Monetary Policy and Shocks: A Comparative Study of the 70s and the Post-Pandemic Era

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« Economics is a very difficult subject. I've compared it to trying to learn how to repair a car when the engine is running. »

Ben Bernanke

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List of Abbreviations

Fed	Federal Reserve
FOMC	Federal Open Market Committee
NBER	National Bureau of Economic Research
FRED	Federal Reserve Economic Data
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
VAR	Vector AutoRegressive Model
SVAR	Structural Vector AutoRegressive Model
IRF	Impulse Response Function
QE	Quantitative Easing
GDP	Gross Domestic Product
PPI	Producer Price Index
CPI	Consumer Price Index
PCE	Personal Consumption Expenditures
WTI	West Texas Intermediate (Spot Crude Oil Price)
FFR	Fed Funds Rate

Introduction

The exploration of central bank responses to inflation is a common topic in economic research. The question of whether central banks' actions are appropriate or effective in the face of economic shocks has been studied extensively. However, recent global events have renewed interest in this area.

Following the COVID-19 pandemic, central banks around the world have raised interest rates in response to increases in energy and commodity prices. This situation has led to comparisons with the stagflation of the 1970s, a period characterised by high inflation and low economic growth. Earlier studies, such as those by Gomez & Loscos (2012) and Blanchard & Riggi (2013), have drawn similar comparisons, though they focused on different periods.

Recent publications (e.g., Ball et al., 2022; Bergholt et al., 2024; Blanchard & Bernanke, 2023), have begun to examine the post-pandemic inflation crisis. However, much of this research is concerned with identifying the causes of inflation rather than assessing the effectiveness of monetary policy responses. Moreover, the literature has not yet explored direct comparisons between the current inflationary period and those of the 1970s.

1.1 The Limits of the Historical Comparison

The economic situation following the COVID crisis is marked by the shutdown of production lines and disruptions to the global economy that led to inflationary pressures. These supply-side disruptions share some similarities with the oil shocks of the 1970s. These similarities suggest that it is worthwhile to examine how central banks are managing inflation today, in light of past experiences.

It is important to acknowledge the critiques against comparing the inflationary shocks of the 1970s with those following the COVID-19 pandemic and to recognize the significant differences between these two periods. For example, while the 1970s were driven by oil supply shocks in a heavily industrialized economy, the post-COVID period has been shaped by a mix of pandemic-induced supply and demand shocks in a more service-oriented, energy-independent economy.

Table 1.1 highlights the U.S. economy's transition from a manufacturing-heavy, oil-importing nation to a service-oriented, energy-exporting one fundamentally alters the economic landscape as the main sector in the 70s. This is well illustrated by the manufacturing sector, which was the main sector in the 1970s, accounting for 21.8% of the economy, but has declined to only 10.7% in the 2020s.

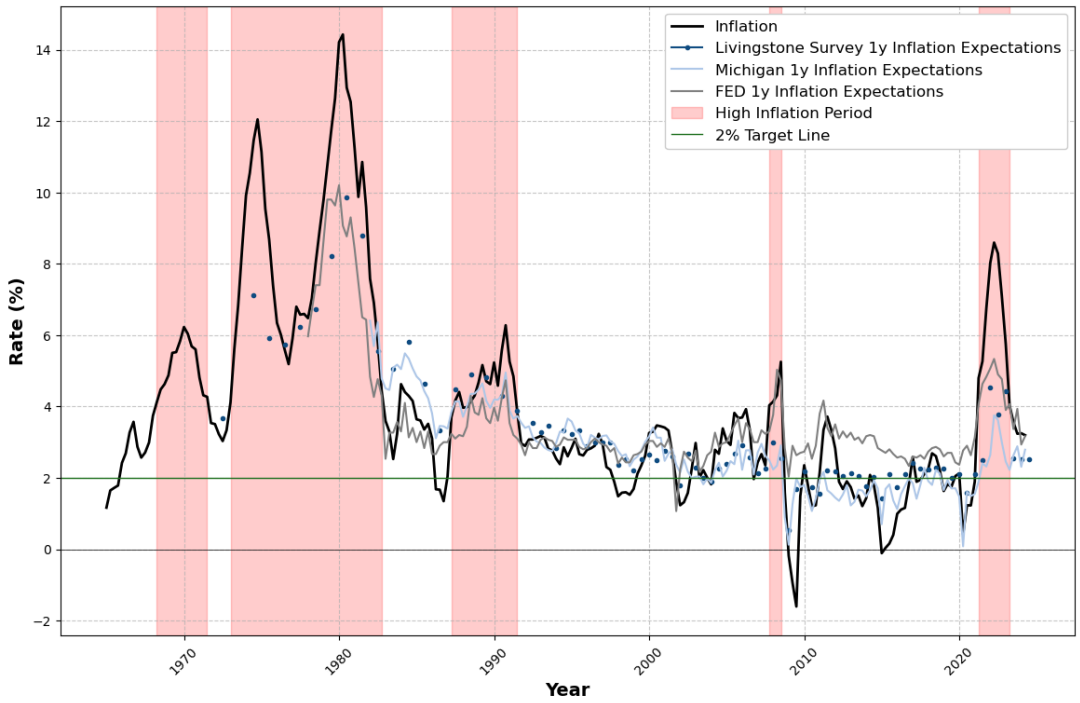
Regarding expected inflation, Figure 1.1 depicts the actual inflation rate alongside one-year inflation expectations from the Livingston Survey, Michigan Survey, and the Federal Reserve. The figure underscores periods where inflation expectations remained well-anchored, such as during the 1990s and 2000s, in contrast to periods of unanchored expectations. The 1970s were characterized by unanchored inflation expectations, while current inflation is occurring under better-anchored expectations and more coordinated fiscal and monetary policies. The inflation peak following the COVID-19 crisis was perceived by economic agents as transitory. When inflation expectations are well-anchored, central banks are less compelled to intervene to re-anchor them. This contrasts with the 1970s when unanchored expectations necessitated strong actions by central banks to combat inflation.

Table 1.1: Contribution to the GDP per sector

	1970s [1970-1979]	**2020s** [2013-2022]	**Difference**
Agriculture, forestry, fishing, and hunting	2.8%	0.9%	-67.1%
Mining	1.8%	1.5%	-16.8%
Utilities	2.1%	1.6%	-23.9%
Construction	4.6%	4.2%	-9.2%
Manufacturing	21.8%	10.7%	-51.0%
Wholesale trade	6.5%	6.1%	-6.8%
Retail trade	7.6%	6.1%	-20.2%
Transportation and warehousing	3.7%	3.2%	-13.4%
Information	3.9%	5.2%	33.2%
Finance and insurance	4.4%	7.7%	75.6%
Real estate and rental and leasing	10.3%	13.0%	26.6%
Professional and business services	5.2%	12.5%	139.5%
Educational services	0.7%	1.2%	78.4%
Health care and social assistance	3.5%	7.4%	112.7%
Arts, entertainment, recreation, accommodation, and food services	2.8%	4.0%	42.8%
Other services, except government	1.8%	0.7%	-60.5%
Government	15.7%	12.4%	-21.2%

Source: Bureau of Economic Analysis (BEA)

Figure 1.1: Evolution of the Inflation and Expected Inflation.

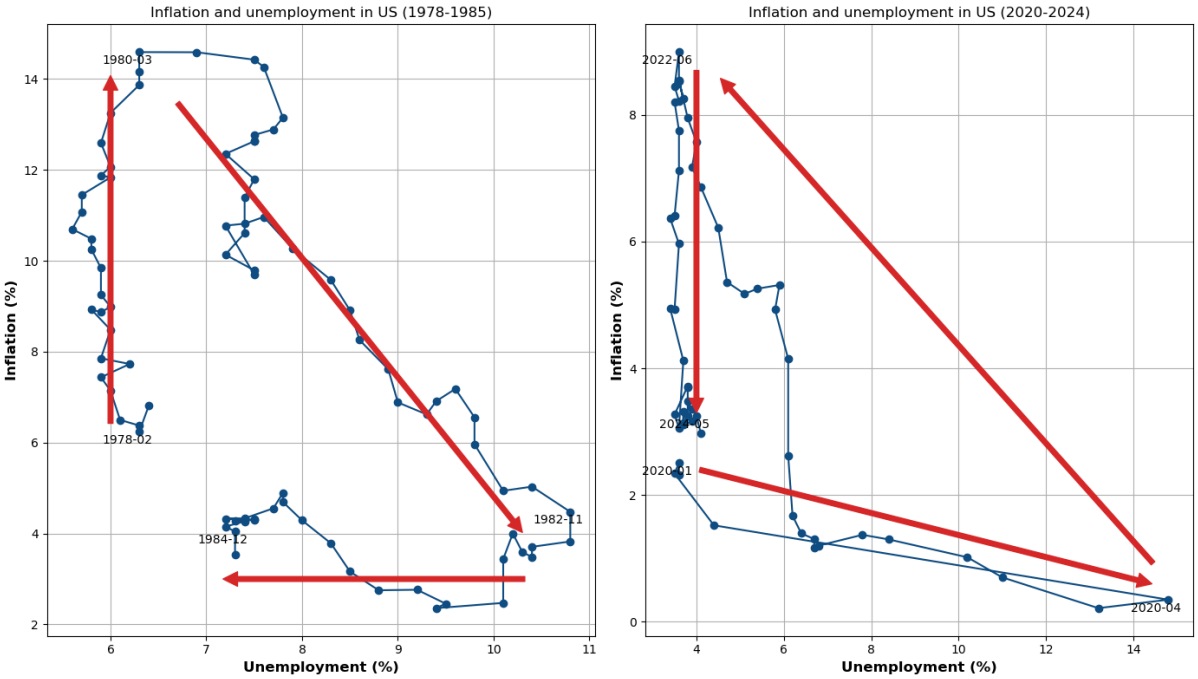


Sources: FRED database (MICH, EXPINF1YR and CPIAUCSL_PC1),
Federal Reserve Bank of Philadelphia Livingstone Survey Data.

The inflation-unemployment dynamics in the United States have shown distinct differences between the 1970s and the recent post-COVID period, as illustrated in Figure 1.2. In the 1970s, inflation and unemployment moved in a clockwise direction, where an initial surge in inflation coincided with a

significant rise in unemployment. Anti-inflationary policies eventually reduced inflation, but unemployment continued to rise before finally declining later in the period. In contrast, the recent inflationary surge beginning in 2021 exhibits a counter-clockwise pattern, with inflation rising while unemployment simultaneously declined. As inflation began to decrease in 2022, unemployment remained relatively stable.

Figure 1.2: Trade-off between Inflation and Unemployment



Sources: FRED Database (UNRATE and CPIAUCSL_PC1)

Factors such as the globalized nature of modern supply chains, technological advancements, and the increased financialization of the economy create different inflation transmission mechanisms. These complexities make direct comparisons challenging.

However, both periods were marked by significant supply-side disruptions stemming from external factors such as wars, revolutions, and pandemics, leading to persistent inflationary pressures that posed challenges for central banks. While there are structural differences between these periods, the comparison remains valuable. Moreover, the similarities are compelling enough to justify a re-examination of past strategies to better inform contemporary monetary policy responses. By understanding these distinctions, lessons from the past can be drawn while acknowledging the unique characteristics of today's economic environment.

This thesis will investigate central bank policies in the context of these parallels. The aim is to contribute to the ongoing discussion about the effectiveness of monetary policy during periods of economic disruption and therefore to the understanding of how historical monetary strategies might inform current policy decisions. By investigating the parallels between the monetary policies of these two distinct periods, this research aims to identify the evolution of framework called during similar challenges to what extent historical lessons have informed contemporary central bank strategies.

1.2 Research Objectives and Questions

The primary objective of this thesis is twofold. First, it seeks to conduct a historical review and analysis of the Federal Reserve's monetary policy during two pivotal periods: the 1970s and the post-COVID era. This involves an examination of the economic conditions, policy decisions, and external shocks that defined these eras. By investigating the evolution of monetary policy frameworks and the economic environment preceding major supply shocks, this thesis aims to provide a contextual foundation essential for evaluating the Federal Reserve's policy responses and identifying the academic research that influenced them.

Second, this thesis seeks to empirically assess the extent of divergence between the Federal Reserve's actual monetary policy and the discretionary policy prescription as defined by the Taylor Rule during these periods. Using a Structural Vector Autoregressive (SVAR) model that incorporates the Taylor Rule, this analysis will quantify the deviations of the Federal Reserve's policy decisions from the rule-based policy, particularly in response to supply shocks. The empirical analysis will measure the effectiveness of the Federal Reserve's management of the Federal Funds Rate in stabilizing inflation and unemployment.

To achieve these objectives, the research will address the following questions:

1. What were the monetary policies in the United States during the 1970s compared to those in the post-COVID era in the context of managing shocks?
2. How have the shifts in the Federal Reserve's policy frameworks and priorities, as informed by an academic review of the literature, influenced its approach to managing inflation during periods of economic instability?
3. What were the timing, nature, and magnitude of economic shocks?
4. How closely did the Federal Reserve's monetary policy decisions during the 1970s and the post-pandemic era adhere to the Taylor Rule?
5. What lessons can be drawn from the counterfactual analysis of the Federal Reserve's responses to the shocks if it had followed the Taylor rule?

By addressing these questions, this thesis seeks to contribute to a better understanding of the Federal Reserve's policy evolution and its effectiveness during periods of economic instability. While the findings are primarily intended to add to the academic discussion on central banking, they may also offer useful insights for policymakers facing future economic challenges.

1.3 Theoretical Foundations

This section establishes the theoretical basis for the thesis by critically examining key economic theories related to optimal monetary policy and supply shocks. It aims to create a framework for analysing the research findings, ensuring that the study is grounded in established economic principles. By exploring these theories, the section positions the thesis within the broader context of monetary policy, emphasising the relevance of theoretical models to both historical and contemporary economic situations.

1.3.1 Optimal Monetary Policy and the Taylor Rule

The Taylor Rule, proposed by John B. Taylor (1993), has deeply influenced monetary policy by offering a simple yet powerful framework for adjusting interest rates in response to economic conditions. Despite its relatively straightforward formulation, the Taylor Rule continues to serve as a reference point in discussions of monetary policy, particularly for managing inflation. Its relevance persists not only in academic discourse but also in its role as a guiding framework for central banks.

The rule, expressed as

$$i_t = r^* + \pi_t + 0.5(\pi_t - \pi^*) + 0.5(y_t - y^*)$$

where:

- i_t is the nominal interest rate.
- r^* is the real equilibrium interest rate.
- π_t is the rate of inflation.
- π^* is the target inflation rate.
- y_t is the real GDP.
- y^* is the potential GDP.

provides a systematic approach for adjusting nominal interest rates in response to deviations from target inflation and potential output. This approach has proven effective in offering a clear framework for balancing the objectives of inflation control and economic stability. The ability of the Taylor Rule to encapsulate these goals in a simple formula has contributed to its enduring status as a reference tool in monetary policy.

Historically, the Taylor Rule was developed in response to the economic conditions of the late 20th century, particularly the challenges of the 1970s, which were marked by high inflation and significant economic volatility. The rule was conceived as a response to the discretionary monetary policies of that era, which often failed to stabilize the economy. By offering a systematic guide, the Taylor Rule aimed to provide a more predictable approach to policy, thereby reducing the likelihood of the inflationary spirals that characterized the 1970s (Asso et al., 2007). The adherence to the framework during the ”Great Moderation” further demonstrated its usefulness in maintaining economic stability (Taylor, 2013).

Critics argue that strict adherence to the rule can be too rigid, particularly when faced with unexpected shocks that do not fit the historical data on which the rule is based (McCallum, 1985). Conversely, proponents argue that deviations from the rule, especially during periods of economic uncertainty, can lead to higher volatility and undermine the credibility of monetary policy (Taylor, 2001). This ongoing debate highlights the tension between rule-based and discretionary approaches to monetary policy, a theme that is critical to understanding the actions of central banks in both historical and contemporary contexts.

The Taylor Rule continues to remain relevant in both academic discussions and among policymakers (Carlstrom & Fuerst, 2003). Bernanke (2013) highlights its utility as a benchmark for evaluating the stance of monetary policy. Although central banks may not strictly follow the rule, it offers a valuable

reference that helps guide policy decisions within a clear and consistent framework. This consistency is crucial for maintaining the central bank's credibility of its policy, which plays a vital role in anchoring inflation expectations and fostering economic stability.

Academic research further underscores the enduring relevance of the Taylor Rule. For example, Woodford (2001) links the Taylor Rule with more complex, micro-founded economic theories. He demonstrates that the rule can be obtained from optimizing behaviour in forward-looking models. This theoretical foundation has solidified the Taylor Rule as a critical tool for central banks, particularly in their efforts to manage inflation expectations.

The role of the Taylor Rule within the Federal Reserve underscores its practical importance. By the mid-1990s, the rule was regularly considered by the Federal Open Market Committee (FOMC) in its deliberations. Members such as Janet Yellen[1] recognized the value of the rule in guiding interest rate decisions, and it quickly became a benchmark for evaluating the appropriateness of monetary policy (Asso et al., 2007). This integration of the Taylor Rule into the Fed's decision-making process reflects its robustness and the trust placed in it as a guide for achieving macroeconomic stability.

Comparing the Fed's response to inflation in the 1970s with more recent periods highlights the continued relevance of the Taylor Rule. The 1970s taught central bankers the importance of responding decisively to inflationary pressures, a lesson embedded in the Taylor Rule's formulation. By prescribing adjustments to interest rates in response to inflation deviations, the rule helps prevent the kind of persistent inflation that was a significant problem in the 1970s. This historical context reinforces the importance of the Taylor Rule as a guide for modern monetary policy, particularly in times of economic uncertainty (Taylor, 2013).

Even though the economic environment has evolved since the rule was first introduced, the principles underlying the Taylor Rule remain applicable. The Federal Reserve, like other central banks, continues to face the issue of managing inflation while supporting economic growth. The Taylor Rule offers a systematic approach to achieving these objectives, providing a framework that can be adapted to different economic contexts. As Bernanke (2015) notes, while the rule may not be followed to the letter, its role as a reference point is noteworthy in ensuring that monetary policy remains grounded in a clear, systematic approach.

The Taylor Rule continues to play an important role in monetary policy, offering a systematic framework for managing inflation and stabilizing output. Its simplicity, combined with its theoretical robustness and its role as a practical guide, makes it a relevant reference point for central banks, particularly the Federal Reserve. As the global economy continues to navigate a complex environment, the Taylor Rule remains as pertinent today as it was when it was first introduced, providing an essential tool for maintaining economic stability.

1.3.2 Supply Shocks, Inflation and Policy Responses

Supply shocks present a significant challenge to central banks because they can disrupt the normal trade-offs between inflation and unemployment, complicating the task of monetary policy. These shocks, which can arise from various sources such as commodity price spikes, natural disasters, or geopolitical events, can lead to abrupt changes in inflation dynamics that traditional monetary policy tools may struggle to address. The Phillips Curve, which traditionally illustrates the inverse relationship

[1] Chair of the Federal Reserve (2014-2018)

between inflation and unemployment, plays a crucial role in understanding how supply shocks affect these macroeconomic variables (Phillips, 1958).

The Phillips Curve framework has historically been used as a central tool in macroeconomic analysis since its introduction. It posits that there is a trade-off between inflation and unemployment. In the short run, reducing inflation typically requires higher unemployment, and vice versa (Friedman & Schwartz, 1963). However, supply shocks can shift the Phillips Curve, creating situations where inflation and unemployment rise simultaneously, as was the case during the oil shocks of the 1970s. These events challenged the conventional wisdom of the time and led to significant shifts in both economic theory and central banking practices.

Recent research has revisited the Phillips Curve, especially in the context of the inflationary pressures observed in the 2020s. Benigno and Eggertsson (2023) highlight how the Phillips Curve continues to be relevant for understanding inflation dynamics, particularly under conditions of tight labour markets. Their work suggests that when the labour market is exceptionally tight, inflation can rise sharply without significant decreases in unemployment, complicating the traditional inflation-unemployment trade-off.

Central banks' responses to supply shocks are subject to the specific economic context and their prevailing monetary policy frameworks. The oil shocks of the 1970s provide a historical example of the difficulties central banks face in such situations. During this period, central banks initially underestimated the inflationary impact of the shocks, leading to prolonged periods of high inflation and economic stagnation (Blinder, 1981). The COVID-19 pandemic, on the other hand, led central banks to adopt more proactive measures, such as significant liquidity injections and forward guidance, to prevent inflation expectations from becoming unanchored, as shown in Figure 1.1. They also supported the expansive fiscal policies implemented by governments to address the supply shock. However, the long-term effects of these extensive support measures remain unclear, raising questions about the effectiveness of the fiscal response in dealing with ongoing supply chain disruptions and labour market shifts.

The role of inflation expectations is particularly important in the context of supply shocks. Central banks aim to anchor these expectations to prevent a wage-price spiral, where wage increases lead to higher prices, which in turn lead to further wage demands (Galí, 2008). The credibility of the central bank in maintaining its inflation target is crucial in this regard. If economic agents believe that the central bank will allow inflation to rise unchecked, inflation expectations may become unanchored, leading to persistently high inflation. Conversely, if the central bank is perceived as overly aggressive in combating inflation, it may induce a recession by raising interest rates too quickly.

In conclusion, the theoretical foundations discussed in this section aim to offer a practical framework for analyzing central bank policies in response to economic shocks. By understanding the principles of optimal monetary policy, the Taylor Rule, and the impact of supply shocks on inflation dynamics, this research will examine the central bank actions across different historical periods. The insights gained from this analysis will contribute to the broader discourse on how central banks can best achieve their mandates in an increasingly intricate and unpredictable global economy.

1.4 Research Design

This section outlines the research design and methodology employed in this thesis to evaluate and compare the Federal Reserve's monetary policy responses during the 1970s and the post-pandemic era.

The methodology integrates historical analysis with empirical modelling to provide a comprehensive understanding of how the Federal Reserve's strategies have evolved and their effectiveness in managing economic shocks. The methodology is structured into three key components: historical analysis, shock identification, and counterfactual analysis, with more technical details provided in Section 3.1.

The research design of this thesis is structured to integrate both historical and empirical approaches, enabling a combined analysis of the Federal Reserve's monetary policy over time. The study follows a historical comparative approach, focusing on two distinct periods characterized by significant supply shocks: the 1970s and the post-pandemic era. The analysis is conducted in several stages:

1. **Monetary History of the U.S.** The first part of this research focuses on historical analysis, allowing an understanding of the economic conditions and monetary policies during the two periods under investigation. Chapter 2 offers a review of the Federal Reserve's monetary policies during the 1970s and since the start of the COVID crisis, exploring the broader economic context, key policy decisions, and the external shocks that shaped these policies. The primary objective of this chapter is to identify the shifts in the Fed's monetary policy frameworks, particularly highlighting the contributions from academics that influenced these changes during Paul Volcker's tenure.

2. **Empirical Modeling and Analysis** The empirical analysis in this thesis aims to evaluate the Federal Reserve's monetary policy responses during the 1970s and the post-pandemic era. The analysis is structured as follows:

   - *Identification and Measurement of Shocks*
     The empirical analysis employs an SVAR model to identify and measure the effects of economic shocks, including supply, demand, energy, and monetary shocks, that occurred during the 1970s and the post-COVID era. An automated variable selection - based on the literature - is settled to conduct the appropriate VAR model.

   - *Impulse Response Functions (IRFs) and Structural Shocks Analysis*
     The SVAR model also generates Impulse Response Functions (IRFs) to trace the dynamic responses of the identified shocks on macroeconomic variables over time. This analysis helps in understanding the structural effects of shocks on selected variables.

     Resulting of these steps, a comparison of the shock's impact is conducted.

   - *Comparison of the Shocks*
     A comparison of the three main shocks is performed. For each period, the type of shocks and their magnitude are measured. A cross-comparison is also realised.

   - *Comparative Analysis of the Federal Reserve's Monetary Policy*
     This section compares the Federal Reserve's monetary policy with the Taylor Rule. It evaluates how closely the Fed's decisions aligned with the Taylor Rule and incorporates inflation expectations to understand their influence on policy choices. This analysis aims to identify shifts in the Fed's strategy over time.

3. **Counterfactual Analysis Using the Taylor Rule** A counterfactual analysis is conducted to assess how the Federal Reserve might have adjusted monetary policy under a strict adherence to the Taylor Rule during the 1970s and post-COVID periods. This involves comparing the actual Federal Funds Rate to the counterfactual rate implied by the Taylor Rule, examining potential outcomes on economic variables.

Chapter 2 Fed Policy: Key Contexts and Changes

This chapter aims to explore the historical context of U.S. monetary policy of the transformative 1970s and the post-COVID crisis. By examining key economic challenges, policy decisions, and theoretical developments, this analysis provides elements for understanding the evolution of central bank mandates and their impact on economic stability. This exploration seeks to contextualise the empirical analysis of Chapter 3 within the historical economic landscape. Special attention will be given to the transition from monetary targeting to inflation targeting, setting the stage for subsequent analyses in this thesis.

Therefore, this review is structured in four main sections. The first one is related to the creation of the Federal Reserve, its first mandate and the events that led to the 70's shocks. The second section is relative to the 70s, the central point of comparison in the thesis's context. The third section covers monetary policies undertaken since the COVID crisis. Finally, the last section is relative to the central bank's shift of frameworks during shocks, especially the emergence of monetarism in the 70s.

2.1 The Evolution of U.S. Monetary Policy (1867-1960)

Milton Friedman and Anna Jacobson Schwartz's (1963), Allan H. Meltzer's (2014b), Robert L.(2008), John H. Wood's (2005), Thomas Mayer (1998), Alan S. Blinder's (1999) and Ben S. Bernanke's (2013) are foundational works that provide a detailed analysis of U.S. monetary policy and its profound impact on the economy.

Post-Civil War Era (1867-1900)

The period following the Civil War was marked by significant economic upheaval and transformation. The U.S. economy, recovering from the devastation of the war, faced numerous challenges, including industrialization, urbanization, and immigration. The monetary system during this era was characterized by adherence to the gold standard, which tied the value of the dollar to a specific quantity of gold. This system provided long-term price stability but also contributed to short-term economic volatility.

The deflationary pressures of the 1870s, often referred to as the "Long Depression," were particularly notable. The Panic of 1873, triggered by the collapse of the banking firm Jay Cooke & Company, led to a severe economic downturn. The rigidities of the gold standard exacerbated the deflationary pressures, causing widespread bankruptcies and unemployment.

The subsequent economic recovery was interrupted by the Panic of 1893, another severe financial crisis. The crisis was precipitated by the overextension of railroads and a decline in European investment. The resulting economic contraction underscored the limitations of the gold standard and highlighted the need for a more flexible monetary system.

The Creation of the Federal Reserve (1913)

The repeated banking panics of the late 19th and early 20th centuries culminated in the creation of the Federal Reserve System in 1913. The Federal Reserve was established to provide a more elastic currency, act as a lender of last resort, and improve the stability of the financial system. Friedman and Schwartz (1963) detail the legislative process that led to the Federal Reserve Act of 1913, which marked a significant milestone in U.S. monetary history.

John H. Wood's research (2005) complements this view by tracing the development of central banking practices and the philosophical underpinnings that guided the establishment of the Federal Reserve. Wood argues that while the Federal Reserve was influenced by European central banks such as the Bank of England, Reichsbank, and Bank of France, it was designed with significant differences to suit the unique American context. The Fed adopted decentralization, unlike the centralized European models, and created the Federal Reserve Board to balance regional and national control. It emphasized a public-private partnership rather than purely governmental oversight. The Fed also innovated with tools like open market operations, differentiating itself from European practices, and incorporating lessons from European crises to ensure more robust financial stability and inflation control. This resulted in a hybrid institution tailored to U.S. political and economic realities.

Initially, the Federal Reserve's role was somewhat limited, focusing primarily on managing gold reserves and discount rates. However, its ability to influence the money supply and interest rates gradually increased. The Federal Reserve's actions during World War I and the subsequent economic boom of the 1920s showcased its growing influence over the economy. The expansion of the money supply during World War I, necessitated by war financing, led to post-war inflationary pressures, which the Federal Reserve managed with varying degrees of success.

The Roaring Twenties and the Onset of the Great Depression (1920-1929)

The 1920s, known as the "Roaring Twenties", were characterized by significant economic growth and technological innovation. The Federal Reserve's monetary policy during this period was marked by efforts to stabilize prices and control speculative excesses but Friedman and Schwartz (1963) argue that the Federal Reserve's policies were not always consistent or effective.

The Great Depression, a period of extraordinary economic hardship, began with the stock market crash of 1929. Speculative excesses, monetary tightening by the Federal Reserve, and structural weaknesses in the economy are presented as the key factors that contributed to the crash by Friedman and Schwartz (1963).

The Great Depression and Monetary Policy Failures (1929-1939)

The Great Depression was a defining moment in U.S. economic history, and Friedman and Schwartz (1963) argue that the Federal Reserve's policy failures played a critical role in deepening the crisis. The contraction of the money supply, driven by the Federal Reserve's failure to act as an effective "lender of last resort", led to widespread bank failures and a severe deflationary spiral. This period underscored the critical importance of monetary policy in stabilising the economy and preventing economic collapses.

The New Deal era brought significant changes to the U.S. monetary system. The abandonment of the gold standard in 1933 allowed for greater flexibility in monetary policy. Additionally, various financial reforms, including establishing the Federal Deposit Insurance Corporation (FDIC) and the Glass-Steagall Act, aimed to stabilise the banking system and restore public confidence. The Federal Reserve adopted more proactive measures to manage the money supply and support economic recovery, marking a shift towards a more interventionist monetary policy.

World War II and Post-War Prosperity (1941-1960)

The entry of the United States into World War II in 1941 had profound economic implications. The war effort required massive government spending, which was financed through a combination of

taxation, borrowing, and monetary expansion. The Federal Reserve played a significant role in managing wartime inflation and ensuring adequate financing for the war effort.

The post-war era, as documented in (Friedman & Schwartz, 1963), was marked by remarkable economic growth and stability. In 1944, the Bretton Woods Agreement established a system of fixed exchange rates where currencies were pegged to the US dollar, which was convertible to gold. This system facilitated global trade and investment, contributing to the robust economic expansion of the 1950s.

The year 1951 marks a pivotal moment that redefined the relationship between the Federal Reserve and the Treasury, as cited by Hetzel (2014b). This accord granted the Federal Reserve greater independence in conducting monetary policy, allowing it to focus on price stability and economic growth without direct Treasury interference.

The Federal Reserve's actions during the 1950s were generally successful in these objectives and supporting high levels of employment. The era was also marked by the use of open market operations as a primary tool for regulating the money supply and influencing interest rates. This period also saw the Federal Reserve grappling with the trade-offs between controlling inflation and supporting post-war economic expansion.

Blinder (1999) and Hetzel (2008) emphasize the importance of rule-based policies and the avoidance of discretionary actions, which can lead to policy uncertainty and economic instability. Blinder uses this period as a counterexample to illustrate the need for "precise" theoretical frameworks that guided central banking practices. Hetzel argues that these are essential for preventing the kind of policy errors that contributed to the Great Depression.

The 1960s: Prelude to Turbulence

The 1960s were a decade of significant economic and social change in the United States. The early part of the decade continued the prosperity of the post-war years, with low unemployment and steady economic growth. However, by the mid-1960s, new challenges began to emerge.

One of the most significant economic issues of the 1960s was the emergence of inflationary pressures. The combination of expansive fiscal policies, including significant government spending on social programs and the Vietnam War, began to strain the economy. These fiscal policies were initially accommodated by the Federal Reserve's monetary policy, which maintained low interest rates to support economic growth.

As inflationary pressures intensified, the Federal Reserve faced the complex challenge of balancing the dual objectives of controlling inflation while maintaining high employment. Mayer (1998) and Meltzer (2014b) highlight these difficulties. The decision to transition to a tighter monetary policy in the late 1960s aimed to curb inflation, yet it also set the stage for economic difficulties in the ensuing decade. The late 1960s witnessed the emergence of stagflation—an era of both stagnant economic growth and high inflation—which would come to define the 1970s.

Moreover, it is crucial to consider the impact of international developments on U.S. monetary policy during this period. Meltzer (2014b) underscores the significance of factors such as the European recovery under the Marshall Plan, the Korean War, and subsequent rearmament efforts. A comprehensive understanding of the Federal Reserve's institutional dynamics and decision-making processes during this era, as detailed in the works of Friedman and Schwartz (1963) and Meltzer (2014b), is essential. Their analyses provide deeper insights into how these factors influenced the U.S. economy and the Federal Reserve's policy decisions.

The Breakdown of Bretton Woods

The stability of the international monetary system established under Bretton Woods began to erode in the late 1960s. Persistent U.S. balance of payments deficits, driven by increased foreign spending and investment, put pressure on the fixed exchange rate system. As foreign central banks accumulated large reserves of U.S. dollars, concerns about the dollar's convertibility into gold grew.

The Bretton Woods system was terminated when President Richard Nixon unilaterally severed the dollar's convertibility to gold, in 1971. This decision led to a period of floating exchange rates and increased volatility in international financial markets.

Bernanke (2013) provides a modern perspective on the lessons learned from the breakdown of Bretton Woods and the subsequent changes in the international financial system. Bernanke, a former Fed chairman, pointed out that without the stabilizing influence of a fixed exchange rate system, policymakers had to navigate a more volatile international monetary system that led to mistakes such as overly optimistic monetary policies that contributed to the high inflation of the 1970s.

2.2 Economic Phenomena and Monetary Policies in the 1970s

The 1970s were a decade of significant economic turbulence and policy shifts in the United States. Characterized by high inflation, economic stagnation, and oil price shocks, this period posed substantial challenges for the Federal Reserve. This chapter examines the key economic phenomena of the 1970s and the Federal Reserve's policy responses, drawing on insights from (Abrams et al., 1980; Blinder, 1981; Lopez, 2012; Nelson, 2004; Pierce, 1979; Thomas A. Lubik et al., 2016; Tobin et al., 1980)

The Great Inflation

The Great Inflation of the 1970s was a defining feature of the decade. Lopez (2012) provides a comprehensive review of this period, identifying the root causes and the impact on the economy. Lopez attributes the Great Inflation to a combination of expansionary fiscal policies, oil price shocks, and accommodative monetary policy. He argues that the Federal Reserve's failure to adequately control the money supply and manage inflation expectations contributed to the persistent inflationary pressures.

Nelson (2004) offers a detailed analysis of the Federal Reserve's policy missteps during this period. Nelson argues that the Fed's reliance on outdated economic models and its underestimation of inflationary pressures led to inadequate policy responses. He emphasizes the importance of credible and consistent monetary policy in managing inflation expectations and maintaining economic stability.

The Burns Era

Chairman of the Federal Reserve from 1970 to 1978, Arthur Burns served during a period marked by significant economic challenges. Pierce (1979) examines Burns' tenure, highlighting the political and economic pressures he faced. Pierce argues that Burns' reluctance to tighten monetary policy, due to concerns about unemployment and political considerations, exacerbated the inflation problem. This period was characterized by a lack of clear policy direction and inconsistent responses to inflationary pressures.

Abrams et al. (1980) analyze the policy reaction functions during Burns' tenure. They emphasize the role of expectations in monetary policy and the difficulties Burns faced in balancing inflation and unemployment. The authors argue that Burns' policies were often reactive rather than proactive, leading

to a loss of credibility and effectiveness.

The Oil Shocks and Stagflation

The 1970s were also marked by two major oil shocks, which had significant economic implications. The first oil shock occurred in 1973, following the Yom Kippur War. The OPEC imposed an oil embargo on countries supporting Israel which led to a sharp increase in oil prices and contributed to stagflation, simultaneous high inflation and high unemployment.

Blinder (1981) provides a critical analysis of the stagflation period. Blinder discusses the interplay between monetary and fiscal policies and argues that a combination of supply shocks and policy mistakes led to the simultaneous occurrence of high inflation and unemployment. He emphasizes the challenges of addressing stagflation and the need for a coordinated policy response.

However, Bernanke (2013) and Romer and Romer (2002) also critique the overly optimistic view held by policymakers in the 1960s and 1970s, who believed that they could achieve permanently lower unemployment by tolerating slightly higher inflation. He argues that this approach led to a sustained increase in inflation, a view that echoes Milton Friedman's warning against the idea of a stable trade-off between inflation and unemployment. This critique might contrast with Blinder's emphasis on policy coordination, as Bernanke seems to suggest that the fundamental understanding of the trade-off was flawed, rather than solely focusing on the coordination of policies.

The Burns Disinflation and Policy Shifts

In response to the persistent inflation, the Federal Reserve under Arthur Burns attempted to implement disinflationary policies. Lubik et al. (2016) explore the Federal Reserve's efforts to curb inflation in the mid-1970s. They document the challenges of achieving disinflation without triggering a severe recession and highlight the lessons learned for future policy-making.

The disinflation efforts were only partially successful, and inflation remained a significant problem throughout the decade. The Federal Reserve's credibility was further undermined by the inconsistent application of monetary policy and the failure to anchor inflation expectations.

A critical juncture emerged with the first oil shock in 1974, prompting the Federal Reserve to respond with interest rate hikes. This period fueled debates, with economists like Finn Kydland advocating for clear rules in monetary policy (Kydland & Prescott, 1977), marking a paradigm shift in assessing policy tools and emphasizing the need for transparent guidelines.

The Humphrey-Hawkins Full Employment Act of October 1978 redefined the mission of the Federal Reserve, setting goals for maximum employment, stable prices, and low long-term interest rates. Bernanke (2013) emphasizes the dual mandate specificity imposed by this Act. He notes that this Act marked a formal recognition of the Federal Reserve's responsibility not only to manage inflation but also to foster conditions conducive to full employment.

G. William Miller, the casting error

G. William Miller succeeded Burns in 1978, facing mounting inflationary pressures and energy-related challenges during a brief tenure that concluded in 1979. Despite his efforts, inflationary pressures persisted, and Miller's policies did not have a lasting impact on stabilizing the economy. His tenure highlighted the difficulties in managing inflation and the need for a more consistent and credible policy framework (Meltzer, 2014a). G. William Miller was an ill-suited choice to follow Arthur Burns as Federal Reserve Chair due to his lack of expertise in monetary policy. His background was primarily in corporate

management as the CEO of Textron Inc., which left him unprepared to effectively address the complex economic challenges of inflation and monetary control.

The Volcker Era and the Triumph over Inflation

Paul Volcker was appointed Chairman of the Federal Reserve in 1979, at a time when the U.S. economy was struggling with persistent high inflation and economic stagnation. Volcker's tenure marked a significant shift in the Federal Reserve's approach to monetary policy. Determined to tackle inflation head-on, Volcker implemented a series of drastic measures aimed at controlling the money supply and restoring the credibility of the Federal Reserve described hereafter.

Volcker's strategy, often referred to as "shock therapy," involved tightening monetary policy by significantly raising interest rates. This approach was guided by monetarist theories, which emphasized the control of the money supply as a means to combat inflation. According to Blinder (1999), Volcker's policies represented a clear break from the past, focusing on reducing inflation even at the risk of inducing a recession.

The immediate impact of Volcker's policies was severe. The economy entered a deep recession, with unemployment rates soaring and economic output declining. However, as discussed by Nelson (2004) these measures were necessary to break the cycle of rising inflation expectations that had taken hold in the economy.

Volcker's unwavering commitment to controlling inflation, despite significant political and public pressure, eventually restored the Federal Reserve's credibility. Abrams et al.(1980) argue that Volcker's success lay in his ability to manage expectations and convince the public and markets that the Federal Reserve was committed to maintaining price stability.

Lubik et al. (2016) draw parallels between Burns' earlier, less successful disinflation efforts and Volcker's approach. They highlight how Volcker's willingness to endure short-term pain for long-term gain was crucial in achieving lasting disinflation.

The success of Volcker's policies had profound implications for U.S. monetary policy. Tobin et al. (1980) reflect on the long-term impact of Volcker's tenure. They argue that the experience underscored the importance of maintaining a rules-based approach to monetary policy and the need for central bank independence to resist political pressures.

Tobin (1978) addresses the global context of the monetary policy challenges of the 1970s and early 1980s. He advocates for reforms to the international monetary system, emphasizing the need for coordinated international policy responses to enhance stability and prevent future crises. Volcker's tenure at the Federal Reserve is seen as a key example of how determined and credible policy action can stabilize not only a national economy but also contribute to global economic stability.

2.3 Fed Monetary Policy since the beginning of COVID

The purpose of this literature review is also to analyze the Federal Reserve's monetary policy actions in response to the rising inflation following the COVID-19 pandemic. By synthesizing primary sources, specifically the Federal Open Market Committee (FOMC) meeting minutes, and recent academic literature, this review aims to elucidate the rationale, effectiveness, and implications of the Fed's policy decisions during this period.

This review covers the period from early 2020, when COVID-19 began significantly impacting the global economy, through the recovery phase and the emergence of inflationary pressures. It focuses on the Fed's transition from crisis management to combating inflation, integrating critical analyses from recent academic papers.

Initial Response to COVID-19

As the COVID-19 pandemic began to spread globally, the Federal Reserve took immediate action to mitigate the economic impact. The initial response included significant interest rate cuts and the introduction of various liquidity support measures.

Interest Rate Cuts

In early March 2020, the FOMC held an emergency meeting and decided to lower the target range for the federal funds rate by 50 basis points to 1.00-1.25%. This decision was driven by the need to support maximum employment and price stability goals amidst the escalating risks posed by the coronavirus. The Committee emphasized its readiness to use its tools to support the economy (Federal Open Market Committee, 2020e).

On March 15, 2020, the FOMC held another emergency meeting and lowered the federal funds rate further to a target range of 0-0.25%. This marked a return to the effective lower bound. Additionally, the Committee announced plans to increase its holdings of Treasury securities by at least $500 billion and agency mortgage-backed securities by at least $200 billion to support smooth market functioning and accommodative financial conditions(Federal Open Market Committee, 2020d).

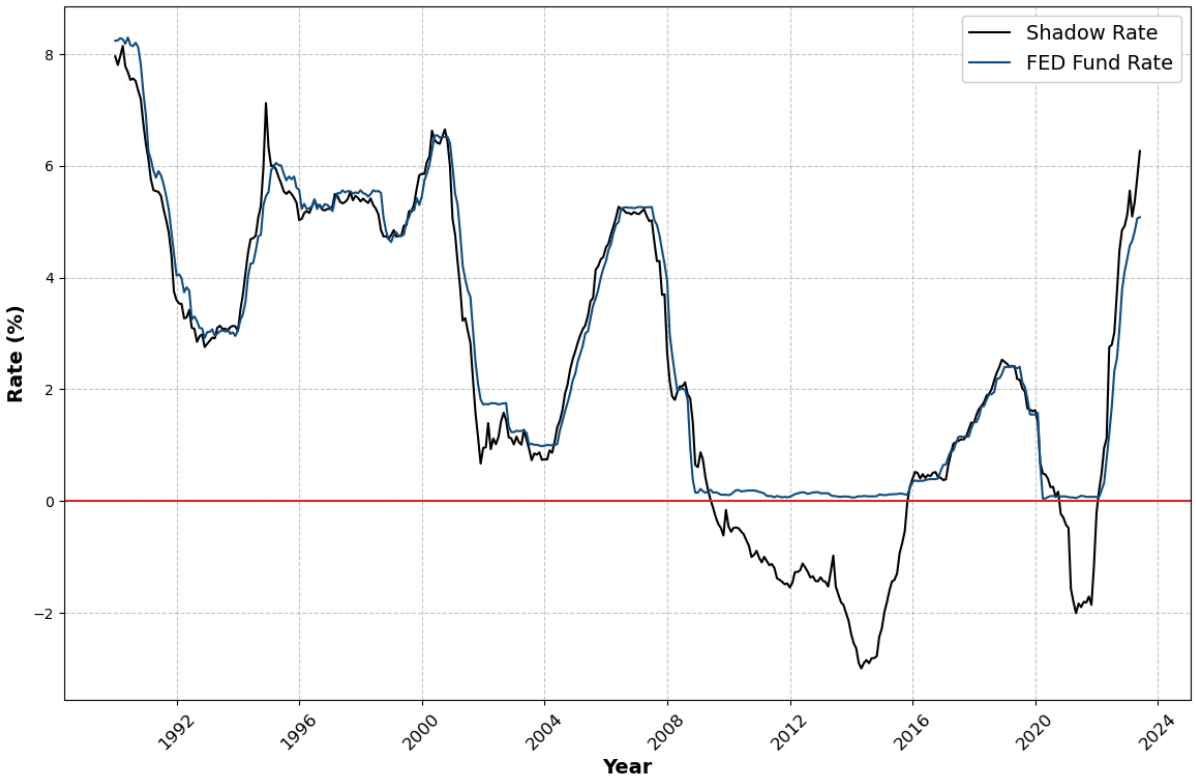
Liquidity Support

To enhance liquidity, the Fed introduced several measures:

- Reducing reserve requirements to 0% to support lending.
- Coordinating with major central banks to enhance the provision of liquidity via the standing U.S. dollar liquidity swap line arrangements.
- Encouraging the use of the discount window by lowering the primary credit rate and extending the maximum term of loans to 90 days (Federal Open Market Committee, 2020a).

As depicted in the Chart 2.1, a decline in the Federal Funds Rate during the COVID-19 crisis can be observed, which aligns with the Federal Reserve's efforts to lower interest rates in response to the economic downturn. However, the graph also illustrates the additional liquidity support provided by the Federal Reserve, captured through the "Shadow Rate" calculated by Jing Cynthia Wu and Fan Dora Xia (2016). The Shadow Rate offers a more comprehensive view of the monetary policy mechanisms implemented by the Fed, particularly during periods when the nominal interest rate is constrained by the zero lower bound. This metric reveals the extent of the Fed's accommodative measures, such as quantitative easing, which are not fully reflected in the standard interest rate but are crucial for understanding the overall stance of monetary policy during the COVID-19 crisis.

Figure 2.1: Fed Fund Rate vs. Shadow Rate



Sources: Board of Governors of the Federal Reserve System (US), Jing Cynthia Wu and Fan Dora Xia (2016)

Forward Guidance and Market Expectations

The Fed communicated its policy stance to manage market expectations effectively. In the April 2020 FOMC meeting, the Committee stated its commitment to using its full range of tools to support the U.S. economy during this challenging time, emphasising that it would keep rates low until the economy had weathered the recent events and was on track to achieve its maximum employment and price stability goals (Federal Open Market Committee, 2020a).

Bergholt et al. (2024) emphasise that these rate cuts were essential in mitigating the liquidity crisis and ensuring the smooth functioning of financial markets. The introduction of liquidity facilities, such as the PMCCF[1] and SMCCF[2], supported large employers and stabilised market conditions. Primiceri (2024) highlights the importance of clear communication in managing market expectations. The Fed's commitment to low interest rates and its readiness to use all available tools played a pivotal role in stabilizing financial markets and supporting economic recovery.

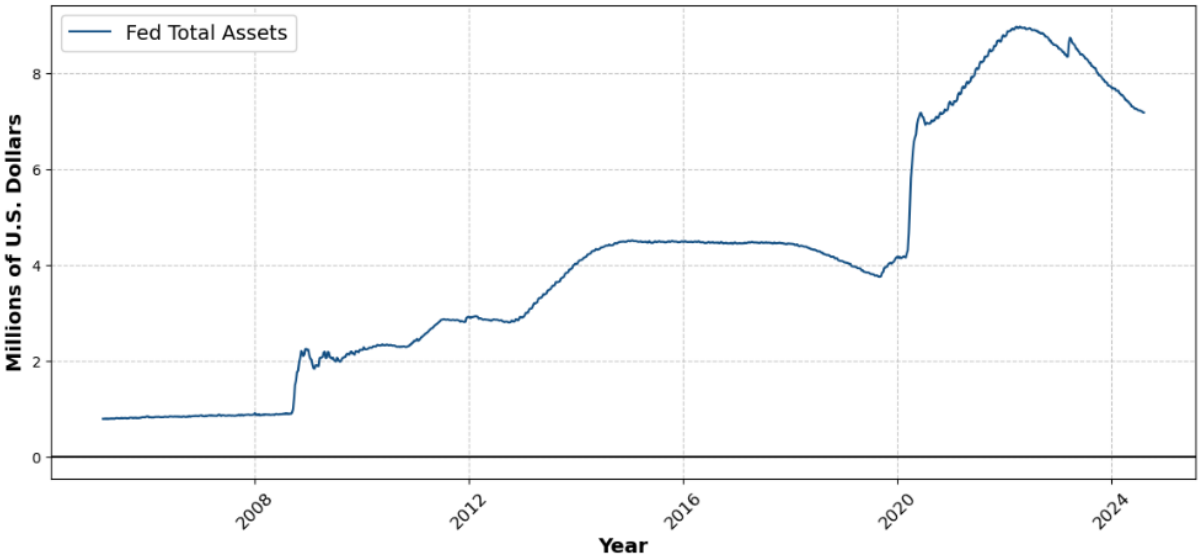
[1]Primary Market Corporate Credit Facility
[2]Secondary Market Corporate Credit Facility

Policy Actions Throughout the Pandemic

Quantitative Easing (QE)

Throughout 2020, the Fed engaged in asset purchase programs to provide further economic support. These purchases aimed to stabilize financial markets and support the flow of credit to households and businesses. The Fed's balance sheet (Figure 2.2) expanded significantly as a result of these actions. The June 2020 FOMC meeting minutes highlighted the critical role of these asset purchases in maintaining accommodative financial conditions (Federal Open Market Committee, 2020c).

Figure 2.2: Fed Balance Sheet



Sources: FRED Dataset (WALCL)

Support for Specific Sectors

The Fed introduced targeted lending programs to support various sectors of the economy:

- Paycheck Protection Program Liquidity Facility (PPPLF): This program was designed to support small businesses by providing liquidity to financial institutions participating in the Paycheck Protection Program (Federal Open Market Committee, 2020a).
- Main Street Lending Program: This program aimed to support small and medium-sized businesses that were in good financial standing before the pandemic (Federal Open Market Committee, 2020a).
- Municipal Liquidity Facility: This facility provided essential support to state and local governments facing financial difficulties due to declining revenues and increased expenditures (Federal Open Market Committee, 2020a).

The Fed introduced targeted lending programs such as the PPPLF and the Main Street Lending Program to support small and medium-sized businesses. These programs provided essential liquidity to businesses affected by the pandemic (Federal Open Market Committee, 2020a).

Long-Term Forward Guidance

The Fed enhanced its forward guidance to provide clarity and manage market expectations. By December 2020, the FOMC committed to maintaining an accommodative monetary policy stance until substantial further progress was made toward maximum employment and price stability goals. This guidance included maintaining the federal funds rate at the lower bound and continuing substantial asset purchases (Federal Open Market Committee, 2020b).

Blanchard and Riggi (2013) argue that QE was significant in maintaining accommodative financial conditions and supporting the flow of credit to households and businesses. The paper compares pandemic-era QE with measures taken during the 2008 financial crisis, highlighting similarities and differences. Bergholt et al. (2024) underscore the significance of these programs in providing liquidity to SMEs and ensuring their continued operations during the pandemic. The Municipal Liquidity Facility (MLF) is highlighted as a critical support mechanism for state and local governments facing financial strain. Primiceri (2024) notes that the Fed's enhanced forward guidance was crucial in providing clarity and managing market expectations during the pandemic. The commitment to low rates and continued asset purchases played a vital role in supporting economic recovery and stabilizing financial markets.

Transition to Post-Pandemic Policy

As the economy began to recover, the Fed's policies evolved accordingly. The March 2021 FOMC minutes indicated that the Fed would continue to support the economy but would also start considering the appropriate timing and approach for scaling back its asset purchases (Federal Open Market Committee, 2021d).

Tapering QE

The decisions and rationale behind reducing the pace of asset purchases, known as tapering, were discussed extensively in the July 2021 FOMC minutes. The Committee noted the progress made toward its goals and began reducing the pace of asset purchases gradually while ensuring that financial conditions remained supportive of economic growth (Federal Open Market Committee, 2021b).

Inflation Concerns

Rising inflation became a significant concern as the economy recovered. The Fed responded by emphasizing its commitment to price stability and readiness to adjust policy as needed. The June 2021 FOMC minutes highlighted discussions on inflation dynamics and the potential need for future policy adjustments to address persistent inflation pressures. Participants noted that although inflation remained elevated, there were signs that it would decline as supply and demand imbalances eased (Federal Open Market Committee, 2021c):

> "Inflation had increased notably and was expected to remain elevated in the near term, reflecting supply chain disruptions and strong demand in sectors where production bottlenecks were most acute."

In the December 2021 FOMC minutes, the Committee discussed the historical context of inflation, drawing parallels to the 1970s inflation shock and the need to avoid similar outcomes through timely and decisive monetary interventions (Federal Open Market Committee, 2021a):

> "Several participants emphasized the importance of maintaining the Committee's credibility in its commitment to achieving 2 percent inflation over the longer run, noting lessons

learned from the high and volatile inflation of the 1970s and early 1980s."

These discussions often referenced the policy approaches of past Fed Chairs, such as Paul Volcker and Arthur F. Burns, in combating inflation while supporting economic growth. The Committee acknowledged the aggressive rate hikes and policy measures implemented by Paul Volcker in the early 1980s to curb inflation, contrasting it with Arthur F. Burns' tenure, where inflation was not addressed with sufficient urgency (Federal Open Market Committee, 2021a):

> "Participants highlighted the decisive actions taken by Paul Volcker to control inflation in the early 1980s, underscoring the need for vigilance and responsiveness in the current economic environment"

Primiceri (2024) and Blanchard and Riggi (2013) compare pandemic-era inflation with the 1970s. They emphasize the Fed's improved credibility and communication strategies as key factors in mitigating the inflationary impact, contrasting it with the less effective measures of the 1970s. Primiceri notes that the Fed's proactive stance and clear communication helped to anchor inflation expectations, which was critical in preventing the high and volatile inflation experienced in the 1970s (Blanchard & Riggi, 2013; Primiceri & Giannone, 2024).

Current Policy Stance

Interest Rate Normalization

Recent moves to raise interest rates have been part of the Fed's strategy to normalize monetary policy. The January 2024 FOMC minutes detailed the steps taken to increase the federal funds rate in response to sustained economic growth and rising inflation pressures. The expected trajectory of future rate hikes was also discussed to manage market expectations effectively (Federal Open Market Committee, 2024b):

> "Participants agreed that maintaining the current stance of policy with gradual increases in the federal funds rate would be appropriate to support continued economic expansion and a return to 2 per cent inflation."

Balance Sheet Reduction

The Fed's strategies for reducing its balance sheet have been critical in the current policy stance. The April 2024 FOMC minutes outlined plans for reducing the holdings of Treasury securities and agency mortgage-backed securities, a process known as balance sheet normalization, to ensure long-term financial stability (Federal Open Market Committee, 2024a):

> "The Committee reaffirmed its plan to reduce the Federal Reserve's securities holdings predictably, primarily by adjusting the reinvestment of principal payments received from securities held in the System Open Market Account."

Bergholt et al. (2024) analyze the potential challenges associated with balance sheet reduction, stressing the importance of avoiding market disruptions and maintaining financial stability during the normalization process. The study suggests that a gradual and predictable approach to balance sheet normalization is essential to prevent adverse market reactions and ensure a smooth transition (Bergholt et al., 2024).

2.4 The Federal Reserve's Transformation

This section explores the significant shifts in economic frameworks, theories, and academic support that occurred during the crises of the 1970s stagflation period and the COVID-19 pandemic. By comparing the changes in economic thought and policy responses across these two eras, this section aims to highlight how crises can drive innovation in economic theory and reshape the tools used by policymakers to address complex economic challenges.

2.4.1 A Regime Change, Shift to Monetarism

After the timeline dressed in Section 2.2, a shift in the framework of the Federal Reserve will be highlighted hereafter.

The 1970s marked a pivotal era for the Federal Reserve, characterized by significant shifts in monetary policy frameworks. This chapter explores the transition from Arthur Burns' discretionary Keynesian approach to Paul Volcker's monetarist policies, highlighting the academic and policy perspectives that shaped and responded to these changes. This review provides a comprehensive understanding of the period's economic and theoretical developments, emphasizing the emergence of monetarism and its eventual dominance over Keynesian economics.

Keynesian Framework

Keynesian economics, as articulated by John Maynard Keynes in the 1930s, emerged as the dominant paradigm for post-war economic management. Keynesian theory emphasized the role of government intervention and discretionary fiscal and monetary policies to stabilize the economy, particularly in addressing unemployment and stimulating demand (Samuelson, 2010). This framework was predominant in shaping the Federal Reserve's policies during the mid-20th century.

Arthur Burns, who served as Federal Reserve Chairman from 1970 to 1978, operated within a Keynesian framework. Burns focused on discretionary policy measures, such as adjusting interest rates and conducting open market operations, to manage economic cycles. His tenure was marked by efforts to control inflation and unemployment, although these efforts faced significant challenges.

Burns' approach has been extensively analyzed in academic literature. Meltzer (2014a) notes that Burns faced significant political pressures, which influenced his policy decisions. Romer and Romer (2002) argue that Burns' policies were constrained by the prevailing economic theories of the time, which emphasized the Phillips curve trade-off between inflation and unemployment. Burns' reliance on discretionary measures and his underestimation of the long-term inflationary impact of expansive monetary policies are critical points of analysis in understanding his tenure (Nelson, 2004).

The Emergence of Monetarism

The intellectual challenge to Keynesian orthodoxy came from the monetarist school, led by Milton Friedman. Monetarists argued that controlling the money supply was crucial to managing inflation and that discretionary policies often led to time inconsistency problems. Friedman's (1968) seminal work, "The Role of Monetary Policy," argued that inflation is always and everywhere a monetary phenomenon.

The development of monetarist theory involved significant contributions from several key economists. Lucas (1981) introduced the concept of rational expectations, emphasizing the importance of policy credibility and consistent rules over discretionary interventions. Kydland and Prescott (1977) expanded

on these ideas by highlighting the time inconsistency problem in policy-making, arguing that rules-based policies could improve economic outcomes by enhancing policy credibility.

Empirical studies in the 1970s supported the shift towards monetarist policies. Barro (1977) provided evidence that emphasises the adverse effects of inflation and the benefits of a rule-based monetary framework. Sargent (1981) reinforced these findings, showing that monetary policies focused on controlling the money supply could effectively manage inflation. These studies played a crucial role in shaping the intellectual climate that favoured monetarist principles.

The academic community had increasingly advocated for a shift towards rule-based monetary policies before Volcker's appointment. Taylor (1993) highlights that the groundwork for the Volcker revolution was laid by academic contributions emphasizing the importance of monetary rules over discretionary interventions.

The Federal Reserve's Transformation: From Burns to Volcker

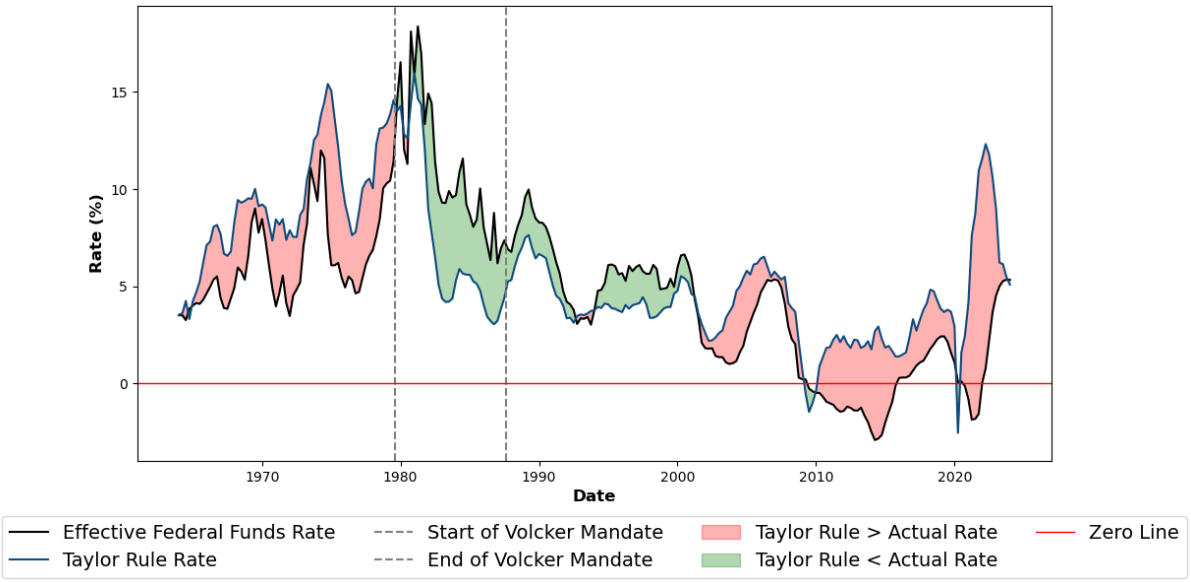
Paul Volcker, appointed as Federal Reserve Chairman in 1979, brought a radical shift in policy by adopting monetarist principles. Volcker's approach, known as the "Volcker shock", focused on reducing money supply growth to curb inflation. This strategy was extensively debated in academic circles before its implementation, with many scholars advocating for a shift towards rule-based policies (Meltzer, 2014a).

The Burns era was characterized by high inflation and economic instability, often attributed to the lack of a consistent and credible monetary policy framework (Blinder, 1981). In contrast, the Volcker era saw a significant reduction in inflation, albeit at the cost of a severe recession in the early 1980s. Goodfriend and King (2005) argue that the Volcker-led disinflation demonstrated the effectiveness of a committed monetarist approach.

How the structural change of the U.S. economy impacts the monetary policy efficiency is analysed by Boivin and Giannoni (2006). They estimate a vector autoregressive model over the pre- and post-1980 periods. A reduced effect of monetary policy shocks in the latter period is underlined. Their findings suggest that by responding more strongly to inflation expectations, monetary policy has stabilized the economy more effectively. This supports the view that the Volcker era's policies, which were more responsive to inflation expectations, played a crucial role in stabilizing the economy and reducing output and inflation volatility.

The transition from Burns to Volcker represented not just a change in leadership but a fundamental shift in monetary policy philosophy. The academic literature increasingly supported monetarist principles during this period, reflecting a broader intellectual shift towards rule-based policies. This shift was evident in the works of (Kydland & Prescott, 1977), who argued for the importance of credible and consistent monetary policies to avoid time inconsistency and build policy credibility. Restoring credible and consistent long-term inflation expectations leads to a focus on bringing inflation back in the dual mandate of the Fed. The shift to this inflation-targeting regime can be highlighted when comparing the Federal Funds rates with the implied rate given by the Taylor Rule.

Figure 2.3: Real Federal Funds Rate vs Taylor Rule



Source: FRED Database (DFF and GDPDEF_PC1)

Figure 2.3 shows the Real Federal Funds Rate (augmented with the Shadow rate) and the rate suggested by the Taylor Rule (using both the GDP deflator and CPI as inflation measures) from 1960 to 2023. Notably, deviations from the Taylor Rule are evident during the 1970s and early 1980s, highlighting the aggressive monetary tightening under Volcker.

Long-term Implications and Legacy

The long-term implications of the Volcker revolution are profound. The adoption of monetarist principles under Volcker set the stage for the Federal Reserve's subsequent focus on low and stable inflation as a primary policy objective. Taylor (1993) notes that the principles established during Volcker's tenure influenced the development of the Taylor Rule, which provided a systematic approach to setting interest rates based on economic conditions.

The 1970s was a transformative decade for the Federal Reserve, driven by economic crises and significant shifts in monetary policy frameworks. This chapter has explored the evolution of U.S. monetary policy from the post-Civil War era to the transformative 1970s, highlighting key economic challenges, policy decisions, and theoretical developments. The transition from Keynesian to monetarist frameworks reflected a fundamental rethinking of the role of the Federal Reserve and the tools available for macroeconomic management. Understanding this regime change provides valuable insights into the evolution of monetary policy and its impact on U.S. economic stability. This historical analysis sets the stage for robust statistical analyses in subsequent chapters, providing a solid foundation for addressing the research question and contributing to the broader field of monetary economics.

2.4.2 From Forecasts to Facts, A Data-Driven Shift

Forward Guidance

The Fed has updated its communication strategy to reflect its current policy stance. The March 2024 FOMC minutes emphasized the importance of clear and transparent communication to maintain public trust and manage market expectations. The Committee reiterated its commitment to adjusting policy based on evolving economic conditions and risks (Federal Open Market Committee, 2024d):

> "The Committee remains committed to communicating its assessment of the economic outlook and its policy intentions clearly to help inform the public's expectations and decisions."

Data Dependency

In recent FOMC meetings, there has been a clear emphasis on a data-dependent approach to future rate cuts. The data-dependent strategy Fed's approach has shifted towards future rate cuts. The June 2024 FOMC minutes highlighted this shift (Federal Open Market Committee, 2024c):

> "Participants emphasized the importance of conditioning future policy decisions on incoming data, the evolving economic outlook, and the balance of risks."

This approach ensures that the Fed remains flexible and responsive to changes in the economic environment, rather than adhering to a predetermined policy path. The data dependency underscores the Fed's commitment to making informed decisions that align with its dual mandate of maximum employment and price stability.

Primiceri (2024) discusses the implications of a data-dependent approach, arguing that it allows the Fed to remain adaptable to new information and changing economic conditions. This strategy is crucial for maintaining credibility and ensuring that monetary policy adjustments are aligned with evolving economic realities.

The Federal Reserve's response to the post-COVID inflation has been marked by a shift from crisis management to addressing inflationary pressures through a combination of interest rate normalization, balance sheet reduction, and a data-dependent approach. The literature highlights the complexity of the inflation dynamics and the critical role of managing expectations. The Fed's ability to adapt its strategies based on incoming data and historical lessons has been pivotal in navigating the economic recovery. Future research will continue to explore the broader implications of these actions in achieving the Fed's dual mandate of maximum employment and price stability.

The historical review of the Federal Reserve's monetary policy during the 1970s and the post-COVID era highlights the intricate relationship between economic conditions, policy decisions, and external shocks. The analysis of these two periods reveals significant parallels, particularly in the challenges posed by supply shocks and the resulting economic instability. The evolution of the Federal Reserve's monetary policy frameworks and shifting priorities over time is also underlined.

This chapter identifies that, in both periods, the monetary policy framework underwent substantial changes: during the 1970s, this evolution was influenced by the rise of a new school of thought

advocating for strict inflation targeting, while in the post-COVID era, there was a noticeable shift from forward guidance to a more data-dependent approach.

These insights provide the foundation for the empirical analysis that follows in Chapter 3. This analysis will investigate the Federal Reserve's adherence to the Taylor Rule and perform a counterfactual of its responses to the economic shocks of these two periods. By building on the historical context established in this chapter, the subsequent empirical investigation will offer a deeper understanding of how central bank strategies have adapted to manage inflation in the face of significant economic disruptions.

Chapter 3 Empirical Analysis

This chapter undertakes the empirical analysis to address the following research question which can be summarised as ”Analysis of the Federal Reserve’s monetary policy during two pivotal periods: the 1970s and the post-COVID era”. To explore this, a structured, multi-step approach will be employed.

This chapter builds upon the findings of Chapter 2, where the major economic shocks of the 1970s, such as the oil crises and stagflation, were analyzed, along with the economic disruptions associated with the post-COVID recovery.

The central question guiding this analysis is: What would have been the outcomes if the Federal Reserve’s monetary policy responses to supply shocks in the 1970s and the post-COVID era had adhered strictly to the Taylor Rule?

To answer this question, the following steps and corresponding sub-questions will be addressed:

- Variable’s selection What is the most relevant combination of variables to be employed within an SVAR model to identify economic shocks? This point is developed in section 3.2
- Nature and Timing of Shocks (Identification): When did significant economic shocks occur during the 1970s and the post-COVID era? What types of shocks (supply, demand, energy, monetary) were most prevalent in these periods? This point is in section 3.2 and 3.1.4
- Magnitude and Impact of Shocks: How strong were these shocks, and what were their impacts on key macroeconomic variables? The magnitude and impact of these shocks are measured and analyzed in the following sections 3.3.
- Counterfactual under Taylor Rule: Were the Federal Reserve’s policy responses consistent with the Taylor Rule? What would have been the counterfactual scenarios if the Federal Reserve had strictly followed the Taylor Rule? This point is covered in section 3.4.

By examining these counterfactual scenarios, this research aims to provide an understanding of how the Federal Reserve’s monetary policy decisions during these two periods might have differed under a strict adherence to the Taylor Rule. This approach allows for a comparison of actual versus hypothetical policy outcomes, offering some insights into the potential impacts of such a policy framework on economic stability.

3.1 Model Development

3.1.1 Rationale for Using SVAR Models

Before delving into developing the model and the analysis of variables, it is important to validate the tools that this analysis will employ.

The foundational work by Sims (1980) introduced VAR models as a method to analyze the dynamics of multiple time series. This approach allows for a data-driven understanding of economic relationships.

The VAR models extend this framework by incorporating structural information, enabling the identification and isolation of different types of economic shocks—such as supply, demand, energy, and

monetary shocks. Blanchard and Quah (1988) demonstrated the effectiveness of using long-run restrictions within SVAR models to identify between demand and supply shocks, a technique that has become a methodological blueprint in macroeconomic research.

SVAR models are particularly suitable for this study as they allow us to analyze how shocks propagate over time and assess their short-term and long-term effects. This is crucial for evaluating monetary policy, including the exploration of counterfactual scenarios, such as adherence to the Taylor Rule.

The literature on inflation and monetary policy responses to economic shocks is extensive, with significant contributions that inform this research's understanding of these phenomena, particularly through the use of SVAR models. More precisely, this review integrates the three axes the models will cover: comparative analysis, oil shocks, and post-pandemic inflation.

- **Historical Comparative Study**: Study on the inflationary episodes of the 1970s and the early 2000s (Blanchard & Riggi, 2013). He highlights the significant differences in economic environments and central bank strategies, noting that the 1970s were characterized by oil shocks and wage-price spirals, while the early 2000s faced different supply and demand dynamics.
- **Oil Shocks Effects**: They explore the effect of oil shocks with a New Keynesian framework, it is shown significant and persistent impacts on the economy are mediated through both supply-side constraints and demand-side adjustments (Blanchard, Olivier and Gali, Jordi, 2007).
- **Post-Pandemic Inflation Analysis**:
  - inflation dynamics: it is shown how production complementarities and wage rigidity amplify the effects of supply shocks on inflation (Lorenzoni & Werning, 2023). Their findings provide a theoretical and empirical basis for understanding recent inflation dynamics.
  - expectation dynamics: and also its impact on actual inflation during periods of economic stress (Bullard et al., 2024). It demonstrates how shifts in inflation expectations can lead to "inflation scares", where inflation accelerates rapidly due to self-fulfilling prophecies.
  - focus on decomposing supply-driven from demand-driven (Bergholt et al., 2024).
    Their analysis shows that supply shocks, particularly those related to energy prices, have played a dominant role in driving core inflation in recent years. This distinction is essential for formulating appropriate policy responses, as different types of inflationary pressures require tailored interventions.
  - disentangling the sources and dynamics of inflation (Gagliardone & Gertler, 2023): They highlight the significant roles of oil price shocks, monetary policy responses, and labour market conditions in driving inflationary episodes.
  - drivers of post-pandemic inflation: Primiceri & Gianone (2024) analyse the economic impacts of the COVID-19 pandemic, focusing on the resultant supply and demand shock. They demonstrate how the pandemic-induced supply disruptions and shifts in consumer behaviour have contributed to inflationary pressures. This study highlights the necessity of flexible and adaptive monetary policy to address the unique challenges posed by such unprecedented events.

As shown here above, SVAR models are confirmed to be appropriate for disentangling the sources and dynamics of inflation. The papers highlight the significant roles of oil price shocks, monetary policy responses, and labour market conditions in driving inflationary episodes. Therefore, an SVAR model

will be used in this thesis, which aims to identify and analyze the structural shocks affecting the U.S. economy during the 1970s and the post-COVID era.

3.1.2 Shock Categorisation and Variables

Shock categories

As shown in the previous section, the papers investigate the three types of questions covered by this thesis. However, authors explore different and particular combinations of variables and shocks to explore their specific research subject. Seven different types of shocks are identified in these papers: Demand, Energy, External, Fiscal, Labour, Monetary, and Supply. Moreover, the authors do not consistently employ the same variables to identify these shocks.

The following table 3.1 presents the variables used in the selected papers.

Table 3.1: Summary of Literature Categorization

	Demand	Energy	External	Fiscal	Labour	Monetary	Supply
CPI_all	(1,2)	(3)					
CPI_Urb	(1; 2)						
GDP_IDP	(1)log diff, (2)						
PCE	(1,2)						
WTI		(3, 4)					
CPI_En		(3)					
EER			(7)				
Gov				(1)			
UNRATE					(5 ; 6)		
Wages					(6)		
Real_FED						(5)	
Real_M2						(5)	
Real_GDP							(1)log diff , (4)log
GDP_Pot							(4)
PPI							(4)
INDPRO							(4)

Note: Summary of literature categorization for various economic indicators across different categories.
(1) : (Bergholt et al., 2024) (2) : (Ball et al., 2022) , (3) : (Gagliardone & Gertler, 2023) ,
(4) : (Firat & Hao, 2023) , (5) : (Bullard et al., 2024) , (6) : (Primiceri & Giannone, 2024) ,
(7) : (Blanchard & Bernanke, 2023)

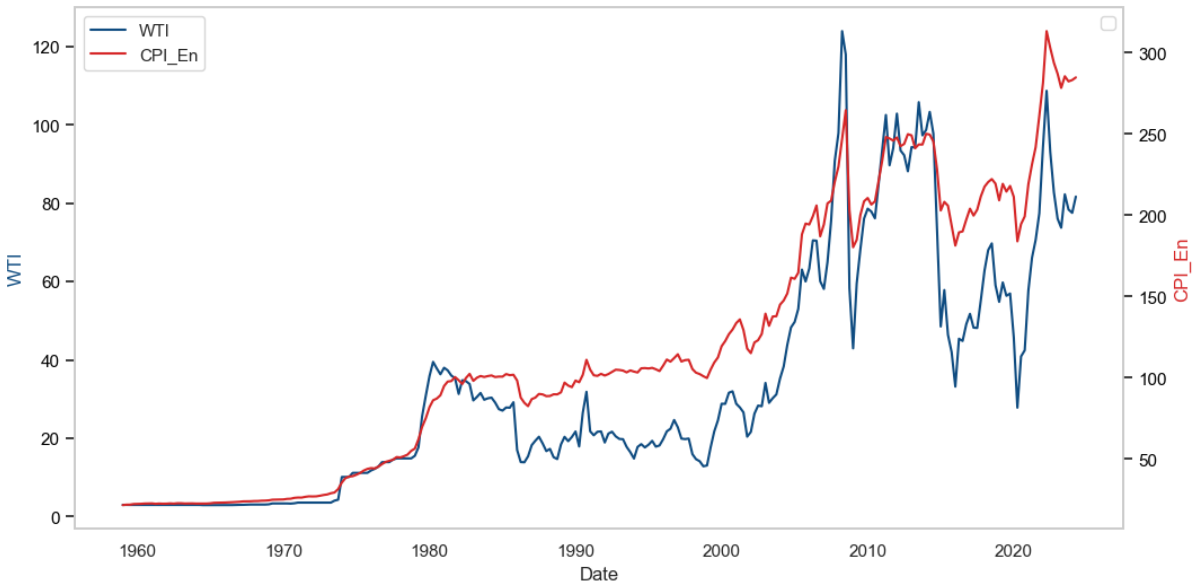
In subsequent analysis, only four main shock types will be considered: demand, supply, energy, and monetary. This categorization aligns with the literature as shown in the table and is consistent with the predominant focus of the research.

This categorization is also informed by economic theory, which suggests that different types of shocks (e.g., supply shocks, demand shocks, energy shocks) affect different sets of variables. For instance, supply-related variables include real GDP, PPI, and potential GDP; demand-related variables in-

clude inflation measures as the GDP deflator, CPI and personal consumption expenditures (PCE); energy-related variables include oil prices and CPI for energy.

To identify energy shocks, a comparison between WTI crude oil prices and the CPI Energy index was conducted (Figure 3.1). A strong correlation between the two is evident during the 1970s, suggesting that energy prices were largely driven by oil prices at that time. However, divergences emerged over subsequent periods, indicating that the CPI Energy index provides a more comprehensive representation of overall energy costs.

Figure 3.1: Comparison between the WTI and the CPI Energy.



Sources: FRED Database (WTISPLC and CPIENGSL)

Variable transformation

To ensure the robustness and validity of the VAR model in capturing the underlying relationships among the variables, a comprehensive preliminary analysis was conducted to select the optimal combination of variables and their respective transformations. This approach was guided by the dual objectives of maximizing cointegration and ensuring model stability. Specifically, the analysis considered four possible forms for each variable: the raw (untransformed series), the logarithmic transformation, the first difference, and the logarithm of the first difference. This systematic comparison allowed for the identification of the most appropriate transformation for each variable by balancing the trade-off between cointegration—whereby the model can capture long-term equilibrium relationships—and stability—where the model adheres to the stationarity requirements essential for the validity of VAR modelling. By evaluating these transformations, the methodology ensures that the final set of variables fed into the VAR model not only exhibits desirable statistical properties but also retains meaningful economic interpretations, thereby enhancing the overall reliability and interpretability of the results.

Variable Selection Process

The selection process is based on an iterative process performing VAR models with each combination of the variables listed. The optimal variable set is determined through an iterative process that evaluates numerous combinations of potential variables, themselves and their transformations. The stability and adequacy of the model are assessed through four diagnostic tests which are based on the model stability criteria, Akaike Information Criterion (AIC) and diagnostic tests such as Granger causality and the Ljung-Box test for residual autocorrelation. This rigorous selection process ensured that the chosen variables provided the best fit and most reliable results for our VAR model. Each VAR model is evaluated and their results are gathered in a result table. The empirical justification for the selected variables is rooted in their performance during the model selection process.

Table 3.2: Summary of Results of the Model Variables selection

Supply	Demand	Energy	Monetary	stable	AIC	Granger	Ljung	Total
logGDP_Pot	logGDP_IDP	logCPI_En	Real_FED	VRAI	-35.5439	4	2	6
logGDP_Pot	logCPI_less	logCPI_En	Real_FED	VRAI	-34.9081	6	3	9
logGDP_Pot	logCPI_Urb	logCPI_En	Real_FED	VRAI	-34.4744	6	2	8
logGDP_Pot	logPCE	logCPI_En	Real_FED	VRAI	-33.2858	4	2	6
logGDP_Pot	logGDP_IDP	logWTI	Real_FED	VRAI	-32.9307	3	2	5
logGDP_Pot	logCPI_less	logWTI	Real_FED	VRAI	-32.3678	3	2	5
logGDP_Pot	logCPI_Urb	logWTI	Real_FED	VRAI	-31.6626	4	2	6
logGDP_Pot	logPCE	logWTI	Real_FED	VRAI	-30.6823	3	2	5
logReal_GDP	logGDP_IDP	logCPI_En	Real_FED	VRAI	-28.5843	7	3	10
logReal_GDP	**logCPI_less**	**logCPI_En**	**Real_FED**	**VRAI**	**-27.9973**	**8**	**3**	**11**

The empirical analysis employs quarterly macroeconomic data spanning from 1960 to 2024, sourced from the Federal Reserve Economic Data (FRED) database. Detailed descriptions of each variable, including the specific data series, will be provided in subsequent sections.

3.1.3 Model selection and transformation

Following the previous selection process, the VAR model that will used in this study will be specified to capture the dynamic interactions between four key macroeconomic variables following this procedure developed hereafter: real GDP, core CPI (CPI excluding food and energy), energy CPI, and the Federal Funds Rate. These variables are selected based on their relevance in capturing supply, demand, energy, and monetary shocks, as highlighted in the literature review and confirmed by empirical tests.

- **Real GDP (logReal_GDP):** This variable represents the output of the economy, capturing the effects of supply and demand shocks on economic activity. The use of logged real GDP helps stabilize variance and ensures linearity in the model, which is crucial for accurate estimation and interpretation.
  Source: FRED Database (GDPC1) - Real Gross Domestic Product, Billions of Chained 2017 Dollars, Quarterly, Seasonally Adjusted Annual Rate.

- **Core CPI (logCPI_less):** The core Consumer Price Index, excluding food and energy, is used to measure underlying inflationary pressures, which are primarily influenced by demand shocks. Log

transformation of this variable is necessary to achieve stationarity and to handle the skewness in the distribution of price changes.
Source: FRED Database CPILFESL_NBD19600101 - Consumer Price Index for All Urban Consumers: All Items Less Food and Energy in U.S. City Average, Index Q1 1960=100, Quarterly, Seasonally Adjusted.

- **Energy CPI (logCPI_En):** The energy component of the CPI reflects the price dynamics of energy goods, which are crucial for identifying energy shocks. The volatility of energy prices is addressed by logging the data, which helps stabilize the variance and makes the series more suitable for VAR modelling.
  Sources: FRED Database
  (CPIENGSL) - Consumer Price Index for All Urban Consumers: Energy in the U.S. City Average, Index 1982-1984=100, Quarterly, Seasonally Adjusted.
  (WTISPLC) - Spot Crude Oil Price: West Texas Intermediate (WTI), Dollars per Barrel.

- **Real Federal Funds Rate (Real_FED):** This variable represents the monetary policy stance, capturing the impact of monetary shocks on the economy. Unlike the other variables, the real Federal Funds Rate is not logged, as its scale and nature do not necessitate transformation for this analysis. To increase economic accuracy, the limit of the zero lower bound has been removed. The shadow rate (Wu & Xia, 2016) has been incorporated when the value of the FFR reaches 0.
  Source: DFF - Federal Funds Effective Rate, Percent, Quarterly, Not Seasonally Adjusted

The figures illustrating the variables and their logarithmic transformations are provided in the Appendix A.3.1.

3.1.4 Model specification

Theoretical Development of the Model

The detailed theoretical development of the VAR model, including the derivation of the identification matrix and the interpretation of structural shocks, is provided in the appendix A.1. This includes the mathematical formulation of the VAR model, the imposition of identification restrictions, and the theoretical underpinnings of the shock identification process.

Lag Selection

The optimal lag length for the VAR model is determined using information criteria such as the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), and the Hannan-Quinn Criterion (HQIC). In this study, a lag length of two quarters was selected based on the minimum values of these criteria, balancing model fit. The results of the lag order selection are available in Appendix A.2.1.

Summary of Regression Results

The VAR model demonstrates a high level of econometric adequacy, as indicated by several critical diagnostic metrics in Appendix A.2.2. The Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), and the Hannan-Quinn Information Criterion (HQIC) all reflect a model that is optimally balanced between parsimony and goodness-of-fit. The log-likelihood value further supports the robustness of the model, underscoring its strong alignment with the observed data. The statistically significant coefficients for essential variables, such as the first lag of logReal_GDP and the first lag of logCPI_less, confirm the model's effectiveness in capturing the intrinsic dynamics of the time series. Additionally,

the low residual correlations across the model's equations indicate that the VAR structure adequately explains the interdependencies among the variables, minimizing any unexplained variance. These diagnostic results collectively affirm the model's validity and its suitability for the analysis presented in this research.

Structural Shock Identification

To identify the structural shocks, this sign restriction matrix imposes the following restrictions based on economic theory:

Table 3.3: Sign Restriction Matrix

	Types of Shocks:			
Responses to shocks:	Supply	Demand	Energy	Monetary
real GDP	+	+	-	na
core CPI	-	+	+	+
Energy Price	+	+	+	na
Interest Rate (Fed)	-	+	+	+

A detailed explanation of the sign restriction matrix applied to the VAR model is provided in the Appendix. Please refer to the Appendix A.1.2.1 for further information.

3.2 Identification and Analysis of Shocks

This section identifies and analyzes the significant shocks that have impacted the U.S. economy using the Structural Vector Autoregressive (SVAR) model. The SVAR model allows for disentangling the effects of various types of shocks on key macroeconomic variables, providing a deeper understanding of their dynamics and interactions.

3.2.1 Analysis of Impulse Response Functions (IRFs)

Impulse Response Functions (IRFs) are essential for analyzing the dynamic responses of macroeconomic variables to structural shocks in a Structural VAR (SVAR) model. The IRFs trace the effects of a one-time shock on the current and future values of the endogenous variables. Figure A.3.3 illustrates the IRF results from the SVAR model with sign restrictions, where each panel shows the response of one variable to a shock in another. The solid blue line represents the estimated response, while the grey area indicates the confidence intervals. This analysis focuses on the dynamic effects of four distinct economic shocks—supply, demand, energy, and monetary—on key macroeconomic variables: GDP, core inflation, energy prices, and the interest rate (Fed). A comparison of these results with IRFs from a VAR model without sign restrictions is available in Appendix A.3.2, offering further insights into the model's effectiveness in capturing the underlying economic mechanisms.

Supply Shock

Under the imposed sign restrictions, the supply shock is expected to increase Real GDP and energy prices while decreasing core CPI and the interest rate. The IRFs confirm these theoretical expectations: Real GDP exhibits a positive response, reflecting an increase in output due to the supply shock. Energy

prices also rise, consistent with higher production demands. Core CPI initially decreases, aligning with the restriction that a supply shock should alleviate inflationary pressures in the short term. The interest rate decreases slightly, which is in line with the central bank potentially lowering rates to support the economy in response to higher output and lower inflation. This support reaction by central banks in the event of a supply shock was described in Section 2.3 of the Fed's response to the COVID crisis. The Fed also cut rates at the height of the oil shocks at the end of 1973 and 1980, which had repercussions for the supply chain. These results highlight the model's ability to capture the complex interactions between supply-side factors and monetary policy responses.

Demand Shocks

For the demand shock, the sign restrictions anticipate positive responses across all variables: Real GDP, core CPI, energy prices, and the interest rate. The IRFs follow this pattern, with Real GDP increasing significantly, demonstrating the direct impact of heightened demand on economic activity. Core CPI rises sharply, indicative of demand-pull inflation as higher demand pushes up prices. Energy prices also increase, reflecting greater demand in the energy sector. The interest rate rises in response to the inflationary pressures, consistent with a central bank tightening policy to prevent overheating of the economy. These findings underscore the model's effectiveness in capturing the inflationary and growth-stimulating effects of demand shocks.

Energy Shocks

The energy shock, according to the sign restrictions, is expected to have a negative impact on Real GDP, while positively affecting core CPI, energy prices, and the interest rate. The IRFs align with these expectations: Real GDP declines, reflecting the drag on economic activity due to higher energy costs. Core CPI increases, as energy price hikes contribute to broader inflation. Energy prices naturally rise sharply as a direct consequence of the shock, confirming the model's capacity to simulate the immediate impact of energy market disturbances. The interest rate also increases, consistent with a central bank reaction to rising inflation. This response illustrates the broader economic repercussions of energy shocks, particularly their stagflationary tendencies.

Monetary Shocks

The monetary shock, characterized by a rise in the interest rate, is expected to decrease Real GDP while increasing core CPI and energy prices, with a positive response also anticipated for the interest rate itself. The IRFs reflect these imposed dynamics: Real GDP falls, consistent with the contractionary effect of higher interest rates on economic activity. Core CPI increases slightly, which may seem counterintuitive but aligns with the sign restriction that assumes a lagged effect of monetary tightening on inflation. Energy prices exhibit a muted positive response, potentially due to reduced demand offsetting the inflationary effects. The interest rate increases sharply, as expected, confirming the direct impact of the monetary shock. This analysis highlights the model's robustness in capturing the effects of monetary policy adjustments on the broader economy.

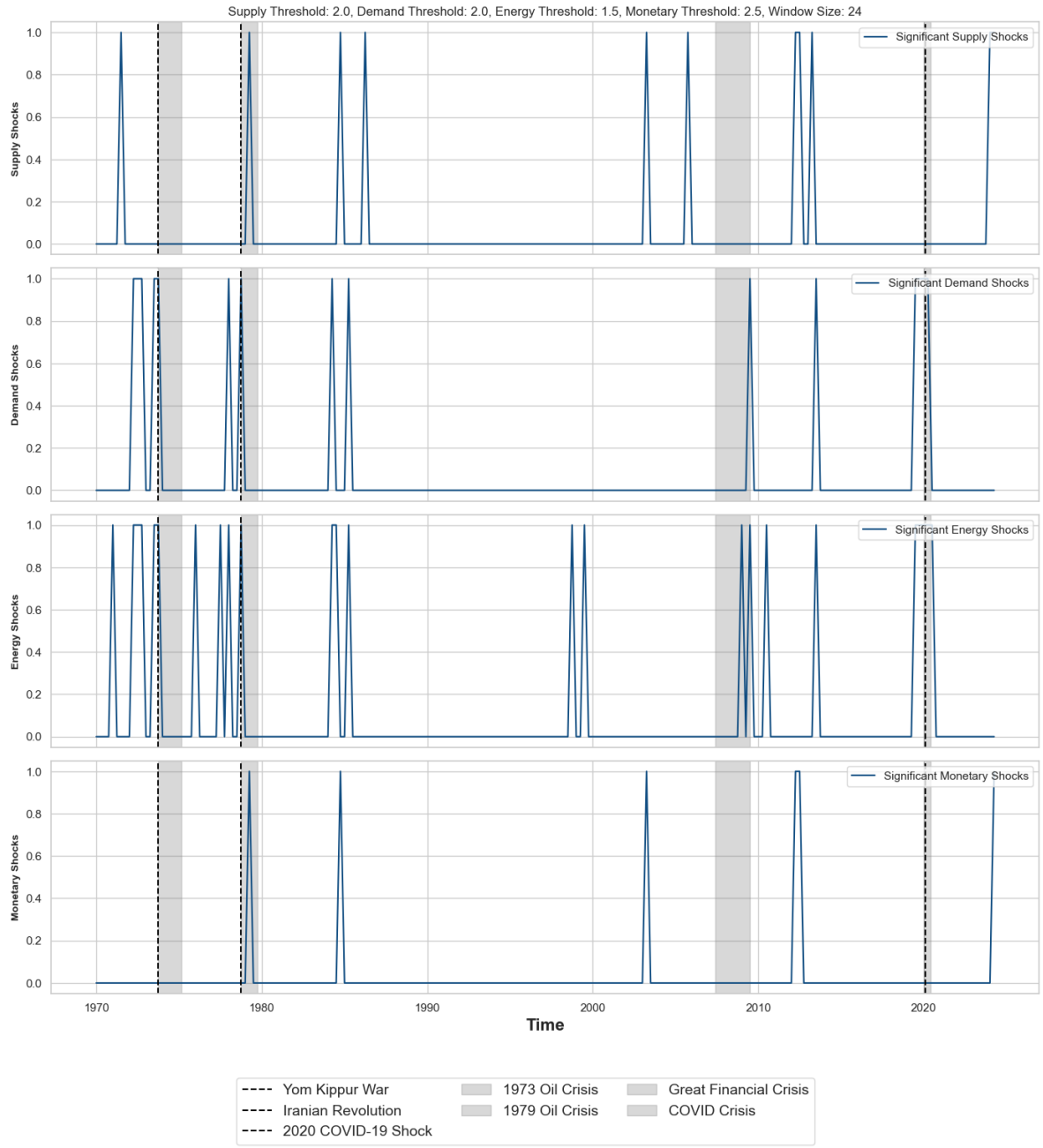
3.2.2 Identification of Historical Economic Shocks

To identify significant shocks dynamically, a rolling window approach is employed where structural shocks are analyzed over a specified window size. The dynamic thresholds were determined using the standard deviation and mean of the structural shocks within each window. Specifically, thresholds for identifying significant shocks were computed as multiples of the standard deviation added to the mean,

ensuring that only deviations beyond typical fluctuations were considered significant. The thresholds were set as follows: a multiplier of 2.0 for both supply and demand shocks, 1.5 for energy shocks, and 2.5 for monetary shocks. A window size of 24 months was chosen to balance sensitivity with temporal accuracy.

The structural shocks were categorized based on whether their magnitudes exceeded the respective dynamic thresholds within each rolling window. A binary indicator was assigned to each time point to signal the occurrence of a significant shock if the threshold was surpassed.

Figure 3.2: Identification of Historical Economic Shocks



The results of the shock identification process are illustrated in Figure 3.2, which displays the time series of significant supply, demand, energy, and monetary shocks across several decades. Each panel in Figure 3.2 corresponds to one type of shock, with significant periods marked by peaks that exceed the respective thresholds.

Several historical events were highlighted to contextualize the identified shocks:

1973 Oil Crisis and Yom Kippur War: Significant energy shocks were detected during this period, which corresponded to the sharp increase in oil prices due to geopolitical tensions. The supply and demand shocks were also identified, reflecting the broader disruptions of the economy.

1978 Iranian Revolution and 1979 Oil Crisis: The energy shocks during this period were highly significant, aligning with the disruption in the global oil supply caused by the Iranian Revolution and the subsequent 1979 Oil Crisis.

Great Financial Crisis (2007-2009): Significant demand and energy shocks were identified during this period, consistent with the severe economic contraction and the aggressive monetary policy responses that followed.

COVID-19 Pandemic (2020): The analysis identified substantial demand, and monetary shocks during the early months of 2020, corresponding to the unprecedented global economic disruptions caused by the COVID-19 pandemic. A later monetary shock was also identified, coinciding with the Fed's rate hike.

The identification of these shocks aligns with historical records, demonstrating the effectiveness of the VAR model with sign restrictions in capturing significant economic events. This dynamic and systematic approach not only validates the robustness of the model but also provides a useful tool for analyzing the temporal evolution of economic shocks.

3.3 Analysis and Comparison of the Historical Shocks

To analyze the impact of significant historical shocks on macroeconomic variables, I incorporated dummy variables representing the years 1973, 1979, and 2020 into the VAR model with sign restrictions. These years correspond to pivotal economic events: the 1973 Oil Crisis, the 1979 Oil Crisis, and the 2020 COVID-19 pandemic. The inclusion of these dummies allows the model to isolate and examine the distinct effects of these shocks on real GDP, core inflation, energy prices, and the interest rate (Fed).

Specific Characteristics of the Dummy Variables:

- **1973 Shock:** This dummy variable takes a value of one from December 1973 onward, marking the onset of the 1973 Oil Crisis, and remains one for all subsequent periods. This approach captures the lasting impact of the oil crisis on the economy.
  This is in line with the permanent shift of the oil price since 1973 as observed in Figure 3.1
- **1979 Shock:** This dummy variable takes a value of one from April 1979 to June 1980, covering the period of the 1979 Oil Crisis. This timeframe is chosen to reflect the acute phase of the crisis, including its immediate aftermath.
- **2020 Shock:** This dummy variable takes a value of one from April 2020 to December 2020, capturing the initial impact of the COVID-19 pandemic. This period reflects the most intense phase of economic disruption due to the pandemic's global spread.

By assigning a value of one during the specified periods and zero otherwise, these dummy variables enable the model to account for the immediate impacts of these significant disruptions. This precise modelling approach ensures that the VAR model can effectively capture the distinct effects of these historical events on the key macroeconomic variables under study.

3.3.1 Analysis of The Shocks

This section is dedicated to comparing the historical shocks across different periods, focusing on key events such as the 1973 Oil Crisis, the 1979 Oil Crisis, and the 2020 COVID-19 Shock. This comparison is conducted in terms of magnitude, frequency, and impact on macroeconomic variables.

Impact of the 1973 Oil Crisis

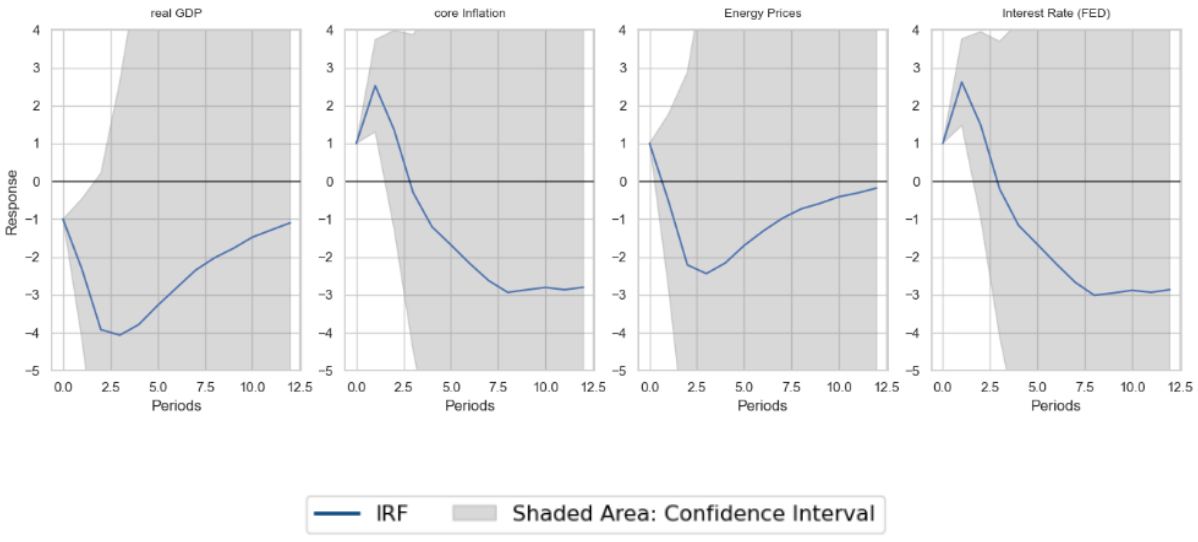
The IRF for the 1973 dummy indicates a sharp decline in real GDP following the shock. This substantial drop reflects the severe economic downturn caused by the 1973 Oil Crisis, which led to widespread supply constraints and heightened economic uncertainty. The persistence of this negative effect underscores the prolonged impact of the crisis on economic output.

Core inflation initially decreased in response to the 1973 shock, which may seem counterintuitive given the inflationary nature of oil price increases. However, this decline could reflect a significant contraction in demand as economic activity slowed, outweighing the inflationary pressures from higher energy costs.

As expected, energy prices surged following the 1973 shock, with the IRF showing a substantial and sustained increase. This is directly attributable to the oil embargo and subsequent supply disruptions, which drove energy prices to unprecedented levels.

The interest rate response to the 1973 shock begins with a slight decrease, likely indicating an initial policy response to support the economy amid the downturn. However, as inflationary pressures from higher energy prices build, the interest rate gradually increases, reflecting the central bank's efforts to curb inflation.

Figure 3.3: IRF 1973 Shock



1979 Oil Shock

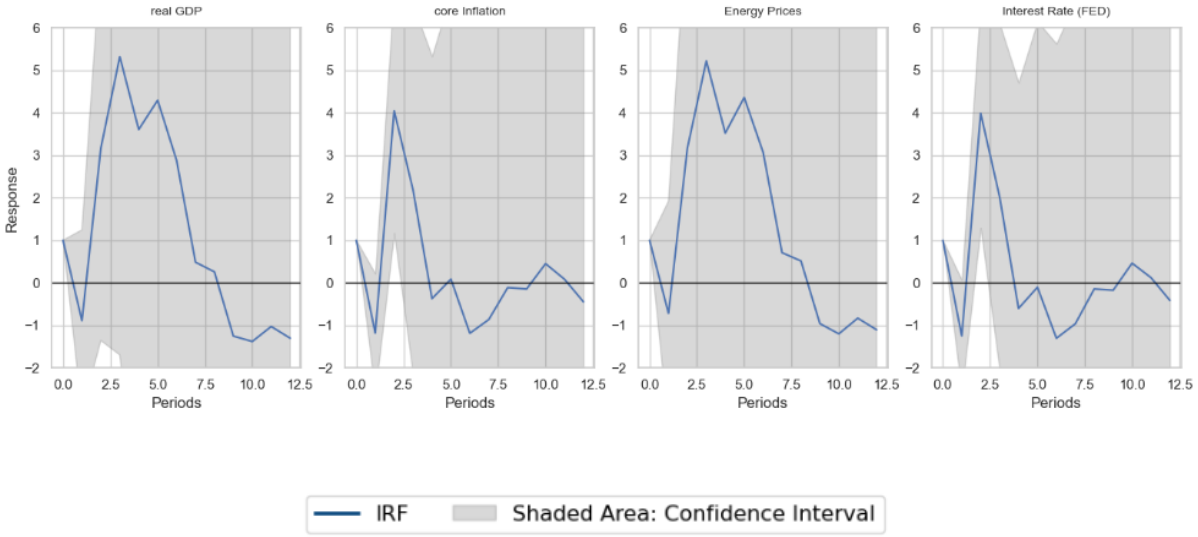
The IRF for the 1979 dummy shows a decline in real GDP similar to that seen in 1973, though with more volatility. The 1979 Oil Crisis, triggered by the Iranian Revolution, resulted in significant economic disruptions, though the more volatile response suggests a complex interplay of factors, including possibly more resilient economic conditions compared to 1973.

Core inflation again decreases following the 1979 shock, reflecting a similar pattern to the 1973 crisis. The immediate drop in inflation may indicate reduced economic activity, as the shock likely led to demand contraction. Over time, however, the inflationary impact of sustained high energy prices would likely reverse this trend.

The IRF indicates a sharp increase in energy prices following the 1979 shock, consistent with the severe disruptions in oil supply. The volatility observed in this response could be due to the market's reaction to both the immediate effects of the crisis and the ongoing geopolitical instability.

The interest rate initially decreased following the 1979 shock, similar to the 1973 crisis, suggesting an initial monetary policy response aimed at stabilizing the economy. However, as inflationary pressures mount due to persistent high energy prices, the interest rate rises, reflecting the central bank's shift towards inflation control.

Figure 3.4: IRF 1979 Shock



2020 COVID-19 Shock

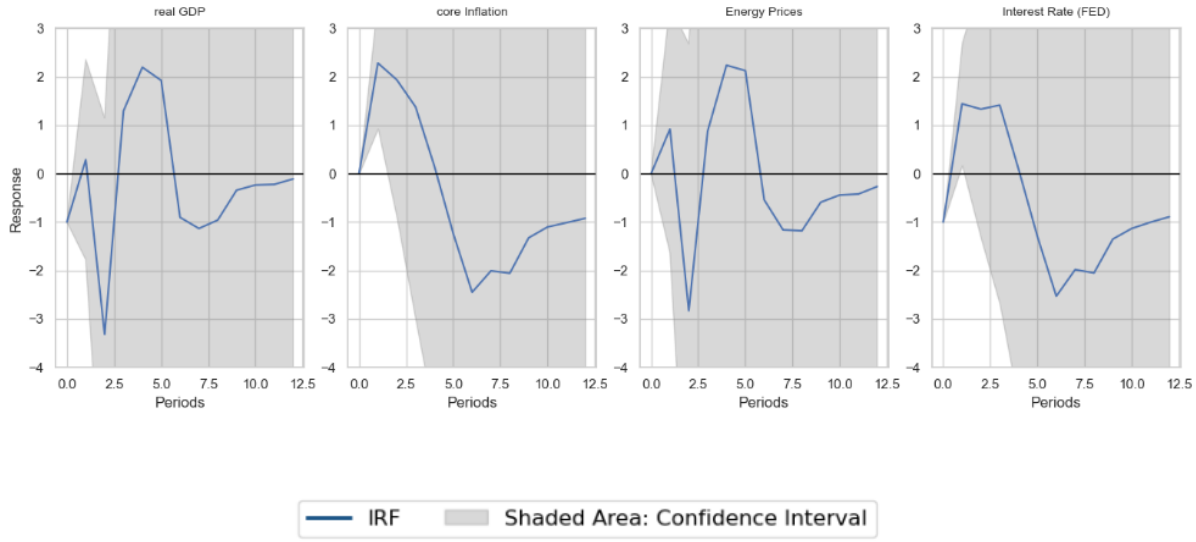
The IRF for the 2020 dummy shows a sharp initial decline in real GDP, reflecting the immediate and severe economic impact of the COVID-19 pandemic. This rapid contraction is consistent with the widespread shutdowns and disruptions to economic activity seen globally. However, unlike the previous oil crises, there is a partial recovery observed in the IRF, likely due to the swift and substantial fiscal and monetary responses enacted to mitigate the downturn.

Core inflation's response to the 2020 shock is more volatile compared to the earlier shocks. This volatility reflects the unique nature of the COVID-19 pandemic, where supply chain disruptions and rapid shifts in demand created significant fluctuations in inflationary pressures.

Energy prices initially increased following the 2020 shock, but the response is less pronounced than in the 1973 and 1979 crises. This muted response could be due to the simultaneous demand collapse, which offset the upward pressure on energy prices caused by supply disruptions.

The interest rate response to the 2020 shock is markedly different from the previous crises, showing a sharp decline. This reflects the aggressive monetary easing policies implemented globally to support economic activity during the pandemic. The sustained low interest rates underscore the unprecedented nature of the policy response aimed at mitigating the economic fallout from the pandemic.

Figure 3.5: IRF 2020 Shock

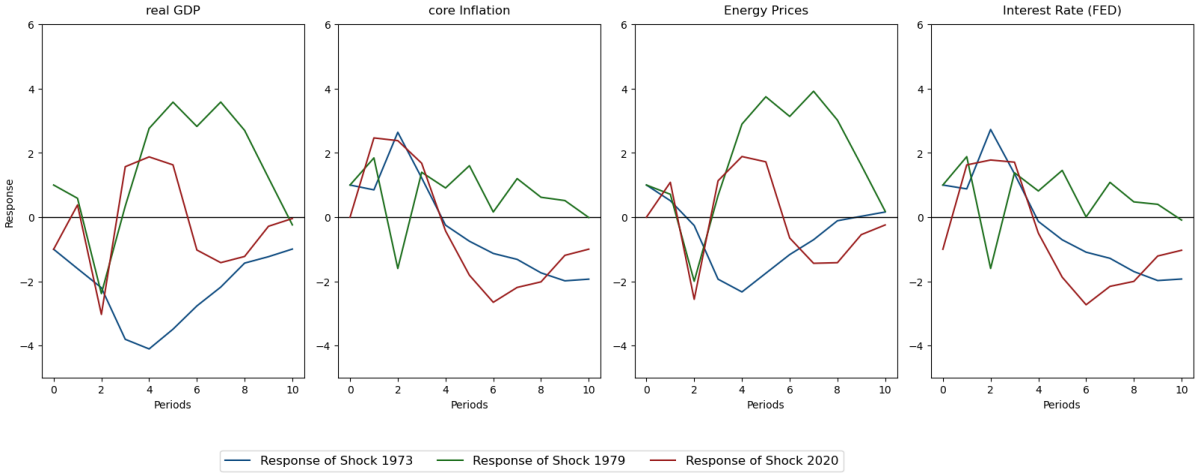


3.3.2 Comparison of the Shocks

The IRFs of Figure 3.6 provide a clear comparative picture of how the 1973, 1979, and 2020 shocks affected real GDP, core inflation, energy prices, and interest rates. By focusing directly on the differences and similarities in their impacts, we can measure the relative severity and dynamics of each shock on these key economic variables.

The 1973 shock resulted in a persistent decline in GDP, indicating a prolonged economic downturn, whereas the 1979 shock initially boosted GDP but led to significant volatility and an eventual downturn. The 2020 shock, while initially causing a sharp drop, shows a partial recovery by period 4, making it less persistently negative than the 1973 shock but more severe initially than the 1979 response. This suggests that the 1973 shock had the most lasting negative impact on GDP, while the 2020 shock, despite its severity, allowed for quicker recovery dynamics.

Figure 3.6: Comparison of the Shocks Impacts



In terms of core inflation, both the 1973 and 2020 shocks lead to a sustained decrease, with the 1973 shock showing a more pronounced and consistent disinflationary effect. The 1979 shock, however, initially increased inflation before eventually aligning with the disinflationary trends of the other two shocks. The magnitude of inflation decrease is most significant in 1973, making it the most deflationary of the three, while the 1979 shock's initial inflationary spike sets it apart, reflecting different inflation dynamics.

Energy prices reacted most strongly to the 1979 shock, with a higher peak and more volatility compared to the 1973 shock. The 2020 shock, in contrast, shows a much less dramatic impact, reflecting a different economic context where demand constraints tempered the inflationary pressures on energy prices. Thus, the 1979 shock had the most destabilizing effect on energy markets, whereas the 2020 shock's impact was more subdued.

The interest rate responses are sharply different across the shocks. The 2020 shock resulted in the most substantial and sustained decrease, reflecting aggressive monetary easing. The 1973 shock also leads to a reduction, but it is more gradual and less severe. The 1979 shock initially caused an increase followed by a decline, reflecting a more complex monetary policy response. The 2020 shock's impact on the interest rate is the most pronounced and sustained, indicating a more robust and immediate monetary policy reaction compared to the earlier shocks.

Measurement of Impact

Overall, the 1979 shock had the most volatile and severe impact on energy prices and an initially inflationary effect on core inflation, making it the most disruptive in terms of price stability. The 2020 shock, while causing the sharpest initial drop in GDP and the most significant decrease in the interest rate, allowed for quicker GDP recovery, showing resilience. The 1973 shock had the most sustained negative impact on GDP and the most pronounced disinflationary effect, marking it as the most persistent in its economic disruption. These comparisons highlight the relative severity and different dynamics of each shock, with the 1979 shock destabilizing prices the most, the 2020 shock prompting the strongest policy response, and the 1973 shock leading to the most prolonged economic downturn.

Table 3.4: Summary of Shocks Across Different Periods

Period	Shock Type	Magnitude	Impact on GDP	Impact on Inflation	Impact on Energy Price
1973 Oil Crisis	Energy	High	Contraction	High	Medium
1979 Oil Crisis	Energy	High	Contraction	High	High
2020 COVID-19	Supply/Demand	High	Severe Contraction	High	Medium

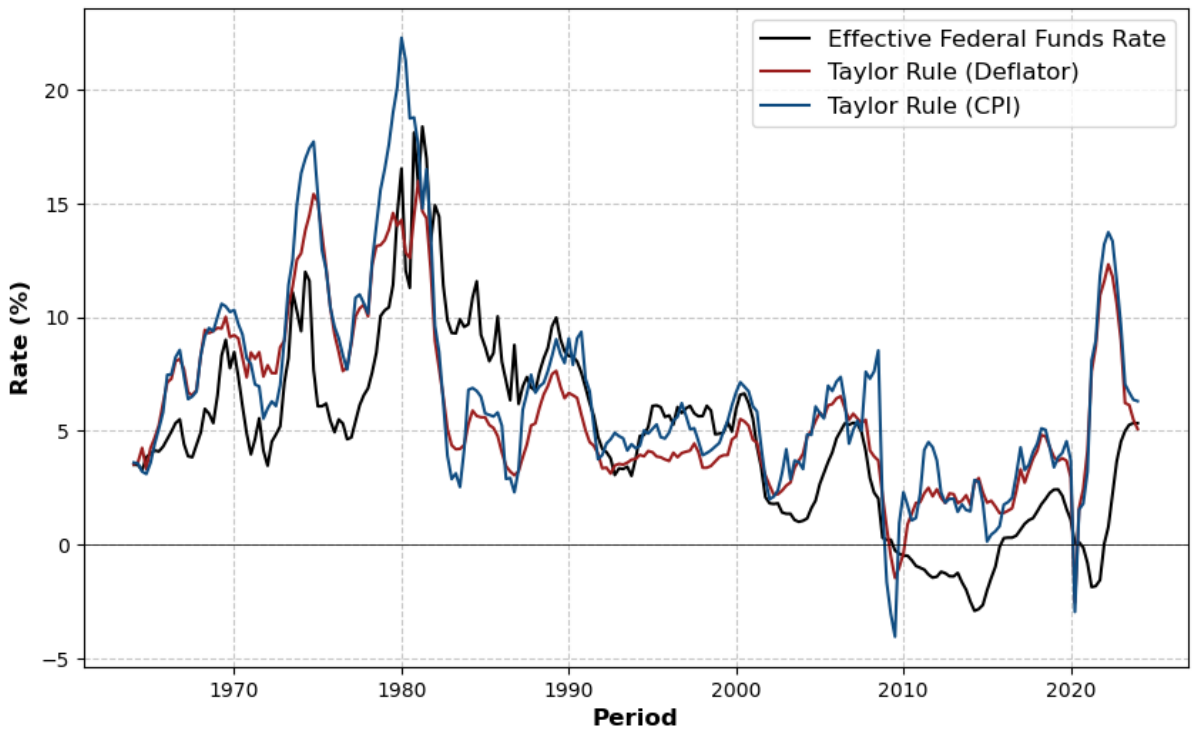
3.4 Counterfactual Analysis with the Taylor Rule

This section conducts a counterfactual analysis using the Taylor Rule to evaluate monetary policy responses during the 1973 oil shock, the 1979 oil shock, and the 2020 COVID-19 pandemic. The objective is to assess how adherence to the Taylor Rule would have influenced economic outcomes, particularly inflation and real GDP, and to provide a benchmark for discussing the policies that were implemented.

3.4.1 The Taylor Rule in Applications

The Taylor Rule, as defined in Section 1.3.1, is subject to variations depending on the choice of proxy variables. Figure 3.7 illustrates the differences between using the GDP Deflator and the Consumer Price Index (CPI) as inflation measures in the Taylor Rule, in comparison to the Effective Federal Funds Rate. The figure demonstrates that the Taylor Rule based on the GDP Deflator tends to be more stable than that based on the CPI. While differences are apparent, they are not substantial enough to significantly alter the conclusions of this study.

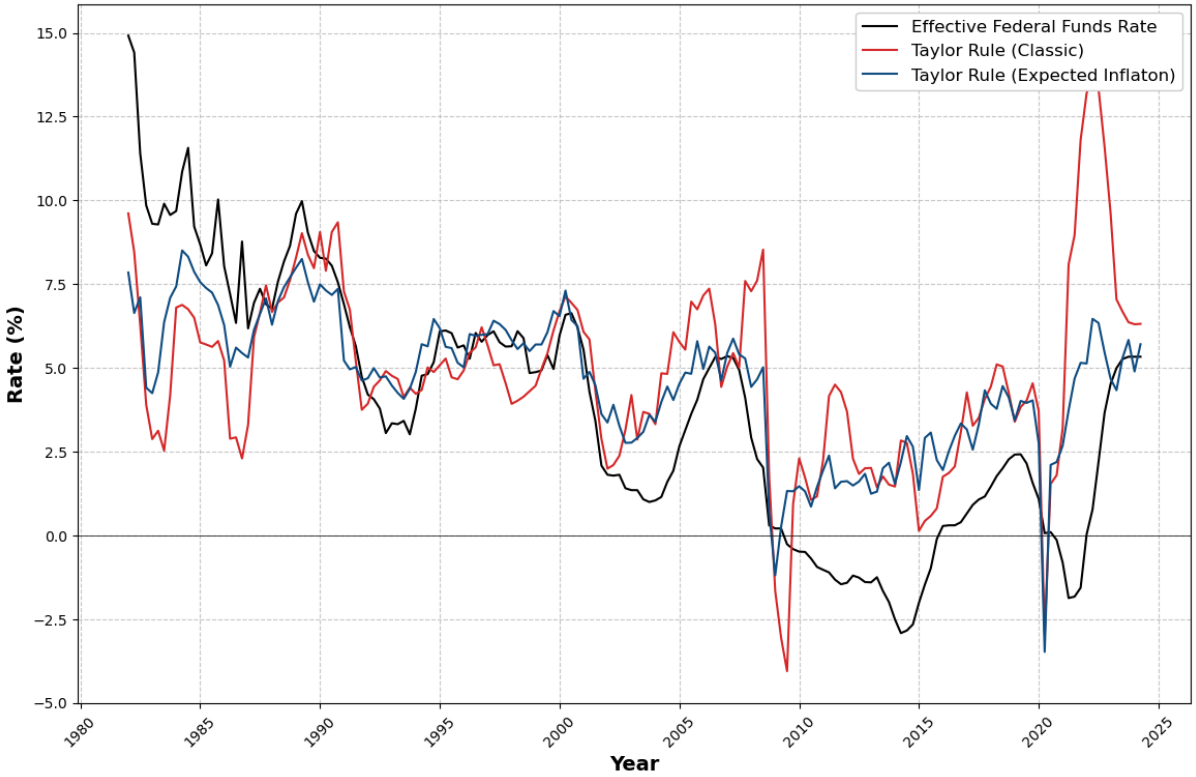
Figure 3.7: Comparison of Actual Fed Funds Rate with Different Taylor Rule Estimates



Source: FRED Database (DFF, GDPPOT, GDPC1, GDPDEF_NBD19600101, and CPIAUCSL_PC1)

A critical consideration, as discussed in Section 1.1, is the role of expected inflation in shaping monetary policy. Comparing the Federal Funds Rate with a Taylor Rule that uses expected inflation instead of actual inflation offers a more insightful analysis. This approach explores how the Federal Reserve might have set rates based on the anticipated future inflation. This makes it possible to assess whether policy decisions were in line with or deviated from what might have been optimal based on forward-looking expectations.

Figure 3.8: Actual Inflation Rate vs. Inflation Expectations in the Taylor Rule



Source: FRED Database (DFF, GDPPOT, GDPC1, and EXPINF1YR)

Figure 3.8 shows that when the Taylor Rule is generated using expected inflation at a 1-year horizon, it appears less volatile and reacts less sharply to economic shocks. Notably, during periods of economic crisis, such as the COVID-19 pandemic, the Taylor Rule based on expected inflation takes on less extreme values and rebounds more quickly than the classic Taylor Rule. This observation is particularly evident in the response to the Taylor Rule with expected inflation following the COVID-19 crisis. The quicker recovery suggests that economic agents considered the inflation to be transitory, supporting the notion that there was no need for aggressive intervention to counter the inflation, as might have been suggested by the classic Taylor Rule.

The analysis of deviations from the Taylor Rule must be nuanced by considering the role of inflation expectations in shaping monetary policy decisions. As highlighted by Benigno and Eggertsson (2023), the 1970s experienced a collapse of the Keynesian Phillips curve, driven by the unanchoring of inflation expectations. This phenomenon led to the rational expectations revolution, emphasizing the impor-

tance of expectations in macroeconomic models. Therefore, comparisons between the Taylor Rule and the actual Federal Funds Rate should be interpreted with caution. During periods of anchored expectations, such as in the post-2008 financial crisis and the 1990s, the Federal Reserve could afford a more measured approach, even if the Taylor Rule suggested a more aggressive stance. In contrast, during the 1970s, when expectations were unanchored, the Taylor Rule's recommendations for higher interest rates were consistent with the need to re-anchor expectations and control inflation.

3.4.2 Taylor Rule and the Federal Funds Rate

Before proceeding with counterfactual scenarios, it is essential to analyze the relationship between the Taylor Rule rates and the actual Federal Funds Rate over the selected periods. This analysis helps identify periods of significant deviations and understand the potential reasons behind these deviations. When analyzing the Federal Funds Rate (FFR) in comparison to the Taylor Rule, an FFR that is above or equal to the Taylor Rule can be interpreted as an aggressive monetary policy focused on combating inflation. A higher FFR indicates that the central bank has adopted a proactive stance, raising interest rates beyond what the Taylor Rule would suggest as the optimal balance. This approach aims to cool down the economy by reducing demand, thereby controlling inflation, even at the risk of slowing economic growth. It reflects a clear prioritization of price stability over other economic objectives, such as full employment.

Before Volcker (1970s to Early 1980s)

As highlighted in Chapter 2 at page 21, the period before Volcker's tenure, particularly during the 1970s and early 1980s, was marked by significant economic turmoil, characterized by stagflation—high inflation coupled with stagnant economic growth. The Taylor Rule, if strictly adhered to, would have implied a more systematic approach to interest rate adjustments based on inflation and output gaps. Nonetheless, the actual Federal Funds Rate frequently deviated markedly from the Taylor Rule's prescribed path during this period.

As shown in Figure 2.3, the Federal Reserve's monetary policy under Chairman Arthur Burns and later under G. William Miller was less aggressive than the Taylor Rule would suggest, particularly during the periods of the 1973 oil shock and the subsequent inflationary episodes. This deviation can be attributed to the Fed's hesitance to raise interest rates aggressively, likely due to concerns about further depressing already weak economic growth.

Volcker's Tenure (1979-1987)

The situation changed dramatically with the appointment of Paul Volcker as Chairman of the Federal Reserve in 1979. Volcker's approach was characterized by a stark departure from the previous era's policies. His aggressive monetary tightening, which involved raising the Federal Funds Rate well above the Taylor Rule recommendations, was a deliberate move to break the back of the entrenched inflation expectations. This policy shift was particularly evident in the early 1980s when the effective Federal Funds Rate exceeded the Taylor Rule rate significantly, marking a clear regime change under Volcker's leadership.

This period highlights the limitations of the Taylor Rule when faced with unanchored inflation expectations and the need for a central bank to sometimes adopt a more discretionary, albeit aggressive, stance to restore credibility and control inflation.

After Volcker (Late 1980s to COVID crisis)

Following Volcker's tenure, from the late 1980s to the early 2000s, the Federal Reserve adopted a more systematic approach to monetary policy, closely aligning with the Taylor Rule. This period is often referred to as the "Great Moderation," characterized by reduced volatility in both inflation and output, reflecting a more balanced approach to monetary policy.

During this time, the Federal Funds Rate closely followed the Taylor Rule, suggesting that the Fed's policy decisions were largely in line with the rule's prescriptions. Minor deviations did occur, but overall, the alignment was much stronger compared to the 1970s and early 1980s. This era is marked by the Fed's success in maintaining price stability while also supporting economic growth.

However, the period following the 2008 financial crisis saw a significant deviation from the Taylor Rule. The actual Federal Funds Rate remained lower than the Taylor Rule rate for an extended period, reflecting the Federal Reserve's accommodative stance aimed at supporting economic recovery. This period of deviation indicates a shift in focus towards stimulating growth and employment, even if it meant allowing inflation to temporarily rise above target levels. The Fed's decision to maintain low rates can be seen as a response to the unique challenges posed by the global financial crisis, where traditional monetary policy rules like the Taylor Rule may not fully capture the complexities of the situation.

Pandemic and post-pandemic

In the post-COVID-19 period, the Taylor Rule suggests a more aggressive response to inflationary pressures. Indeed, the effective Federal Funds Rate lagged behind the Taylor Rule rate, indicating a potentially slower policy response. This could be attributed to the Federal Reserve's expectation that the inflationary pressures would be transitory, influenced by the nature of the economic shock and the subsequent recovery.

3.4.3 Counterfactual Scenario and Policy Implications

In previous sections, a four-variable Vector Autoregressive (VAR) model is used to identify shocks. The model incorporated the variables as the real GDP, core CPI, CPI Energy, and the Federal Funds Rate. This section reemploys this model to evaluate the impact of adhering to the Taylor Rule during key historical periods. For doing the counterfactual analysis, a new VAR model is set, adding the unemployment rate, reflecting its importance in the Federal Reserve's dual mandate. The counterfactual scenarios generated from this model allow us to assess the potential economic outcomes had the Federal Reserve followed the Taylor Rule more closely during the 1973 oil shock, the 1979 oil shock, and the 2020 COVID-19 pandemic.

Figure 3.9: Counterfactual Analysis using Taylor Rule

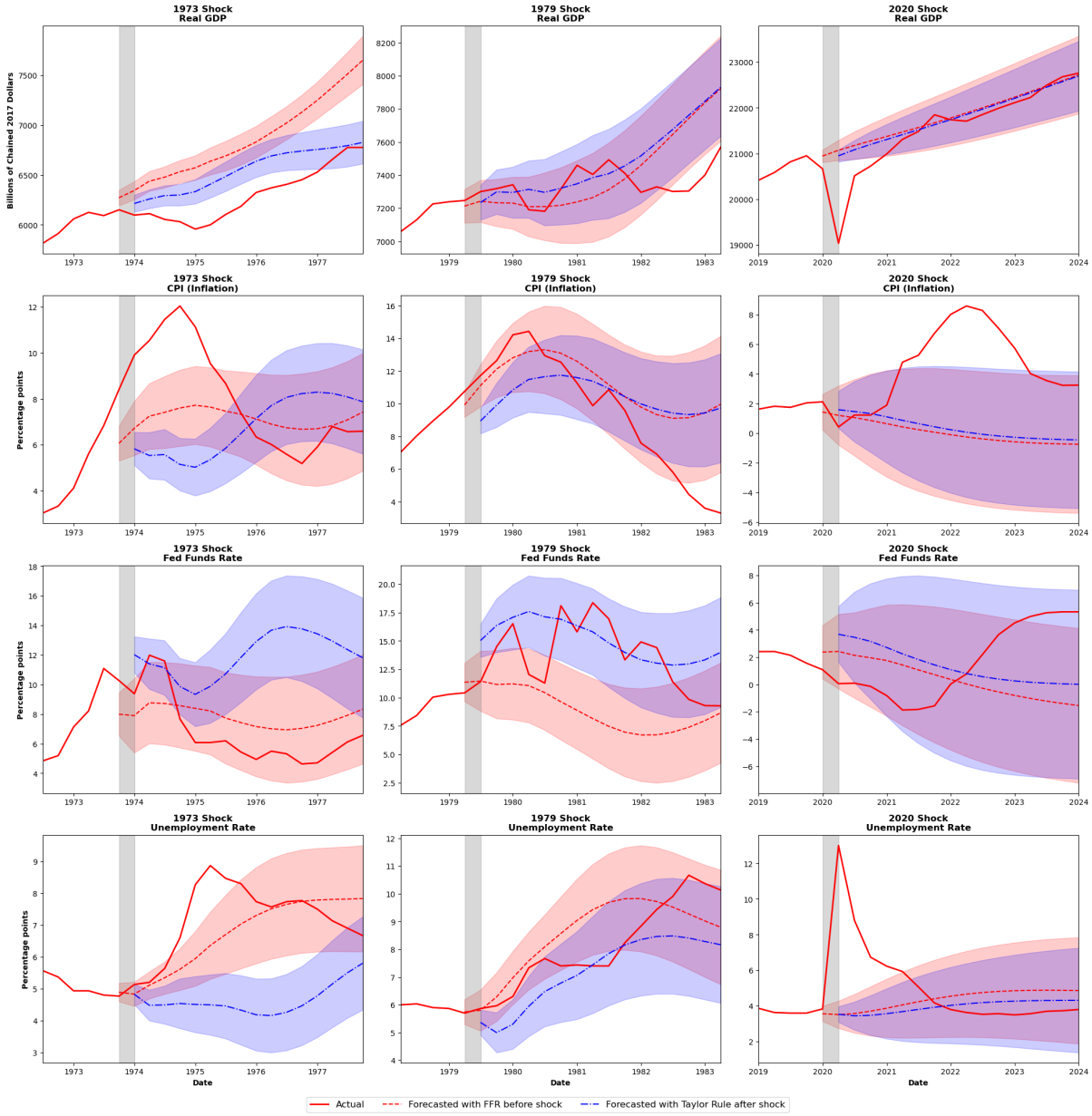


Figure 3.9 compares the actual economic outcomes with those forecasted under the Taylor Rule for the three major shocks. The analysis provides insights into the potential benefits and limitations of adhering to a systematic, rule-based approach to monetary policy.

1973 Oil Shock: The actual Federal Funds Rate during the 1973 oil shock exhibited considerable volatility, with a rapid increase followed by a sharp decrease, which did not effectively stabilize inflation. In contrast, the Taylor Rule, if applied consistently, would have prescribed a higher FFR initially, which could have mitigated the inflationary surge more effectively. The counterfactual scenario suggests that a higher FFR under the Taylor Rule would have led to a milder recession, with a quicker recovery in

real GDP. The Taylor Rule would have also moderated the inflation spike, leading to a more stable price level. Interestingly, both the actual unemployment rate and the counterfactual FFR forecast based on pre-shock data indicate a significant rise in unemployment. However, the Taylor Rule's more aggressive approach to inflation would likely have resulted in a less severe increase in unemployment, suggesting that Burns could have adopted a more aggressive stance to combat inflation during this period.

1979 Oil Shock: The 1979 oil shock presents a contrast to the 1973 scenario. The Taylor Rule and the actual FFR under Volcker's leadership were more aligned, reflecting a consistent policy approach. The Taylor Rule, however, would have prescribed a higher FFR earlier, which might have led to a slightly lower inflation rate than what was observed. While the difference in GDP outcomes would have been minimal, the Taylor Rule's faster response might have resulted in lower unemployment compared to the actual outcomes. This suggests that a more consistent adherence to the Taylor Rule during this period could have improved economic stability, particularly in managing inflation without significantly harming economic growth. The counterfactual shows that the Taylor rule is inspired by Volker's reaction to inflation, as explained in Chapter 2.

2020 COVID-19 Shock: The forecasted Taylor Rule during the COVID-19 crisis indicates that a higher FFR at the exit of the pandemic would have been appropriate, with a gradual reduction over time. According to the model, this early rate increase could have prevented the inflation surge observed a year later. The GDP forecast under the Taylor Rule suggests a faster return to pre-shock trends, with the forecasted GDP recovering more quickly than the actual GDP path around July 2021. Unemployment, which spiked sharply but recovered quickly, would have been unaffected by following the Taylor Rule, implying that the Fed's more cautious approach may have allowed inflation to rise without significantly impacting employment or economic growth in the post-shock context.

These counterfactual scenarios underscore the potential advantages of adhering to the Taylor Rule, particularly in providing more stable economic outcomes. The 1973 oil shock analysis advocated for a more aggressive response to inflation, which could have mitigated some of the economic instability of that period. The 1979 oil shock analysis reinforces the importance of consistency in monetary policy, while the 2020 COVID-19 scenario highlights the risks of delaying rate increases, which could allow inflation to surge unnecessarily.

The counterfactual analysis employing the Taylor Rule highlights the value of systematic, rule-based monetary policies and demonstrates how a more aggressive stance on inflation can contribute to economic stability. By comparing actual monetary policy responses with the prescriptions of the Taylor Rule, this chapter demonstrates how a rule-based approach could enhance policy effectiveness, particularly in stabilizing economic fluctuations. The analysis highlights the pivotal role of monetary policy in shaping economic outcomes and suggests that prompt, decisive responses to inflationary shocks can yield significant benefits.

Conclusion

This thesis has provided a comparative analysis of U.S. monetary policy during two critical periods: the 1970s, marked by oil shocks and stagflation, and the post-pandemic era, characterized by significant supply and demand disruptions. Through an empirical analysis using a Structural Vector Autoregressive (SVAR) model, and the application of the Taylor Rule as a benchmark, several key insights have been drawn.

The findings highlight the differences in the nature and impact of economic shocks during these two periods. The 1970s experienced persistent inflationary pressures due to oil shocks and economic policies that struggled to balance inflation with economic growth. In contrast, the post-COVID era presented a mix of supply-side disruptions and unprecedented monetary and fiscal responses aimed at stabilizing the economy. The comparative analysis of these shocks has underscored the varied effectiveness of the Federal Reserve's responses, depending on the nature of the shocks and the prevailing monetary policy frameworks.

The empirical analysis suggests that adhering to the Taylor Rule during these periods could have led to greater economic stability. While the Taylor Rule offers a structured framework, the complexities of real-world economies often necessitate discretionary policy adjustments. The counterfactual scenario presented in this thesis highlights the potential benefits of a rule-based approach while acknowledging the need for flexibility in policymaking.

While the Taylor Rule has proven to be a valuable tool for guiding monetary policy, it is essential to acknowledge the limitations and the need for flexibility in its application. The historical comparison between the 1970s and the post-pandemic era demonstrates the importance of learning from past experiences while recognizing the unique aspects of each economic environment.

This thesis opens several leads for future research. The comparative analysis conducted here could be extended to include other central banks, exploring how different monetary authorities respond to similar economic shocks and potential links between them. Such studies would provide a broader understanding of the effectiveness of various policy frameworks in diverse economic contexts.

Future research could also investigate the potential for enhancing the Taylor Rule or developing new rule-based frameworks that account for the complexities of the modern globalized economy. This includes factors such as global supply chains, technological advancements, and the increasing role of financial markets in shaping economic stability.

Finally, there is a potential for further exploration of the impact of forward guidance and other non-traditional monetary policy tools on economic outcomes during crises. As central banks increasingly rely on these tools, understanding their effectiveness and the conditions under which they are most beneficial will be critical for refining monetary policy strategies in the future.

Appendices

A.1 Theoretical Material

A.1.1 Structural VAR Model

The 4-variable VAR model is specified as:

$$\mathbf{y}_t = A_1\mathbf{y}_{t-1} + A_2\mathbf{y}_{t-2} + \cdots + A_p\mathbf{y}_{t-p} + \mathbf{u}_t$$

where:

- $\mathbf{y}_t$ is a 4×1 vector of endogenous variables (real GDP, core CPI, energy CPI, Federal Funds Rate).
- A_i are 4×4 coefficient matrices.
- $\mathbf{u}_t$ is a 4×1 vector of residuals, with covariance matrix Σ_u.

Residuals relate to structural shocks ϵ_t via:

$$\mathbf{u}_t = B\epsilon_t$$

where B is the 4×4 impact matrix.

A.1.2 Shock Identification Using Sign Restrictions

The model uses sign restrictions to identify structural shocks. The impulse response function (IRF) is given by:

$$\text{IRF}_h = C_h B$$

The sign restriction matrix S is as follows:

Responses to shocks:	Supply	Demand	Energy	Monetary
real GDP	$+$	$+$	$-$	na
core CPI	$-$	$+$	$+$	$+$
Energy Price	$+$	$+$	$+$	na
Interest Rate (Fed)	$-$	$+$	$+$	$+$

A.1.2.1 Theoretical Justification of the Sign Restriction Matrix

The sign restrictions imposed on the SVAR model are grounded in well-established economic theory. Below is the detailed theoretical justification for each entry in the sign restriction matrix:

Supply Shocks: Supply shocks, such as technological improvements or changes in production capacity, are expected to have the following impacts:

- **Real GDP (+):** A positive supply shock increases the productive capacity of the economy, leading to higher output and, consequently, an increase in real GDP.
- **Core CPI (-):** With increased production capacity, the cost of production generally decreases, leading to lower prices, hence a negative response in core CPI.
- **Energy Price (+):** Supply shocks can lead to an increase in energy demand for production purposes, driving up energy prices, especially in the short term.
- **Interest Rate (Fed) (-):** Central banks might lower interest rates in response to a positive supply shock to accommodate increased production without risking inflation.

Demand Shocks: Demand shocks arise from factors like changes in consumer confidence, fiscal policy, or global demand:

- **Real GDP (+):** A positive demand shock increases aggregate demand, leading to higher production and, thus, higher real GDP.
- **Core CPI (+):** Increased demand typically exerts upward pressure on prices, leading to an increase in core CPI.
- **Energy Price (+):** Higher demand for goods and services often includes increased demand for energy, pushing up energy prices.
- **Interest Rate (Fed) (+):** In response to rising demand and potential inflation, the central bank may raise interest rates to curb inflationary pressures.

Energy Shocks: Energy shocks are primarily driven by changes in energy supply, such as oil price fluctuations:

- **Real GDP (-):** An increase in energy prices typically raises production costs, which can reduce economic output, leading to a decrease in real GDP.
- **Core CPI (+):** Higher energy costs often lead to higher overall production costs, which can increase consumer prices, leading to a positive response in core CPI.
- **Energy Price (+):** By definition, energy shocks directly increase energy prices.
- **Interest Rate (Fed) (+):** Central banks may raise interest rates in response to rising inflation caused by higher energy prices to stabilize the economy.

Monetary Shocks: Monetary shocks are primarily changes in monetary policy, such as adjustments in interest rates:

- **Real GDP (na):** The immediate impact of a monetary shock on real GDP is ambiguous and may depend on various factors, including the state of the economy.
- **Core CPI (+):** A monetary expansion (lower interest rates) can increase inflationary pressures, leading to a rise in core CPI.

- **Energy Price (na):** The direct impact of monetary policy on energy prices is unclear, as it may depend on the transmission mechanism and other factors.
- **Interest Rate (Fed) (+):** A monetary shock directly impacts the interest rate, with expansionary policy leading to lower rates and contractionary policy leading to higher rates.

A.1.2.2 Estimation Procedure Summary

1. **Estimate VAR** to obtain A_i and Σ_u.
2. **Decompose** Σ_u using Cholesky or spectral decomposition to get initial B.
3. **Generate candidate** B^* matrices via rotations.
4. **Check sign restrictions** on IRFs; retain valid matrices.
5. **Inference** based on retained matrices.

A.2 Tables

A.2.1 VAR Order Selection

	AIC	BIC	FPE	HQIC
0	-6.449	-6.391	0.001583	-6.425
1	-27.25	-26.97	1.458e-12	-27.14
2	**-27.77***	**-27.25***	**8.691e-13***	**-27.56***

(* highlights the minimums)

Optimal lag length based on AIC: 2
Optimal lag length based on BIC: 2
Optimal lag length based on HQIC: 2

Table 1: Lag Order Selection

A.2.2 VAR Model Summary

Metric	Value	Interpretation
Akaike Information Criterion (AIC)	-27.7715	Reflects an optimal balance between model complexity and fit, suggesting a well-specified model.
Bayesian Information Criterion (BIC)	-27.2525	Supports the model's parsimony while ensuring an adequate fit to the data.
Hannan-Quinn Information Criterion (HQIC)	-27.5624	Indicates robustness in model specification, balancing model simplicity with data representation.
Log Likelihood	2022.82	High value indicates strong conformity of the model to the observed data.
Significant Coefficients	Yes	Statistically significant coefficients for essential variables demonstrate effective capture of underlying time series dynamics.
Residual Correlation	Low (0.478851 max)	Low residual correlations suggest that the model effectively explains the interdependencies between variables, with minimal unexplained variance.

Table 2: Diagnostic Metrics for VAR Model Evaluation

A.2.3 Estimation and Diagnostics

The SVAR model is estimated using the following steps:

1.	Estimation of the Reduced Form VAR:	We first estimate the reduced form VAR model by regressing each endogenous variable on its lagged values.
2.	Identification of Structural Shocks	Using the identification matrix A, we transform the reduced form residuals $\mathbf{u}_t$ into structural shocks $\mathbf{e}_t$
3.	Diagnostic Tests:	We perform diagnostic tests to ensure the adequacy of the model, including: - **Stability Tests:** Assess whether the SVAR model is dynamically stable. - **Ljung-Box Test:** Checks for autocorrelation in the residuals. - **Granger Causality Test:** Evaluates the causal relationships between the variables.

Table 3: Procedure

These steps ensure that the SVAR model is well-specified and that the identified structural shocks are valid for subsequent analysis.

A.2.4 Detailed Regression Results

Table 4: Detailed Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Results for equation logReal_GDP				
const	-0.002273	0.024541	-0.093	0.926
L1.logReal_GDP	4.009525	3.840064	1.044	0.296
L1.logCPI_less	-11.553729	8.121673	-1.423	0.155
L1.logCPI_En	-5.689873	6.513751	-0.874	0.382
L1.Real_FED	5.388289	6.547978	0.823	0.411
L2.logReal_GDP	7.640479	3.657494	2.089	0.037
L2.logCPI_less	19.183305	7.978090	2.404	0.016
L2.logCPI_En	18.455893	6.453113	2.860	0.004
L2.Real_FED	-18.965970	6.472446	-2.930	0.003
L3.logReal_GDP	-3.986654	3.726569	-1.070	0.285
L3.logCPI_less	16.647166	8.195019	2.031	0.042
L3.logCPI_En	7.917840	6.548707	1.209	0.227
L3.Real_FED	-8.089713	6.569423	-1.231	0.218
Results for equation logCPI_less				
const	-0.002036	0.021474	-0.095	0.924
L1.logReal_GDP	3.520049	3.360082	1.048	0.295
L1.logCPI_less	-10.503280	7.106519	-1.478	0.139
L1.logCPI_En	-5.257214	5.699577	-0.922	0.356
L1.Real_FED	4.989512	5.729526	0.871	0.384
L2.logReal_GDP	6.408494	3.200332	2.002	0.045
L2.logCPI_less	17.239890	6.980883	2.470	0.014
L2.logCPI_En	16.248437	5.646518	2.878	0.004
L2.Real_FED	-16.693328	5.663435	-2.948	0.003
L3.logReal_GDP	-3.464295	3.260773	-1.062	0.288
L3.logCPI_less	14.887785	7.170698	2.076	0.038
L3.logCPI_En	7.198549	5.730164	1.256	0.209
L3.Real_FED	-7.338377	5.748290	-1.277	0.202
Results for equation logCPI_En				
const	-0.004453	0.046171	-0.096	0.923
L1.logReal_GDP	7.678025	7.224469	1.063	0.288
L1.logCPI_less	-22.482889	15.279636	-1.471	0.141
L1.logCPI_En	-11.035493	12.254587	-0.901	0.368
L1.Real_FED	10.504215	12.318980	0.853	0.394
L2.logReal_GDP	13.897578	6.880993	2.020	0.043
L2.logCPI_less	36.419214	15.009508	2.426	0.015
L2.logCPI_En	34.214273	12.140506	2.818	0.005

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Table 4: Table Continued)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
L2.Real_FED	-35.314016	12.176878	-2.900	0.004
L3.logReal_GDP	-8.124610	7.010946	-1.159	0.247
L3.logCPI_less	31.035190	15.417625	2.013	0.044
L3.logCPI_En	14.351171	12.320351	1.165	0.244
L3.Real_FED	-14.611041	12.359324	-1.182	0.237
Results for equation Real_FED				
const	-0.007375	0.076691	-0.096	0.923
L1.logReal_GDP	12.622410	12.000110	1.052	0.293
L1.logCPI_less	-37.290861	25.380040	-1.469	0.142
L1.logCPI_En	-18.463751	20.355321	-0.907	0.364
L1.Real_FED	17.554273	20.462280	0.858	0.391
L2.logReal_GDP	23.178662	11.429584	2.028	0.043
L2.logCPI_less	60.778032	24.931347	2.438	0.015
L2.logCPI_En	57.320802	20.165829	2.842	0.004
L2.Real_FED	-59.062281	20.226244	-2.920	0.003
L3.logReal_GDP	-13.127780	11.645441	-1.127	0.260
L3.logCPI_less	51.873427	25.609245	2.026	0.043
L3.logCPI_En	24.299978	20.464558	1.187	0.235
L3.Real_FED	-24.756266	20.529293	-1.206	0.228

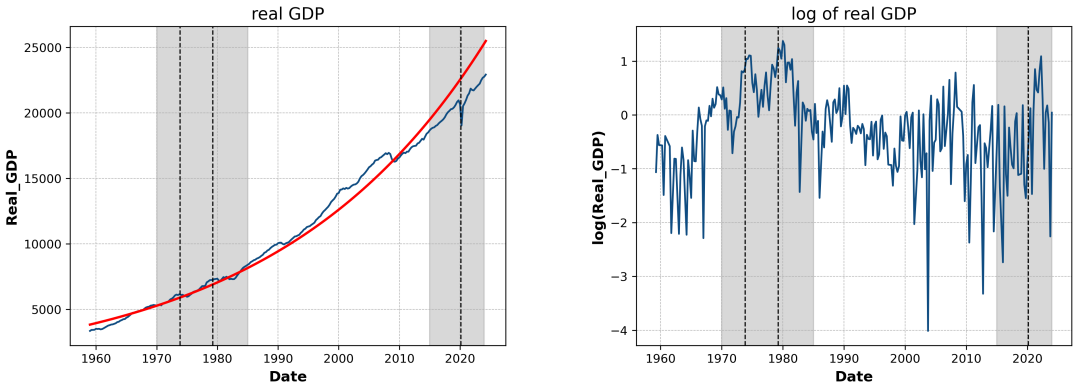
A.2.5 Sign Restriction Matrix with Dummies

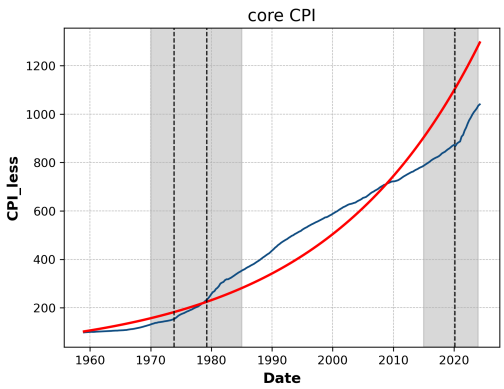
	real GDP	core CPI	CPI Energy	FED	1973	1979	2020
Supply Shock	1	-1	1	-1	0	0	0
Demand Shock	1	1	1	1	0	0	0
Energy Shock	-1	1	1	1	0	0	0
Monetary Shock	0	1	0	1	0	0	0
Shock 1973	-1	1	1	1	1	0	0
Shock 1979	1	1	1	1	0	1	0
Shock 2020	-1	0	0	-1	0	0	1

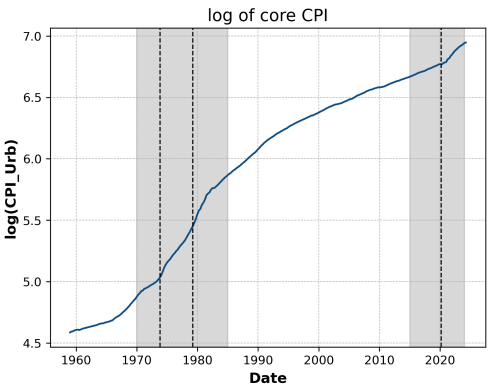
Table 5: Sign Restriction Matrix with Dummies

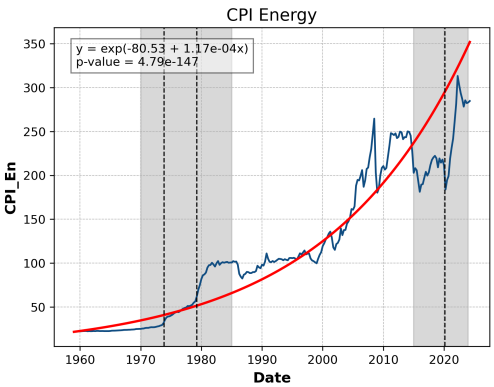
A.3 Figures

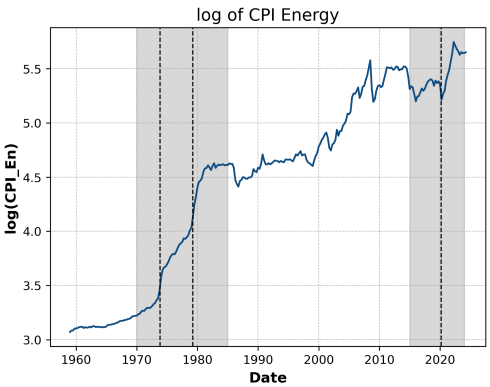
A.3.1 VAR Variables and their Transformation

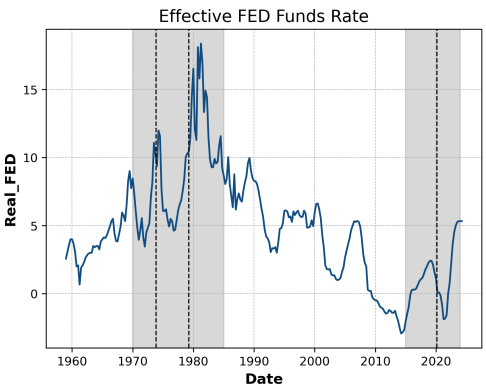


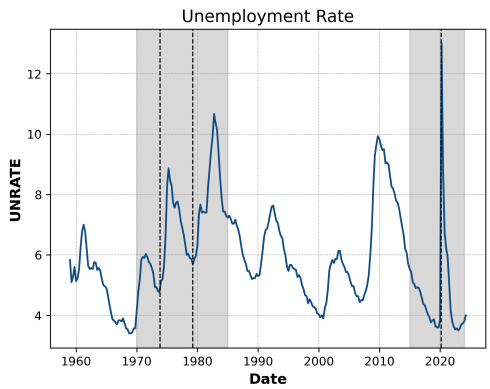




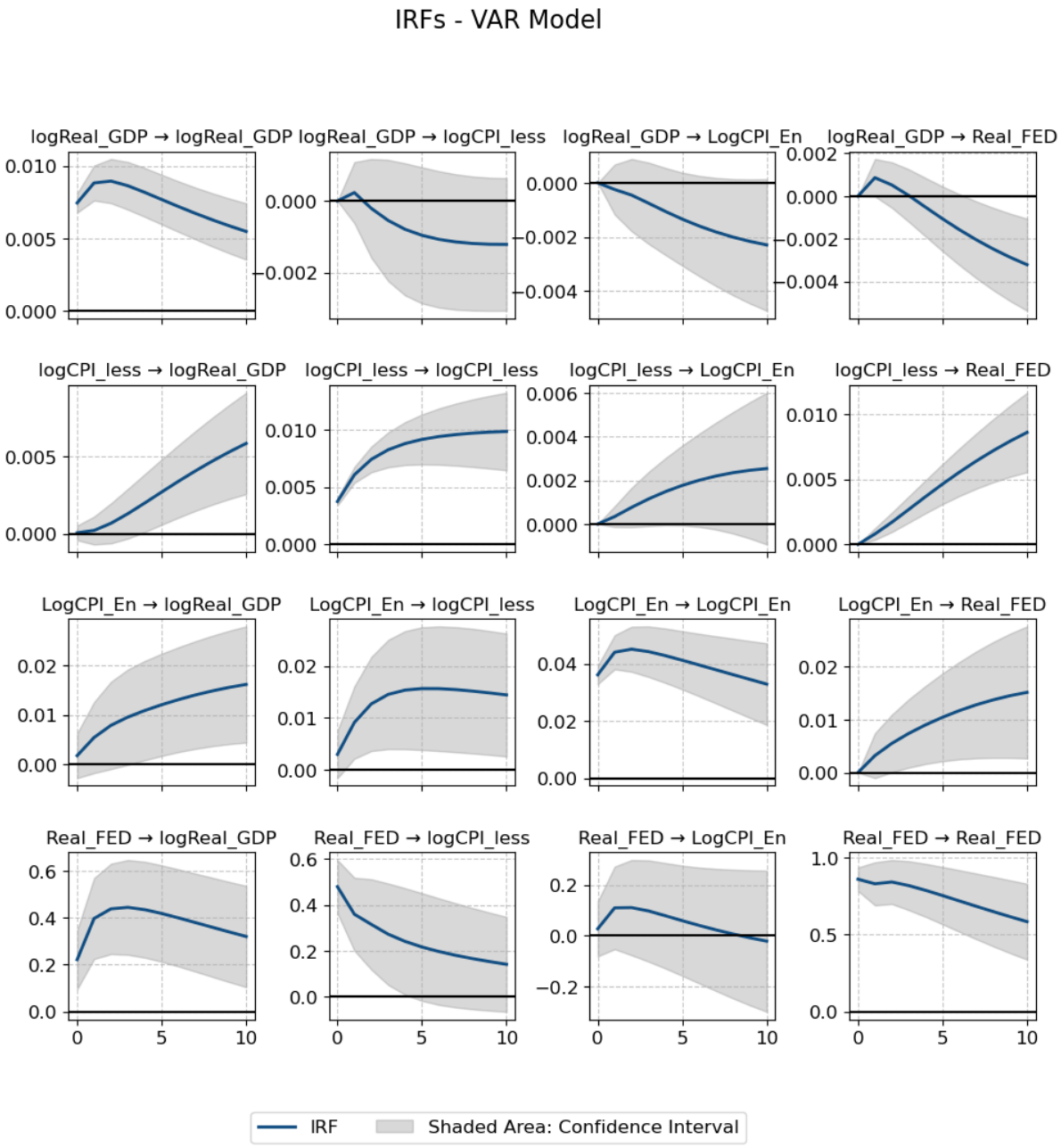






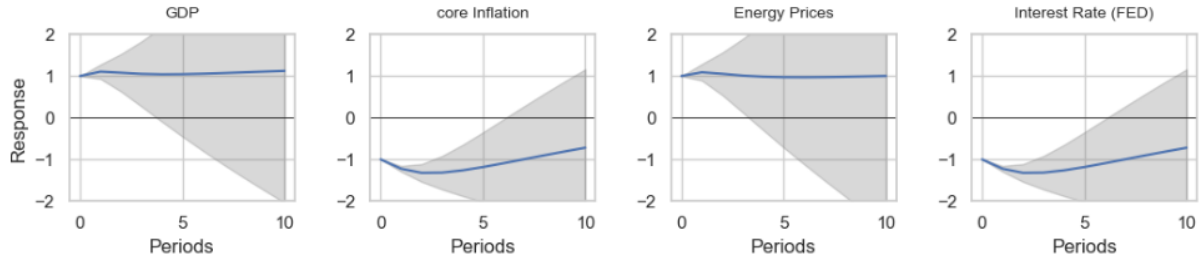


A.3.2 IRF of VAR Model

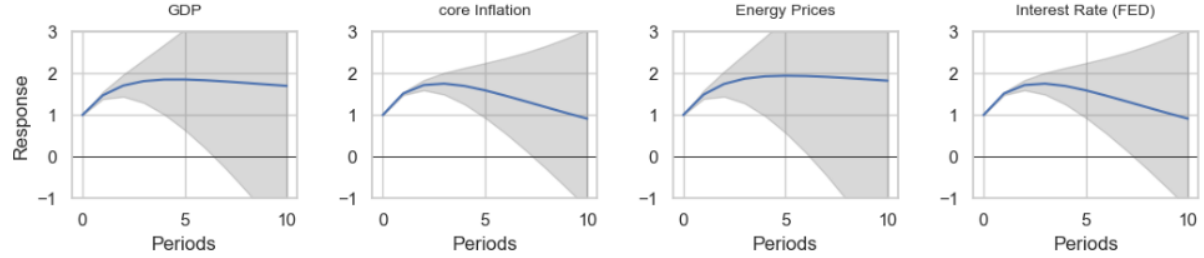


A.3.3 IRF of VAR Model with Sign Restrictions

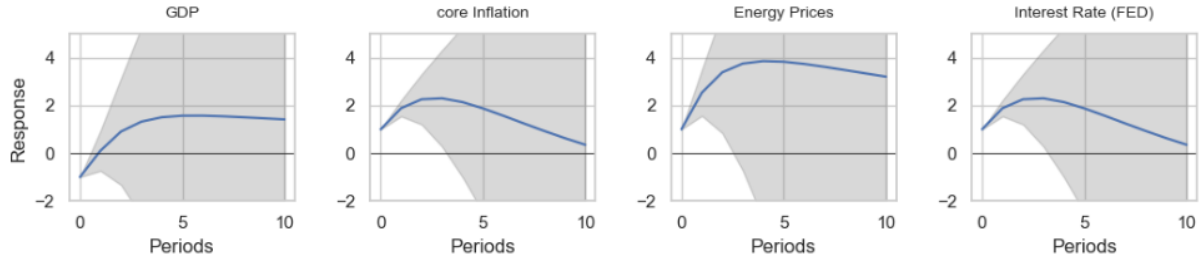
Supply Shock



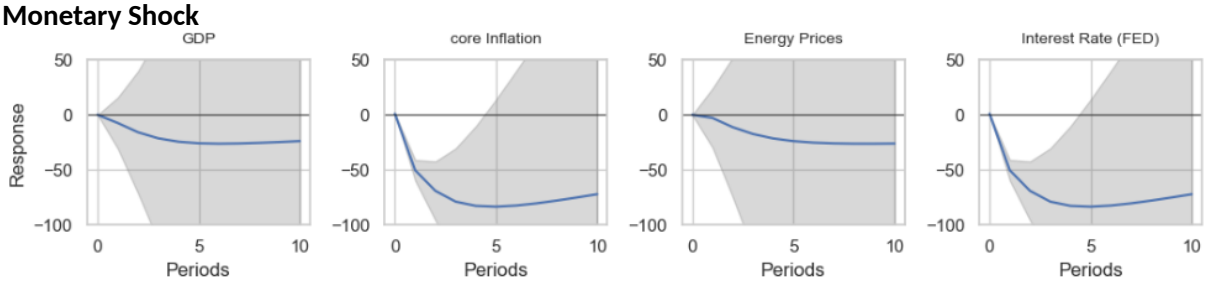
Demand Shock



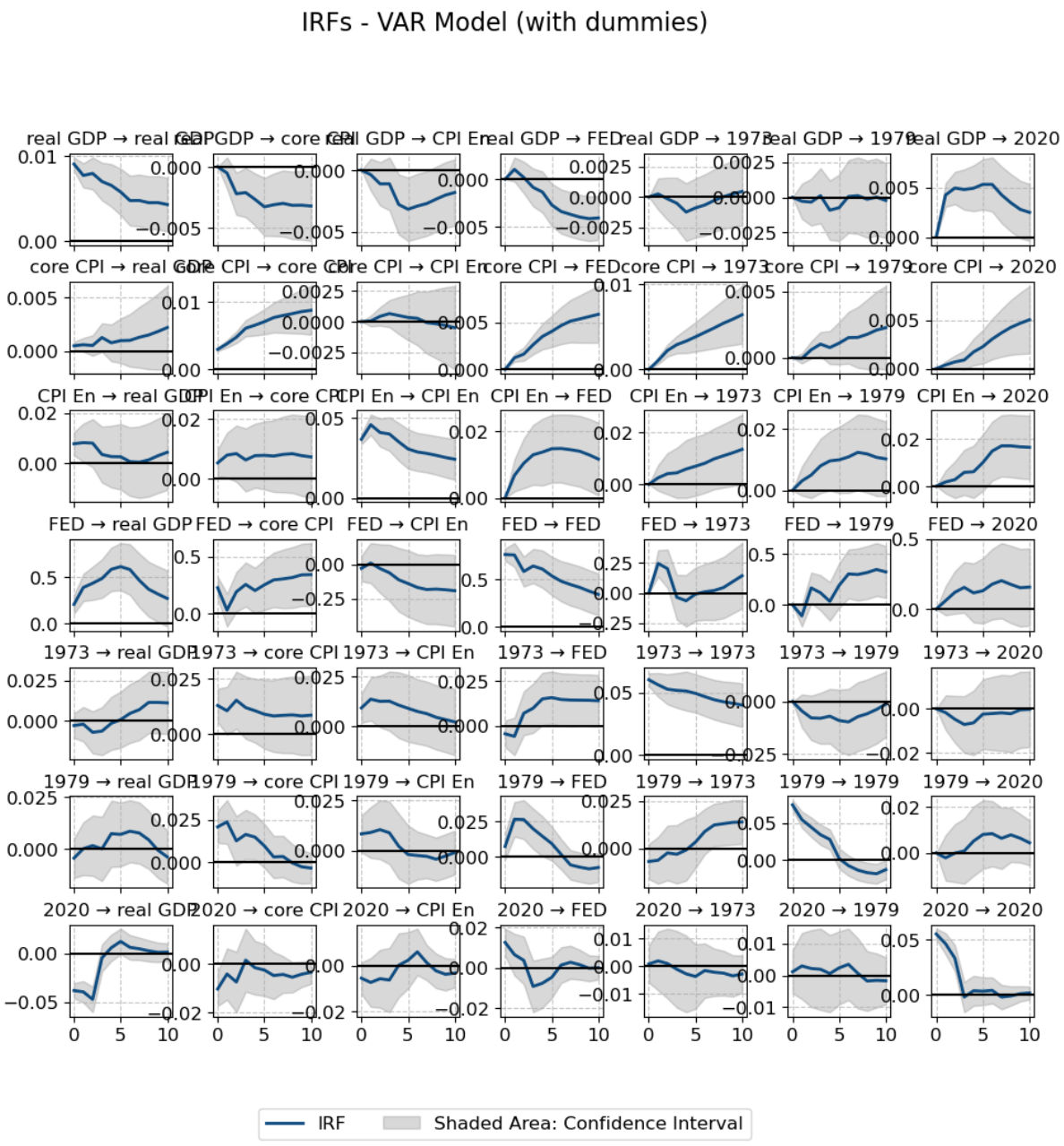
Energy Shock



Monetary Shock



A.3.4 IRF of VAR Model with dummies



Bibliography

Abrams, R. K., Froyen, R., & Waud, R. N. (1980). Monetary Policy Reaction Functions, Consistent Expectations, and The Burns Era. *Journal of Money, Credit and Banking*, 12(1), 30. https://doi.org/10.2307/1991591

Asso, P. F., Kahn, G., & Leeson, R. (2007). The taylor rule and the transformation of monetary policy (tech. rep.). Federal Reserve Bank of Kansas City.

Ball, L., Leigh, D., & Mishra, P. (2022). Understanding U.S. Inflation During the COVID Era (tech. rep. No. w30613). National Bureau of Economic Research. Cambridge, MA. https://doi.org/10.3386/w30613

Barro, R. J. (1977). Unanticipated Money Growth and Unemployment in the United States. *The American Economic Review*, 67(2), 101–115. https://www.jstor.org/stable/1807224

Benigno, P., & Eggertsson, G. B. (2023). It's baaack: The surge in inflation in the 2020s and the return of the non-linear phillips curve (tech. rep.). National Bureau of Economic Research.

Bergholt, D., Canova, F., Furlanetto, F., Maffei-Faccioli, N., & Ulvedal, P. (2024). What drives the recent surge in inflation? The historical decomposition roller coaster. *Working Paper*, (7 | 2024). https://www.norges-bank.no/contentassets/b32c79a497624e3ea35bf9f52cdbef56/wp-2024-07.pdf?v=10042024101314

Bernanke, B. S. (2015). The taylor rule: A benchmark for monetary policy? (Tech. rep.). Brookings Institution.

Bernanke, B. (2013). The Federal Reserve and the financial crisis: Lectures (1., paperback print). Princeton Univ. Press.

Blanchard, O., & Bernanke, B. (2023). What Caused the US Pandemic-Era Inflation? (Tech. rep. No. w31417). National Bureau of Economic Research. Cambridge, MA. https://doi.org/10.3386/w31417

Blanchard, O., & Quah, D. (1988). The Dynamic Effects of Aggregate Demand and Supply Disturbances (tech. rep. No. w2737). National Bureau of Economic Research. Cambridge, MA. https://doi.org/10.3386/w2737

Blanchard, O., & Riggi, M. (2013). Why are the 2000s so Different from the 1970s? a Structural Interpretation of Changes in the Macroeconomic Effects of Oil Prices. *Journal of the European Economic Association*, 11(5), 1032–1052. https://doi.org/10.1111/jeea.12029

Blanchard, Olivier and Gali, Jordi. (2007). The macroeconomic effects of oil shocks: Why are the 2000s so different from the 1970s? (Working Paper No. 13368). National Bureau of Economic Research. https://doi.org/10.3386/w13368

Blinder, A. S. (1981). Economic policy and the great stagflation (Student ed). Academic Press. Includes index.

Blinder, A. S. (1999). Central banking in theory and practice (1. MIT Press paperback ed). MIT Press. Literaturverz. S. [83] - 87.

Boivin, J., & Giannoni, M. P. (2006). Has Monetary Policy Become More Effective? *Review of Economics and Statistics*, 88(3), 445–462. https://doi.org/10.1162/rest.88.3.445

Bullard, J., Alex, G., Salle, I., & Vermandel, G. (2024). Soft Landing and Inflation Scares.

Carlstrom, C. T., & Fuerst, T. S. (2003). The taylor rule: A guidepost for monetary policy? (Tech. rep.). Federal Reserve Bank of Cleveland.

Federal Open Market Committee. (2020a, April). Minutes of the federal open market committee meeting held on april 28-29, 2020.

Federal Open Market Committee. (2020b, December). Minutes of the federal open market committee meeting held on december 16, 2020.

Federal Open Market Committee. (2020c, June). Minutes of the federal open market committee meeting held on june 10, 2020.

Federal Open Market Committee. (2020d, March). Minutes of the federal open market committee meeting held on march 15, 2020.

Federal Open Market Committee. (2020e, March). Minutes of the federal open market committee meeting held on march 3, 2020.

Federal Open Market Committee. (2021a, December). Minutes of the federal open market committee meeting held on december 14-15, 2021.

Federal Open Market Committee. (2021b, July). Minutes of the federal open market committee meeting held on july 28, 2021.

Federal Open Market Committee. (2021c, June). Minutes of the federal open market committee meeting held on june 15-16, 2021.

Federal Open Market Committee. (2021d, March). Minutes of the federal open market committee meeting held on march 17, 2021.

Federal Open Market Committee. (2024a, April). Minutes of the federal open market committee meeting held on april 28, 2024.

Federal Open Market Committee. (2024b, January). Minutes of the federal open market committee meeting held on january 31, 2024.

Federal Open Market Committee. (2024c, June). Minutes of the federal open market committee meeting held on june 12, 2024.

Federal Open Market Committee. (2024d, March). Minutes of the federal open market committee meeting held on march 20, 2024.

Firat, M., & Hao, O. (2023). Demand vs. Supply Decomposition of Inflation: Cross-Country Evidence with Applications. *IMF Working Paper*, (No. 2023/205). https://www.imf.org/en/Publications/WP/Issues/2023/09/28/Demand-vs-539665

Friedman, M. (1968). The Role of Monetary Policy. In S. Estrin & A. Marin (Eds.), Essential Readings in Economics (pp. 215–231). Macmillan Education UK. https://doi.org/10.1007/978-1-349-24002-9_11

Friedman, M., & Schwartz, A. J. (1963). A monetary history of the United States 1867-1960 (9th pbk. printing, 22nd printing). Princeton University Press.

Gagliardone, L., & Gertler, M. (2023). Oil Prices, Monetary Policy and Inflation Surges (tech. rep. No. w31263). National Bureau of Economic Research. Cambridge, MA. https://doi.org/10.3386/w31263

Galí, J. (2008). Monetary policy, inflation, and the business cycle: An introduction to the new Keynesian framework [OCLC: ocn177826088]. Princeton University Press.

Gómez-Loscos, A., Gadea, M. D., & Montañés, A. (2012). Economic growth, inflation and oil shocks: Are the 1970s coming back? *Applied Economics*, 44(35), 4575–4589. https://doi.org/10.1080/00036846.2011.591741

Goodfriend, M., & King, R. G. (2005). The incredible Volcker disinflation. *Journal of Monetary Economics*, 52(5), 981–1015. https://doi.org/10.1016/j.jmoneco.2005.07.001

Hetzel, R. L. (2008). The monetary policy of the federal reserve: A history. Cambridge university press.

Kydland, F. E., & Prescott, E. C. (1977). Rules Rather than Discretion: The Inconsistency of Optimal Plans. *Journal of Political Economy*, 85(3), 473–491. https://doi.org/10.1086/260580

Lopez, D. A. (2012). The great inflation: A historical overview and lessons learned. *Page One Economics*. https://research.stlouisfed.org/publications/page1-econ/2012/10/01/the-great-inflation-a-historical-overview-and-lessons-learned/

Lorenzoni, G., & Werning, I. (2023). Wage-price spirals [© 2023 The Brookings Institution]. *Brookings Papers on Economic Activity*. https://www.brookings.edu/wp-content/uploads/2023/09/5_Lorenzoni-Werning_unembargoed.pdf

Lucas, R. E., & Sargent, T. J. (Eds.). (1981). Rational expectations and econometric practice. Volume 2 [OCLC: 526697158]. University of Minnesota Press.

Mayer, T. (1998). Monetary policy and the great inflation in the United States: The Federal reserve and the failure of macroeconomic policy, 1965-79. E. Elgar.

McCallum, B. (1985). On Consequences and Criticisms of Monetary Targeting (tech. rep. No. w1596). National Bureau of Economic Research. Cambridge, MA. https://doi.org/10.3386/w1596

Meltzer, A. H. (2014a). A history of the Federal Reserve. vol. 2, book : 1970 - 1986 (Paperback ed). Univ. of Chicago Press.

Meltzer, A. H. (2014b). A history of the Federal Reserve. vol. 2, book 1: 1951 - 1969 (Paperback ed). Univ. of Chicago Press.

Nelson, E. (2004). The Great Inflation of the Seventies: What Really Happened? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.762602

Phillips, A. (1958). The relation between unemployment and the rate of change of money wage rates in the united kingdom, 1861-1957. *economica*, 25(100), 283–299.

Pierce, J. L. (1979). The Political Economy of Arthur Burns. *The Journal of Finance*, 34(2), 485–496. https://doi.org/10.1111/j.1540-6261.1979.tb02112.x

Primiceri, G., & Giannone, D. (2024). The drivers of post-pandemic inflation. https://www.ecb.europa.eu/pub/pdf/sintra/ecb.forumcentbankpub2024_Primiceri_paper.en.pdf

Romer, C., & Romer, D. (2002). The Evolution of Economic Understanding and Postwar Stabilization Policy (tech. rep. No. w9274). National Bureau of Economic Research. Cambridge, MA. https://doi.org/10.3386/w9274

Samuelson, R. J. (2010). The great inflation and its aftermath: The past and future of American affluence (Rev. ed). Random House.
”Revised and updated, with a new introduction by the author” – Cover.

Sargent, T. J. (1981). Stopping Moderate Inflations: The Methods of Poincaré and Thatcher. https://doi.org/10.23943/princeton/9780691158709.003.0004

Sims, C. (1980). Macroeconomics and reality. *Econometrica*, 48(1), 1–48. https://doi.org/10.2307/1912017

Taylor, J. B. (1993). Discretion versus policy rules in practice. *Carnegie-Rochester Conference Series on Public Policy*, 39, 195–214. https://doi.org/10.1016/0167-2231(93)90009-L

Taylor, J. B. (Ed.). (2001). Monetary policy rules [Meeting Name: National Bureau of Economic Research Conference on Research in Business Cycles]. University of Chicago Press.
Papers based on the National Bureau of Economic Research Conference on Research in Business Cycles, held at Stanford University, 1998.

Taylor, J. B. (2013). Monetary policy during the past 30 years with lessons for the next 30 years [Place: Washington Publisher: Cato Institute]. *The Cato journal*, 33(3), 333–345.

Thomas A. Lubik, Christian Matthes, & Timothy Sablik. (2016). The Burns Disinflation of 1974 [Publisher: Federal Reserve Bank of Richmond]. *Richmond Fed Economic Brief*, (November). https://ideas.repec.org/a/fip/fedreb/00046.html

Tobin, J. (1978). A Proposal for International Monetary Reform [Publisher: Palgrave Macmillan Journals]. *Eastern Economic Journal*, 4(3/4), 153–159. Retrieved December 18, 2023, from http://www.jstor.org/stable/20642317

Tobin, J., Phelps, E. S., Poole, W., Feldstein, M., Houthakker, H., Modigliani, F., Hendershott, P., Friedman, B., Perry, G., Duesenberry, J., Fellner, W., Gordon, R., Branson, W., Baily, M., & Nordhaus, W. (1980). Stabilization Policy Ten Years After. *Brookings Papers on Economic Activity*, 1980(1), 19. https://doi.org/10.2307/2534285

Wood, J. H. (2005). A history of central banking in Great Britain and the United States [OCLC: ocm56880156]. Cambridge University Press.

Woodford, M. (2001). The Taylor Rule and Optimal Monetary Policy. *American Economic Review*, 91(2), 232–237. https://doi.org/10.1257/aer.91.2.232

Wu, J. C., & Xia, F. D. (2016). Measuring the macroeconomic impact of monetary policy at the zero lower bound. *Journal of Money, Credit and Banking*, 48(2-3), 253–291. https://doi.org/10.1111/jmcb.12200

Executive Summary

This thesis[1] investigates the evolution of the Federal Reserve's monetary policy in response to supply shocks by comparing the experiences of the 1970s and the post-pandemic era. Both periods have witnessed significant economic disruptions and inflationary pressures, leading to frequent comparisons between them. While much has been documented about the 1970s, the post-pandemic period remains a subject of ongoing analysis. This research aims to provide a direct comparison of the Federal Reserve's responses in these two critical periods, offering insights into how historical lessons have been applied or adapted in recent times.

The study is guided by two primary objectives: first, to conduct a historical analysis of the Federal Reserve's monetary policy during the 1970s and post-COVID-19 era, focusing on the economic conditions, external shocks, and policy decisions that characterized each period. Second, it seeks to empirically evaluate the extent to which the Federal Reserve's actual policies in these periods diverged from the Taylor Rule. To achieve these objectives, a Structural Vector Autoregressive (SVAR) model is employed, enabling the identification and analysis of the impact of various economic shocks on key macroeconomic variables during the two periods. This approach allows for the exploration of counterfactual scenarios, particularly regarding how strict adherence to the Taylor Rule would have influenced economic outcomes.

The findings reveal notable differences between the 1970s and the post-pandemic era in terms of economic structure, policy frameworks, and the nature of supply shocks. The 1970s were dominated by oil shocks in a manufacturing-heavy economy, whereas the post-pandemic era has been shaped by a combination of pandemic-induced supply and demand shocks in a more service-oriented economy. The empirical analysis shows that the Federal Reserve's policies during both periods frequently diverged from the Taylor Rule. In the 1970s, this divergence contributed to prolonged inflation, while in the post-COVID-19 era, the Fed's approach has reflected a more nuanced application of rule-based policies, informed by past experiences but adjusted to contemporary challenges.

The counterfactual analysis suggests that stricter adherence to the Taylor Rule during the 1970s could have mitigated inflationary pressures, albeit at the cost of higher unemployment. Conversely, in the post-pandemic era, a closer alignment with the Taylor Rule might have led to earlier tightening of monetary policy, potentially avoiding some of the inflationary pressures observed. These results underscore the importance of rule-based monetary policies, particularly in periods of economic instability. The research highlights the evolution of central banking practices and the potential benefits of systematic policy rules, while also recognizing the need for flexibility in the face of unprecedented challenges.

In conclusion, this thesis contributes to the broader understanding of the Federal Reserve's monetary policy by providing a detailed comparison of two significant periods of economic disruption. The findings carry significant implications for policymakers, suggesting that while historical lessons are valuable, they must be adapted to the specific circumstances of each economic context to effectively guide monetary policy decisions.

[1]This research thesis comprises 16.859 words.