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MONETARY INSTRUMENTS IN ADDRESSING ECONOMIC CRISES: EFFECTIVENESS AND CHALLENGES

ABSTRACT

This article aims to investigate the anti-crisis reforms of the monetary policy of the Federal Reserve System (FRS) of the United States during the global financial crisis, the pandemic period, and the worsening of the military conflict in Ukraine. The study showed a significant decline in inflation due to the reduced demand for goods and services in the first two crises. Under these conditions, the Fed needed unprecedented measures to soften its policy. Repo rates fell to their lowest level during the 2008 crisis but rose during the pandemic, indicating a significant demand for these instruments to ensure stability. Since the 2008 crisis and pandemic, the easing policy has led to an increase in Fed assets. This has significant implications for the ability of monetary policy to respond to today's challenges and has led to the need for very careful control of assets. But in 2022, the Fed had to take measures to curb inflationary trends, in particular raising the discount rate.

The regression analysis carried out in the article demonstrates a significant impact of monetary instruments on the consumer price index, which indicates the effectiveness of those methods used by the Fed. The article analyzes the use of traditional and non-traditional monetary policy tools of the Fed in different economic conditions and the possible risks and negative consequences of the use of non-traditional tools, such as quantitative easing and very low interest rates. Although these techniques can support the economy in a crisis, their risks need to be taken into account. The findings contribute to the knowledge of monetary policy as a management tool and provide stakeholders with valuable insights for future strategizing.

Keywords: unconventional monetary policy, quantitative easing, impact, consumer price index, federal reserve system, development, crisis

JEL Classification: E52, E58, E61, F33, F41

INTRODUCTION

Monetary policy is a lever of state regulation of the economy, an effective and efficient mechanism for regulating the economic cycle and eliminating production decline. The main objective of monetary policy is to achieve equilibrium in the national market characterized by absolute employment and zero inflation. The essence of this policy is to regulate the size of the money supply to stabilize the economy. Traditional monetary policy measures include changes in interest rates, buying and selling of government bonds, resetting rates, and changes in the flow of money in the economy. This policy is formulated by the central bank or any other regulatory authority as a matter of general policy (Corporate Finance Institute, 2024 a).

The lack of independence of the central banks may lead to the fact that monetary policy is influenced by short-term political considerations that are inadmissible in matters of inflation. Sometimes it is possible to observe that targets for inflation can be incompatible with other macroeconomic variables. For instance, the government may prefer high levels of inflation to reduce the real value of the debt.

Analyzing such phenomenon as unemployment from the side of monetary policy we can give an example of expansionary monetary policy. This policy promotes the growth of

economic activity. Due to lower interest rates savings become less attractive and consumer spending and borrowing increase, as a rule, additionally, the unemployment rate decreases, because a higher supply of money stimulates business activity, which leads to the expansion of the labour market.

Monetary policy intends to steer the exchange rates. The exchange rate between domestic and foreign currencies can also be manipulated by The Central Bank with the use of its authority. For example; the Central Bank can approach the printing of more notes; to increase the circulation of cash in the economy. In such a case the foreign currency is worth more than its equivalent in national currency (Corporate Finance Institute, 2024b).

The primary objectives of monetary policy are to manage inflation or unemployment and to support the exchange rate. To achieve the objectives, Central Banks use various tools, for example: open market operations, reserve requirements changes, and interest rate adjustments. In periods of deep economic crisis, traditional monetary policy instruments may be ineffective in achieving the set goals. Then, unconventional methods of monetary policy may be used to accelerate economic growth and stimulate demand.

The central bank can influence the volume of lending in the economy by changing the key rate. For example, when the central bank adjusts and raises the key rate, the cost of credit for banks becomes high. Thus, they increase the interest rate for their customers because they have to compensate for the high cost of borrowing from the central bank. Consequently, the cost of borrowing in the economy increases and the amount of money circulating in the economy decreases (Melnyk et al., 2022; Oliinyk et al., 2022).

Changing reserve requirements is an important monetary policy tool. The amount of money in circulation within an economy can equally be managed through the central bank through the use of the reserve requirement ratio. If the monetary authorities change the ratio up, then more money will be taken by the reserve and hence there will be less money to lend out from the commercial bank, so on the money supply front it is a negative. Commercial banks cannot turn the reserve into loans or finance investments in new businesses. Central banks provide interest on these reserves (IOR/IORR) to commercial banks in exchange for interest on required reserves because the banks are losing out on this commercial opportunity. The central bank can alter the amount of money in circulation by buying or selling government assets in an open market operation. Consequently, the channel will generate more money for banks, which will facilitate higher lending and the money stock in the economy (Loo, n.d.; NBU, n.d. Corporate Finance Institute 2024 a).

Central banks in advanced economies began cutting interest rates after the global financial crisis began in 2007, until short-term rates reached near zero and they could not cut rates any further. To combat the effects of the crisis, some central banks used unconventional monetary policies, including outright purchases of long-term bonds. Some central banks even used short-term rates that were below zero. Similarly, central banks have reduced the transmission mechanism of the COVID-19 outbreak by using measures such as monetary easing, expanding market lending, and meeting the need for market liquidity. Foreign exchange intervention programs and asset purchases have been used by central banks to manage stress in the currency and bond markets. In the recent past, central banks around the world have adjusted monetary policy by raising interest rates in response to rising inflation.

LITERATURE REVIEW

Frederic S. Mishkin and Eugene N. White (2014) investigated the use of unprecedented measures by central banks, in Britain, France, and the United States from the late nineteenth to the late twentieth century. Similar measures had already been used in various contexts and had always caused some kind of resentment.

Nils Jannsen and his co-authors (2019) studied the effect of monetary policy. They found that they differ significantly during crises from the effects in normal times. By employing a panel VAR for twenty advanced economies, the authors demonstrate that monetary policy during financial crises is more potent and has a quicker impact on output and inflation as well as on credit, asset prices, uncertainty, and consumers' confidence. The impact on output and inflation is stronger during the storm phase of the financial crisis which coincides with a recession phase, whereas it is relatively less during the recovery phase.

Zerui Xu (2014) analyzed the periods of the Great Depression, the crises of 1970-1908, the financial crisis of 2008 and the pandemic to determine, in particular, the role of monetary policy in overcoming the crises. Monetary regulation has been one of the leading approaches used to address the problems of economic recession, inflation, high unemployment and contraction of financial activity. The effectiveness of non-standard instruments such as interest rates and quantitative easing is examined based on the retrospective analysis of the implementation of monetary policy. But monetary policy should be such that it can change depending on the current conditions in the economy. Since this creates an uncertain

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environment that brings instability to the financial system, financial supervision should be able to address the problem of speculation.

Maurice Obstfeld's (2019) work is an exploration of the global factors that affect the US monetary policy through the following three main channels, which are associated with large trade-offs for decision-makers. First, the global political-economic environment in terms of global prices and competition influences domestic inflation together with the internal environment. Second, international financial markets determine the pattern of assets' returns and financial environment and thus, influence the United States monetary policy. Finally, US monetary policy affects other countries' economies and the resultant feedback has impacts on the US economy. These interdependent issues suggest that strategies of influence elaborated by the US policymakers have domestic and international consequences. Global variables by themselves may not always make it more difficult for a central bank to maintain long-term price stability. The trade-off between price level management and other goals, including low unemployment and financial stability, is altered by global circumstances at shorter time horizons, though, and this has an impact on the political costs of pursuing a certain price level path. This paper explores the main ways in which the state of the world economy influences the Federal Reserve's policy framework and potentially modifies the trade-offs that its officials must make between different policy objectives. These aims include, of course, the "dual mandate" goals of price stability and full employment, but they also include the more arbitrary goal of financial stability, which has a significant long-term impact on both inflation and activity. A complex world has become even more complex because of global influences and linkages, there is hardly a coincidence. Monetary policy can achieve all objectives simultaneously without compromise, the separation is such that monetary policy should be set concerning a hypothetical natural real interest rate irrespective of other considerations.

Bu, Rogers, and Wu (2021) discuss the identification of the Fed's monetary policy shocks in the light of different policy regimes to identify a series of US monetary policy shocks that effectively combine periods of traditional and unconventional policy and is virtually devoid of the central bank's information effect. The conclusion of the article is a confirmation of the hypothesis that the information effect can lead to the fact that monetary policy shocks have transmission effects with features that differ from the traditional theory. It is found that shocks for series that embody the information effect demonstrate conditional (distorted) impulse responses of output and inflation. This indicates the primary importance for central bank staff conducting quantitative theoretical modelling of monetary policy effects.

Thus, global savings and investment trends have an impact on the US economy. There is considerable uncertainty surrounding the assessment, however, especially in a global context that takes into account the continued relatively strong growth of emerging markets.

AIMS AND OBJECTIVES

The purpose of this study is to examine the effectiveness of monetary policy instruments and to determine the magnitude and direction of their impact on the change in the main macroeconomic indicators.

In order to achieve the set goal, the following tasks were defined:

- to identify the main monetary policy instruments of the Fed;
- to evaluate the model of the influence of monetary policy on changes in the consumer price index.

METHODS

Both general scientific and specialized cognitive methodologies were employed for the research, the findings of which are reported in the article that is being presented. The trends of the Federal Reserve System's monetary indicators and the United States' macroeconomic indicators are ascertained by statistical analytic techniques. To detect modifications to the Fed's monetary management toolset, the analysis and synthesis method is presented. The method of logical abstraction allowed to substantiate the necessity of combining both traditional and non-traditional methods of monetary policy to achieve the set goals. Regression and correlation analysis were used to identify the impact of monetary policy instruments on the consumer price index as the main macroeconomic indicator, in which monetary policy has a direct impact.

RESULTS

The Federal Reserve System performs five main functions for the efficient functioning of the US economy and in the broader public interest. Federal Reserve System:

- implements the nation's monetary policy which is to foster maximum employment, inflation-rate stability, and modest long-term interest rates on the US economy;
- contributes to financial stability and focuses on preventing and controlling systemic risks by monitoring and taking part in financial processes in the United States and other countries;
- contributes to maintaining and enhancing the stability of a single institution and supervises the potential systemic risks that may originate from it;
- ensures that payment and settlement systems are safe and efficient through offering services to the banking industry as well as the US government about dollar transactions and payments;
- focused on consumer safety and community prosperity via consumer-based supervision and examination, conducting study and assessment on new and developing consumer protection phenomena and tendencies, engaging in community economic development activities, and the management of consumer protection laws and ordinances (Federal Reserve System, 2024).

Actually, monetary policy in the USA in its main way affects the economy through changing the interest rates and other financial conditions. To direct these conditions, the Federal Open Market Committee or FOMC moves the target range in the federal funds rate. Any changes in the federal funds rate therefore result in movements in other interest rates which in turn affects spending behaviour among the households and the business entities. In the same way that the FOMC increases or decreases this rate, it manages the cost of borrowings, expenditure by consumers as well as investment necessary for the achievement of its goals in the region.

In determining the appropriate stance of monetary policy, the committee assesses how various factors affect current and projected economic developments. These factors influence the committee's decision on the appropriate stance of monetary policy.

Currently, 3 main factors can be identified:

1. Forecasted factors.
2. Demand shocks result from changes in demand.
3. Supply-side shocks resulting from changes in demand.

As it has already been established there are several variables that influence expenditure, productivity, employment, and prices. Some of these factors can be forecasted so that room can be made for them foresightedly in the workings of the FOMC. For instance, the government influences demand in an economy through the variation of taxes and spending programs and these are often anticipated. However, the effect of a tax cut on an economy may occur even before actual implementation because, through anticipation, business people and consumers may alter their spending habits regarding the tax cut plan. Moreover, there exists certainty that the forward-looking financial markets can include anticipated fiscal changes in the level and structure of the interest rates (Federal Reserve System, n.d.).

Other factors that may have an impact on the buying of goods and services may at times be seen as a shocker and may in one way or the other alter balances in the economy. Examples of such 'demand shocks are shifts in either the consumer's or business sentiment or any changes in the credit policies that the banks and other financial institutions use when extending credit. After establishing a case of demand shock, the FOMC may attempt to counter the effects on the economy through the adoption of a change in the monetary policy. For instance, in 2020, the flow of the worldwide economy was disrupted sharply and unexpectedly due to the coronavirus (COVID-19) pandemic. This crisis intervened in economic activity, altered financial characteristics and threatened the economic prognosis. Given such developments, the FOMC had to make several changes to the monetary policy rather soon and take some non-traditional actions (Federal Reserve System, n.d.; Federal Reserve System, 2021 b).

In other cases, though, because data and other information regarding the state of the economy is not publicly available the FOMC may only learn of a demand shock after some time. Because traditional changes in monetary policy have a lag time in affecting the economy, today's actions may take several quarters or more before their impact on spending and inflation is felt. Hence, demand shocks may cause the economy to deviate from the Fed's desired objectives regarding employment and inflation for some time.

Large negative supply shocks, such as crop failure due to extreme weather or lower productivity growth, can raise the cost of production very sharply and lead to higher prices, lower output and lower employment. Also, instability in the oil market, for example, can reduce the supply of oil and significantly raise its price. Faced with this type of adverse supply

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shock, policymakers may try to compensate for the loss of output by easing monetary policy and creating financial conditions favourable to spending. In other words, they may try to offset the rise in the price level by tightening monetary policy. In such cases, the FOMC takes into account the employment gap and inflation deviations to achieve its goals. True, favourable supply shocks - such as technological breakthroughs or falling prices of critical raw materials - can also affect the economy, lowering prices and boosting output (Federal Reserve System, 2021 a, b; Federal Reserve System, n.d.).

The most influential shocks to the global economy over the past 20 years have been the global financial crisis, the COVID-19 pandemic, and the war in Ukraine.

In the spring and summer of 2007, financial markets began to sense signs of an impending crisis, including declining home prices and the depreciation of subprime loan-related securities. In August 2007, French bank BNP Paribas suspended redemptions in investment funds containing US subprime mortgage-backed securities, which increased distrust of financial institutions. Lenders began demanding large risk premiums and funding sources for subprime-related assets dried up. Despite the deterioration in credit conditions, economic activity remained stable in the second half of 2007, and the Federal Reserve lowered the target federal funds rate by one percentage point.

In early 2008, the financial crisis deepened, severely impacting the economy: housing and stock prices continued to decline and credit spreads widened. The Fed aggressively eased monetary policy, lowering the target federal funds rate to 2 per cent by April 2008. Rising oil and commodity prices increased inflation, which influenced the Fed's decision not to cut rates even more aggressively. Data for the first half of 2008 showed that economic activity was stronger than expected, but by summer financial weaknesses had intensified, setting the stage for the events of September 2008, when the crisis peaked with the bankruptcy of Lehman Brothers (Kohn, D., & Sack, B., 2018).

The collapse of Lehman Brothers on September 15, 2008, led to significant turmoil in the financial markets, which was the main topic of the FOMC meeting the following day. The Federal Reserve's attention was focused on immediate threats to the financial system, including the potential collapse of AIG. These events triggered a global financial panic, leading to a sharp decline in business and household spending and a deep economic downturn.

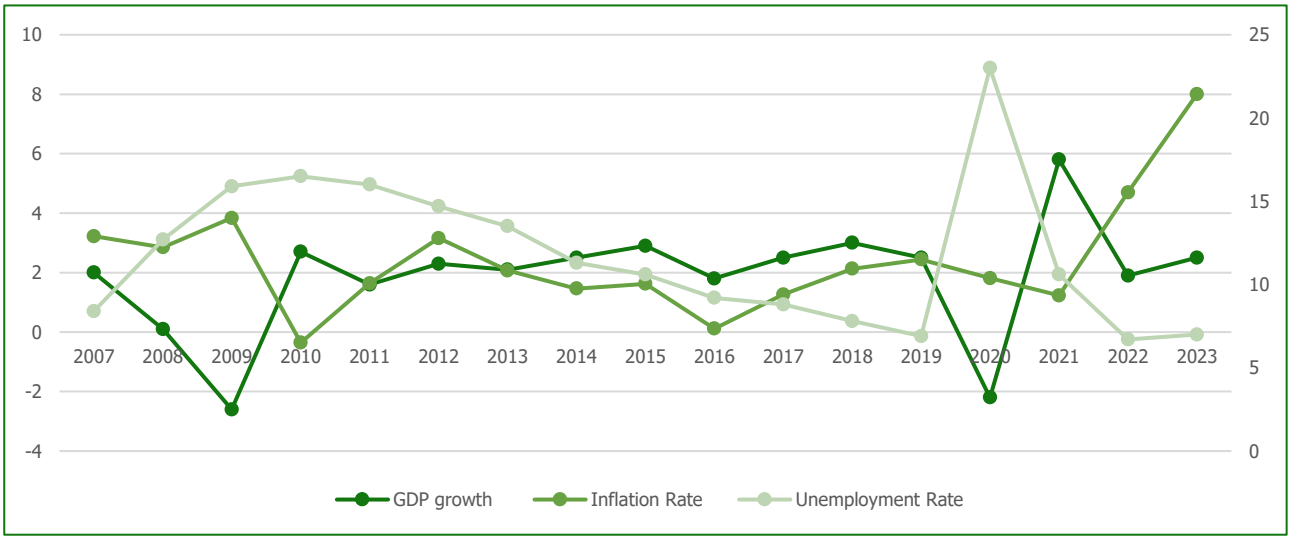

Figure 1. GDP Growth, Inflation and Unemployment in the USA, %. *(Source: World Bank)*

The inflation target in the USA has been at 2% for many years mainly because increasing the long-term inflation target makes expectations attainable in response to inflation, actions of the central bank as well as other factors influencing the economy. This greater sensitivity will lessen the room that the central banks have to cushion the economy from adverse shocks. It could also result in more unstable inflation in the longer run and hence higher inflation risk premia in nominal interest rates (Kohn, 2010; Garbowski et al., 2019).

Whereas, the Federal Reserve and other central banks also came into action and answered the worsening situation in the latter half of the year 2008 not only by supplying emergency funds but also by reducing policy interest rates to almost zero and undertaking other things to relax financial conditions. More specifically, such fast and vigorous responses were supposed to mitigate the pressure on the economy by lowering the interest rates for borrowing for households and businesses in order to keep on spending. This did not help to substantially decrease market risks and prevent the further contraction of the economy (Kohn, 2010).

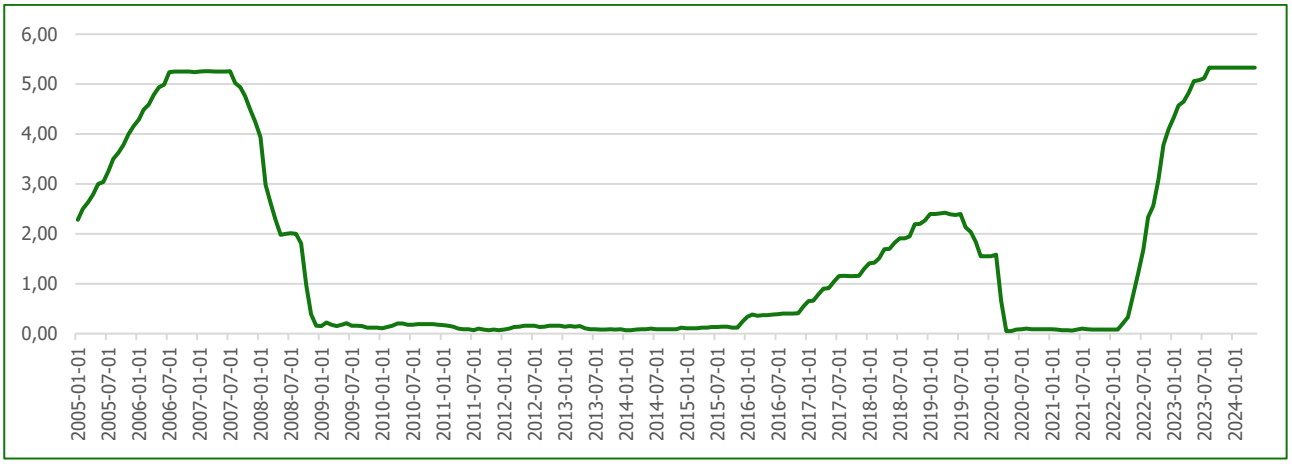

Figure 2. Federal Funds Effective Rate, %. *(Source: FRED)*

In October and November 2008, the Fed continued to cut rates and also announced plans to purchase significant amounts of agency bonds and mortgage-backed securities to stabilize the housing market. However, despite these measures, financial markets remained under severe pressure and the economy continued to decline. By the December FOMC meeting, it was clear that additional measures were needed. After short-term interest rates got to the zero lower bound in December 2008, the Fed employed communications to affect expectations of inflation. During the FOMC meeting held in March 2009, FED stated that it is desirable to maintain the federal funds rate at a level significantly below its normal range for a long time, "an extended period," in fact. This meant that the FED was not only predicting its actions but was also trying to manage expectations in a rather unpredictable world. In telling financial markets that rates would continue to be low for a long time, the FOMC did attain its goal of pulling down long-term interest rates below what could have otherwise been possible. Further, the "extended period" language was spelt out in November 2009, which pointed out that this expectation was contingent on the committee's assessment of resource utilization, inflation and inflation expectations (Kohn, 2010; Garbowski et al., 2019; Federal Reserve System, 2021 b).

In order to enhance the public's ability to better comprehend the decisions made in monetary policy, Board members and Reserve Bank presidents decided that they should produce more frequent forecasts with more extended time frames and they also have to provide an accompanying rationale for these forecasts. In January 2009, policymakers also came up with information concerning their projections of the permanently prevailing rates of growth, inflation, and unemployment. The extra noise regarding the long-term inflation rate was useful in preventing inflation expectations from rising during the crisis (Kohn, 2010).

Amid growing uncertainty, the FOMC left the interest rate unchanged at a low level. Having reduced the federal funds rate to zero, the Federal Reserve turned to unconventional strategies to support the economy. Recognizing that traditional monetary tools were no longer sufficient, the Fed initiated large-scale asset purchases (LSAPs) aimed at lowering long-term interest rates, especially on mortgages. This initiative included purchases of USD 300 billion in Treasury securities, USD 175 billion in agency debt, and USD 1.25 trillion in agency mortgage-backed securities (MBS).

Table 2. Rounds of Quantitative Easing in US Monetary Policy. *(Source: constructed by the author based on Federal Reserve System, 2024)*

Round	Period	Type of Assets	Purchase Amount	Main Objectives
QE1 (First Round)	December 2008 - March 2010	Agency MBS, agency debt, Treasury securities	USD 1.725 trillion (USD 1.25 trillion MBS, USD 175 billion agency debt, USD 300 billion Treasuries)	Lowering interest rates, improving housing market conditions, stabilizing financial markets
QE2 (Second Round)	November 2010 - June 2011	Treasury securities	USD 600 billion	Stimulating the economy, preventing deflation
Operation Twist	September 2011 - December 2012	Selling short-term Treasuries and buying long-term Treasuries	USD 667 billion	Lowering long-term interest rates, supporting economic growth
QE3 (Third Round)	September 2012 - October 2014	Agency MBS, Treasury securities	USD 40 billion per month (increased to USD 85 billion per month from December 2012)	Reducing unemployment, supporting economic growth
QE4 (Fourth Round)	March 2020 - Present	Treasury securities, agency MBS	Unlimited amount (initially USD 500 billion Treasuries and USD 200 billion MBS)	Supporting the economy during the COVID-19 pandemic, ensuring liquidity in financial markets

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Between 2008 and 2014, the Fed conducted several waves of quantitative easing in response to the financial crisis and its aftermath: The first wave (QE1) began in 2008, when the Fed began by purchasing USD 600 billion of bonds and MBS (mortgage-backed securities) to stimulate lending and lower long-term interest rates. This initiative helped alleviate pressure on financial markets and lower mortgage borrowing costs. During the second wave (QE2) 2010-2011, the Fed announced the purchase of USD 600 billion in bonds for 6-8 months, also aimed at stimulating the economy and increasing inflation. In the third wave (QE3), 2012-2014 the Fed launched a USD 85 billion purchase program, including USD 45 billion in mortgage-backed bonds. The goal was to continue to support the labour market and help accelerate the economic recovery.

The rounds had a huge impact, injecting about USD 1.2 trillion in reserve balances into the banking system. This inflow was in sharp contrast to the pre-crisis norm of about USD 15 billion.

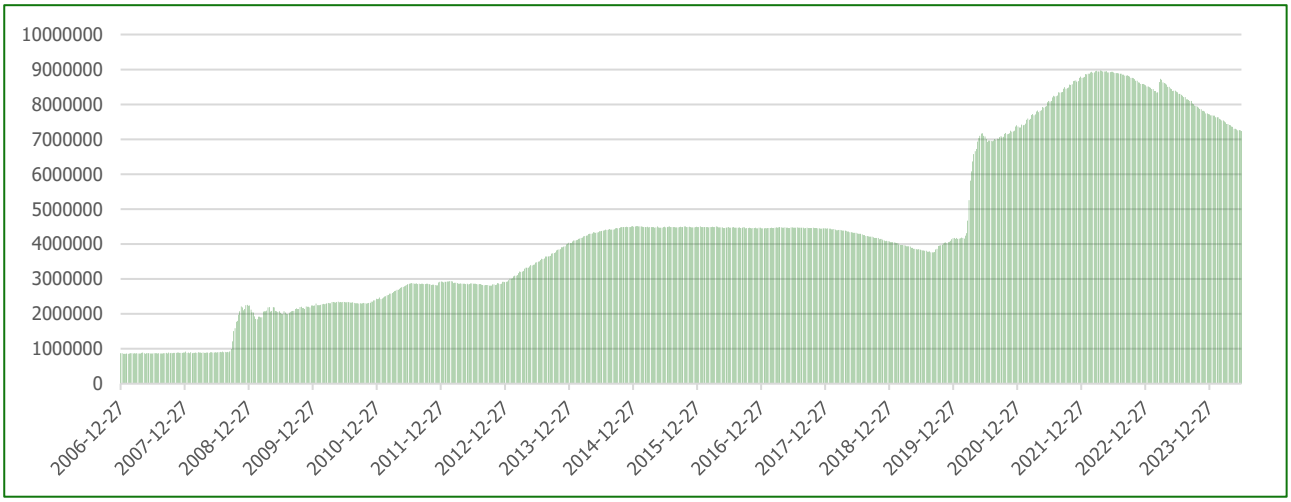

Figure 3. FRED Total Assets, USD million. *(Source: FRED (2024))*

Before the crisis, the Federal Reserve's assets remained relatively stable at about USD 870 billion, mostly represented by Treasury securities. With the onset of the global financial crisis, the Fed began active quantitative easing. The purchase of Treasury securities, agency debt, and mortgage-backed securities (MBS) brought asset holdings close to USD 2 trillion at the end of the year. By the end of 2010, with the QE1 program, assets had increased to about USD 2.3 trillion. Assets increased to USD 2.9 trillion after the introduction of the QE2 program. QE3 program assets continued to increase and by the end of 2014 were approximately USD 4.5 trillion. Assets remained unchanged until 2017 at about USD 4.5 trillion. Then the balance sheet began to shrink, bringing assets down to about USD 3.8 trillion by mid-2019. However, the pandemic changed the situation and triggered a new phase of quantitative easing. The Fed's assets were increased to over USD 7 trillion in a short period. At the end of 2022, the amount of assets purchased to support the economy reached about USD 8.5 trillion. With the onset of economic recovery, the Fed began to gradually reduce the amount of assets. By the end of 2024, assets are expected to be approximately USD 8 trillion (Nizkor Project, 2015).

Indeed, the Federal Reserve's actions during this crisis entailed lending the proceeds of its securities purchases to the banks which resulted in a massive augmentation of the amount of bank reserves. Although the buys of these securities have had its effects on the economy studied, the big reserves developed have been considered to have under no circumstance a giant influence. This view differs from the standard monetary view where reserve plays a critical role. Also, despite enhanced bank reserves, the rate of interest on bank credit is still highly attractive, bank credit expanded has dwindled, and the money stock is still rising which points to a number of underlying complications regarding the machinery of reserve and the general impacts in the economy (Kohn, 2010; Alekseievska, 2020; Hutorov et al., 2020).

The effect on inflation expectations of the asset purchases by the FRB is another key unknown. With the Fed increasing its balance sheet for long-term assets there is of course the necessity for more reserves which in due course will have to be mopped up. Also, the Fed will have to sell these securities to reduce its balance sheet to its stagnant levels or conventional size. This process has dilemmas for some analysts who fear that the Fed may not move early and quickly enough to drain reserves and hike rates that may lead to elevated inflation expectations. Nevertheless, by 2020, it was seen that there had been gradual raising of interest rates from mid-2016 (Kohn, 2010; Nizkor Project, 2015).

In response to the COVID-19 pandemic, tremendous influence was used affecting the federal funds rate target by a decrease of 1.5%in the course of its policy meetings in March 2020 due to which it established a new interest rate band

at 0%-0,25%. This action was aimed at stimulating trading and thus lessening the interest rate on loans for households and businesses since the federal funds rate is the reference point of other short-term and long-term interest rates.

The Fed also used the forward guidance tool which was learned in the period of the Great Recession to make the rates more predictable. At first, the Fed declared it would maintain the target range of the federal funds rate near zero until it had seen several signs indicating the economy's recovery from recent impairments and considering it could reach maximum employment and the inflation target. Such guidance was backed by the new framework of the monetary policy that stated that rates would remain lower for longer in order to attain the Committee's objectives of maximum employment and to achieve inflation near 2%, or modestly above this figure for some time. As of 2021 Q3, inflation had exceeded the Fed's target of 2 per cent, and labour market conditions were close to the Committee's concept of the maximum level. By December 2021 FOMC said that most of its members anticipated that they would start hiking the interest rates in 2022 by a quarter percentage point three times (Milstein, E., Wessel, D., 2021).

Proliferation from the pandemic also deterred economic growth and for this reason, the Fed again relied on the securities purchasing program that worked in the Great Recession. At first, they were made to address disruptions in the operations of financial markets that play a crucial role in functions that revolve around lending and the provision of funds in the economy. For instance, on the 15th of March 2020, the head of the Fed said that for the next couple of months, the Fed will be buying Treasury securities worth at least USD 500 billion and government-guaranteed mortgage-backed securities worth USD 200 billion. After that on 23rd March 2020, it extended these purchases indefinitely saying that it would engage in other securities 'until market conditions are sufficiently improved that the flow of credit to households and businesses are relatively normal' This alteration enhanced the goal of bond purchases for the economy in general (Federal Reserve, 2021 a, b; Milstein, E., Wessel, D., 2021).

In June 2020, the Fed established these rates of purchase at USD 80 billion of Treasuries and USD 40 billion of RMBS and CMBS each month, at a minimum. For ZIRP to be replaced by a more normal policy rate, this pace was to hold until there is further progress in attaining the Fed's dual mandate of maximum employment and inflation stability with this understanding, any talk of rate hikes until such is attainable is deceitful. Thus, starting in November 2021 and owing to the enhancing economic conditions, the Fed gradually reduced the bond purchases to USD 10 billion in Treasury securities and USD 5 billion in mortgage-backed securities every month. In December 2021, the Fed funds rate of tapering was doubled with the monthly purchases of Treasuries and mortgage-backed securities cut by USD 20 billion and USD 10 billion respectively as the FED began to gradually normalise its monetary policy as the recovery of the economy (Ihrig, 2020; Federal Reserve System, 2021 a, b; Milstein, E., Wessel, D., 2021).

Through the Primary Dealer Credit Facility (PDCF) program, which was revived after the global financial crises aimed at providing low-interest 90-day loans to 24 big financial institutions described as primary dealers. This they offered in return for an identical amount of Federal funds, putting up commercial paper and municipal securities as collateral. The goal was to keep these dealers prime for continuing to stabilize credit markets during periods of stress. In the initial period of the pandemic, it was observed that a number of institutions and people behaved more cautiously and money was drawn back, spending sprees in risky assets were not there and dealers experienced difficulties in obtaining funds for supporting the stocks of securities that they had accumulated during the open market sessions.

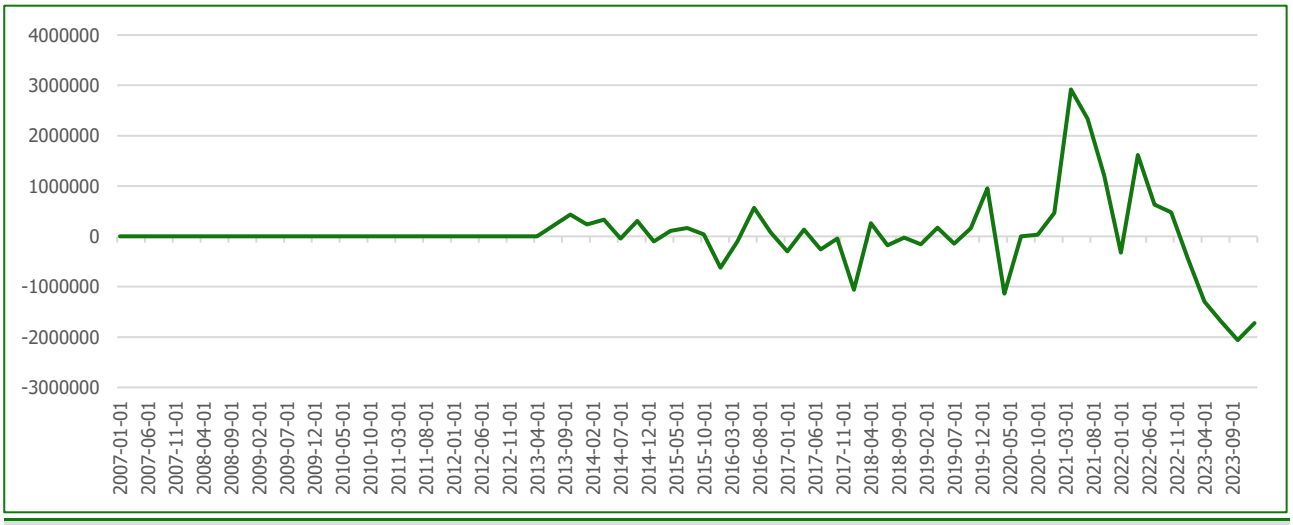

Figure 4. Federal Reserve Reverse Repurchase Agreement Operations. *(Source: FRED, 2024)*

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Also, the Fed has vastly enhanced the use of commissioner repurchase operations (repo transactions) to provide funds to money markets. The repo market which is an over-the-counter market whereby firms lend and borrow cash and short-term securities usually for a single day. Due to regular breakdowns in the repo market having consequences to the Fed funds rate, the Fed's repo operations provided primary dealers with cash in return for federal securities and other assets. Prior to the market shocks by the coronavirus outbreak, the Fed was providing USD 100 billion in ON RPs and USD 20 billion in two-week RPs. During the virus breakout, the Fed significantly increased the program – both by the sizes provided and the volumes borrowed. The Permanent Repo Facility was established by the Fed in July 2021 after the global economic shock was discovered and was created to assist money markets (Milstein, E., Wessel, D., 2021).

Repurchase transactions often involve the sale of securities with a repurchase obligation. Negative values may indicate that the securities have been repurchased back, closing out positions. Changes in the liquidity needs of market participants lead to significant changes in the volume of repo transactions. When participants repurchase funds, assets may temporarily decline.

The Federal Reserve encouraged banks, both large and small, to use their regulatory capital and liquidity buffers to boost lending during the pandemic. This move was supported by post-financial crisis reforms that require banks to hold additional capital to absorb losses and prevent future crises. However, these reforms also allow banks to dip into these buffers during economic downturns to maintain lending. To further support this, the Fed made technical adjustments to its TLAC requirements and phased in limits related to TLAC deficiencies. Additionally, the Fed removed the bank reserve requirement, which was largely symbolic as banks already held reserves well above the required levels. While the Fed restricted dividends and share buybacks during the pandemic to ensure banks had enough capital, these restrictions were lifted for most firms by June 30, 2021, after stress tests confirmed that banks had sufficient capital to continue lending, even in a weaker-than-expected economic environment (Milstein and Wessel, 2021; Koldovskyi et al., 2023).

Since 2022, the Fed's strategy has changed significantly, driven by external factors and a significant increase in inflationary trends. The Fed decided to raise interest rates significantly in response to high inflation. The target federal funds rate reached a range of 4, after having been increased by 3 percentage points, and finally now fixed at 5.33. By early 2023, the 75% level will be reached. This was done to slow economic activity and reduce inflationary pressures. Since the beginning of June 2022, the Fed has reduced its holdings, including both Treasury and mortgage-backed securities by about USD 500 billion. This has led to tighter financial conditions, which has reduced the amount of money in circulation and supported higher interest rates. During times of unstable economic conditions and market volatility, the Fed served the function of providing liquidity to financial institutions through various instruments, including repos. This helped to ensure stability in the banking system and prevent liquidation crises. Also, the Fed regularly communicated its actions and plans to the public and markets through reports and press conferences, actively publicizing the situation. This helped to reduce uncertainty and control expectations about future monetary policy. The purpose of these measures was to contain inflation, support economic stability, and ensure that financial markets operated in a safe manner (J.P. Morgan, 2024; Artyushok et al., 2023; Federal Reserve, 2022).

Thus, after analyzing the components of monetary policy, a regression and correlation analysis was conducted to identify the impact of monetary policy instruments on the consumer price index. For this analysis, the following indicators were selected: the consumer price index, repo operations, 10-year US bond yields, federal funds rate, Fed assets, and money supply. First of all, to build the model, a correlation analysis of the indicators studied in this paper was conducted. As a result, the most influential indicators on the CPI and those that do not correlate with each other were identified in order to avoid multicollinearity in the model, which could negatively affect its interpretation.

Table 2. Correlation analysis of indicators of the Fed's monetary policy instruments in 2000-2023.

Repo operations	Federal funds rate	Assets of the Federal Reserve	Money supply	Yield of 10-year US bonds	Consumer price index	Indicators
1.0000	-0.0348	0.6304	0.6046	0.0727	0.6800	Repo operations
	1.0000	-0.5102	-0.4410	0.6960	0.5237	Federal funds rate
		1.0000	0.9779	-0.5857	0.3154	Assets of the Federal Reserve
			1.0000	-0.6094	0.3464	Money supply
				1.0000	0.2018	Yield of 10-year US bonds
					1.0000	Consumer price index

Based on the results of the correlation analysis, it can be concluded that only 2 indicators - repo transactions and the federal funds rate - do not correlate with each other and do not affect the consumer price index.

Thus, a regression model was built that has the following general form:

$$CPI_t = a + \beta_1 REPO_t + \beta_3 FFR_t \quad (1)$$

where Consumer price index (CPI) is the level of the consumer price index, per cent, REPO is the repo rate, USD billions, and FFR is the federal funds rate, per cent.

The results of the regression analysis are presented in Table 3.

Table 3. Regression analysis of the study of the factors of efficiency of the use of monetary policy instruments by the Federal Reserve.

Model		Unstandardized coefficients	Standardized coefficients	t	Signifi-cance
		Standard deviations	Beta		
1	const	0.329084	1.61236	4.900	<0.0001
	Repo operations (REPO)	7.27344e-07	3.48516e-06	4.792	0.0001
	Federal Funds Rate (FFR)	-0.131064	-0.515548	-2.408	0.0258
R^2 =0,82					

So, the model looks like this:

$$CPI_t = 1.61236const + 3.48516e-06REPO + 0.515548FFR_t \quad (2)$$

(4.900) (4.792) (-2.408)

Based on this model, we can conclude that the model is 82% significant. The largest impact is observed for the variable of short-term refinancing operations, which has a direct relationship with the consumer price index; a significant increase in the volume of operations leads to an increase in the consumer price index, provided that all other variables remain unchanged. The federal funds rate has a smaller impact on the change in the consumer price index. The interest rate effect shows the relationship between the price level and the interest rate. A significant reduction in interest rates by the Fed leads to an intensification of inflationary trends. This model makes it clear that both factors (REPO and FER) have a significant impact on CPI, which can be useful for economic forecasts and policy decisions. The model also proves the statement that the main instrument of monetary policy is the federal funds rate.

However, it should be noted that the federal funds rate is currently the highest since 2007. And the Fed is conducting its restraining monetary policy with caution, as it may overdo it. The consequences of monetary policy are not immediately visible, so it is difficult to predict when the discount rate has reached the level necessary to reduce inflation. Economists are wary of a repeat of the recession of the late 70s and early 80s. That period saw the highest unemployment (10.8%) and mortgage rates (about 17%). The Fed does not consider it advisable to cut rates.

DISCUSSION

Various scientific works analyze the role of the monetary policy of the Federal Reserve System (FRS) as a key tool for the implementation of anti-crisis measures. In particular, the studies by John et al. (2019) show how the Fed's monetary policy adjustment during the global financial crisis had a significant impact on financial markets and economic recovery. The authors emphasize the importance of rapid interest rate cuts and quantitative easing (QE) in mitigating the negative effects of the recession. They argue that these measures provided liquidity to the banking system, stabilized financial markets, and stimulated lending and investment. In our opinion, the effectiveness of these measures is undisputed only in the short term. But if we talk about the long-term consequences of such a significant easing of monetary policy and the active growth of the Fed's balance sheet, it can inflate the prices of financial assets, which in turn can lead to a new "bubble" in the financial market.

In addition, the study by Henkel emphasizes the fact that monetary policy affects the economy unevenly. The results of their study confirm that corporations and banks benefit more from low interest rates and QE, as opposed to small and

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medium-sized businesses and consumers. This discrepancy raises the question of whether the positive results of the Fed's monetary policy are being distributed fairly or whether there is a need for more targeted interventions.

The use of the Fed's monetary policy during the COVID-19 crisis also reveals both the advantages and disadvantages of the policy.

Clarida (2021) argues that the Fed's discount rate cut operation and the start of large-scale quantitative easing programs helped avoid an even worse economic collapse. However, the same policy has led to a significant accumulation of public sector debt and even future inflationary pressures. Furthermore, the experience described in the Fed's Annual Reports (2021) in selected publications suggests that while a rapid response to crises in the form of monetary policy accommodation is necessary and appropriate, an approach to the withdrawal of such measures is equally important to prevent bubbles in the long run. In our view, the issue of continuing short-term economic stimulus combined with realistic long-term financial prosperity is still one of the most important for the Fed.

Movements from stimulative to restrictive money cause directional shifts which put the FED on a stand. The unconventional approaches that were applied to deal with the crisis of 2020 had given rise to circumstances that complicated the management of inflation in the succeeding years even after the crisis. Volatile policies and the time taken to feel the impact of monetary policies summarized the challenge of achieving both economic growth and stability of prices.

CONCLUSIONS

Conclusions and prospects for further development. To summarize, during the global crises of 2008-2010 and the 2020 pandemic, inflation declined significantly. This was the result of a decline in demand for goods and services, which led to deflationary pressures. But in 2022, the situation is different, and the Fed now needs to contain inflationary trends. The Fed raised interest rates before the 2008 crisis and after the pandemic. This was done to increase the cost of short-term borrowing, which in turn reduced the supply of loans and increased their cost. In this way, the Fed was trying to contain economic overheating and control inflation. During the 2008-2010 crisis, repo rates fell to their lowest level, but during the pandemic in 2022, they rose, indicating strong demand for these instruments. This indicates that repos are used as a mechanism to maintain liquidity in the financial system. The Fed's assets grew after the 2008 crisis thanks to its quantitative easing policy, which involved the purchase of financial assets. However, in 2022, there was a decline in assets due to the excessive use of these instruments during the pandemic, when the priority was to finance governments. Regression and correlation analyses show that these factors have a significant impact on the consumer price index, and they contribute to inflation.

Thus, monetary policy regulates the economy by using traditional and non-traditional instruments to achieve a balance in the domestic market, which is described by absolute economic employment, moderate inflation, and stimulating economic development. Traditional instruments include interest rate regulation, open market operations, and setting bank reserve requirements. Non-traditional monetary policy methods are manifested in the form of currency stimulus, i.e. an increase in the currency supply; development recommendations, which are characterized by the bank's encouragement of promising areas; quantitative easing, which means an increase in the money supply while reducing interest rates; and credit easing, which is characterized by the use of low-liquid assets. In different crisis conditions, a combination of both traditional and unconventional instruments can support the economy and have the desired effect. However, unconventional monetary policy instruments such as quantitative easing (QE) and extremely low interest rates have certain risks and potential negative consequences. For example, excessive liquidity may encourage banks and financial institutions to lend to less creditworthy borrowers, increasing the overall credit risk in the financial system. Quantitative easing involves the purchase of government bonds by central banks, which can lead to governments becoming dependent on ongoing financing through bond sales, increasing the overall level of public debt. High debt levels may limit the government's ability to use fiscal stimulus in future economic crises. During the COVID-19 pandemic, public debt increased significantly due to massive bond purchases by the Fed to support the economy.

Further research would be useful to compare the effectiveness of traditional and unconventional monetary policies during different types of economic crises, which could help develop optimal strategies for future crises.

While unconventional monetary policy instruments have the potential to stabilize the economy in times of crisis, they also pose certain risks that require careful monitoring and further research. Knowing and managing these risks is key to ensuring long-term financial stability and sustainable economic growth.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All authors have contributed equally.

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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МОНЕТАРНІ ІНСТРУМЕНТИ В ПОДОЛАННІ ЕКОНОМІЧНИХ КРИЗ: ЕФЕКТИВНІСТЬ І ВИКЛИКИ

Метою дослідження є вивчення антикризових реформ монетарної політики Федеральної резервної системи (ФРС) США під час світової фінансової кризи, періоду пандемії та загострення воєнного конфлікту в Україні. Дослідження показало значне зниження інфляції через скорочення попиту на товари та послуги протягом перших двох криз. За цих умов ФРС потребувала безпрецедентних заходів для пом'якшення своєї політики. Ставки РЕПО впали до найнижчого рівня під час кризи 2008 року, але зросли під час пандемії, що свідчить про значний попит на ці інструменти для забезпечення стабільності. Після кризи та пандемії 2008 року політика пом'якшення призвела до збільшення активів ФРС. Це має значні наслідки для здатності монетарної політики реагувати на сучасні виклики й призвело до необхідності дуже ретельного контролю за активами. Але 2022 року ФРС довелося вжити заходів для стримування інфляційних тенденцій, зокрема підвищити облікову ставку.

Проведений регресійний аналіз демонструє значний вплив монетарних інструментів на індекс споживчих цін, що свідчить про ефективність тих методів, які використовував ФРС. У статті проаналізовано використання традиційних і нетрадиційних інструментів монетарної політики ФРС у різних економічних умовах, а також можливі ризики та негативні наслідки застосування нетрадиційних інструментів, таких як кількісне пом'якшення та дуже низькі процентні ставки. Незважаючи на те, що ці методи можуть підтримати економіку в умовах кризи, необхідно враховувати їхні ризики. Отримані результати поглиблюють знання про монетарну політику як інструмент управління та надають зацікавленим сторонам цінну інформацію для розробки стратегій у майбутньому.

Ключові слова: нетрадиційна монетарна політика, кількісне пом'якшення, вплив, індекс споживчих цін, федеральна резервна система, розвиток, криза

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