last, the frequency of time series data can also be changed with quarterly data used as such an estimation could be more beneficial and precise due to a higher sample size.

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