THE STATE OF THE MACROECONOMY

A MONETARY POLICY REPORT

The State of the Macroeconomy: A Monetary Policy Report

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Unconventional Monetary Policy

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Federal Reserve Balance Sheet

Ryan Marrione

Dear Reader,

We are pleased to share with you the second volume of The State of the Macroeconomy: A Monetary Policy Report. This extensive analysis is the culmination of my 8-person analyst team's deep dive into the world of the Federal Reserve.

This research opportunity is a stepping stone for selecting competitors for our 2023 Federal Reserve College Challenge Team. These eight analysts accepted this test and dove into research on their specific interests and honed in on deep specialization in the study of macroeconomics. Through their specialized topics, the analysts engaged in new forms of quantitative analysis and focused understanding, but when pieced together it created a complete picture of the macroeconomy.

Even though this is only the second year of this research program, it is flourishing in talent by the students involved and the dedication of each analyst. After a semester of work, we are proud to share this comprehensive report in the hopes of aiding others in understanding the world of the Federal Reserve and the role of this institution in the macroeconomy.

While this paper focuses on a current analysis of macroeconomic conditions and establishing the short-run future of the macroeconomy, we specifically tailored research to be of reactions to monetary policy and potential solutions similar to that of a Federal Reserve Report. It has provided excellent preparation for the 2023 National College Federal Reserve Challenge where our analyst team will be representing The George Washington University and hoping to win in the Richmond Federal Reserve region.

Please enjoy all of the hard work and fantastic analysis in the Quarter II, Fiscal Year 2023 edition of The State of the Macroeconomy: A Monetary Policy Report by Federal Reserve Research Analysts at the Undergraduate Economics Society!

Baker Sanders
Federal Reserve Program Chair

INTRODUCTION

The focus of the American economy has shifted to curbing high levels of inflation caused by adjustments to post-pandemic challenges, including supply chain issues, increased consumer spending, and changes in inflation expectations. The stronger economy has led to steady decreases in unemployment since June 2021 in most sectors. However, the repercussions of over-hiring during the pandemic within the technology sector have been revealed in gradual rounds of layoffs beginning in January 2023, causing unemployment rates to rise in cities like San Francisco, where the industry is concentrated. Furthermore, extraneous shocks such as the war in Ukraine and a looming crisis over the debt ceiling have introduced further uncertainty to the economy. While these indicators, along with an inverted yield curve and the recent series of global bank failures, may point to a recession, the Federal Reserve remains focused on inflation.

Although the Fed's dual mandate is to achieve maximum employment and a steady rate of inflation around 2%, its responsibility to maintain financial stability has emerged as another priority as the possibility of contagion following the Silicon Valley Bank failure arose. In keeping with the aforementioned priorities, the team has decided to recommend a Federal Funds Rate (FFR) increase of 25 basis points by the end of 2023, with a 25-basis point increase in June and maintaining the federal funds rate at a terminal rate of 5.25-5.5%.

This report will provide a detailed analysis of the current situation in the US economy with GDP, inflation, unemployment, supply chains, the FFR, real estate and the housing market, unconventional monetary policy, and quantitative easing/tightening and the assets market. Each section will define key terms, offer forecasts for future macroeconomic conditions, and make more specific policy recommendations for each sector.

GROSS DOMESTIC PRODUCT

Introduction

The Gross Domestic Product is a measure used to indicate a country's economic well being. It categorizes all domestically produced final goods and spending into four main components: consumption, investment, and government spending as well as the current account, which is the net exports of that country. The final estimate of a previous quarter's GDP is typically available 3 months after the quarter ends. GDP is an important indicator used in both public and private industries, with this section focusing on how government agencies and the Federal reserve use and interact with this indicator, and how the components of GDP will change in the coming years.

Components of the United States Gross Domestic Product

As previously stated, the 4 components of GDP are consumption spending, investment spending, government spending, and net exports. The final estimate of GDP from the Federal Reserve for 2022 measured that real GDP (adjusted for inflation) increased by 2.1 percent over the course of the year.[1] Consumption spending increased by 2.8 percent, investment spending increased by 3.6 percent, government spending decreased by 0.6 percent, and the current account deficit grew by 1,355 billion.[2] The 2.1 percent increase seen in 2022 is a stark contrast to the 5.9 percent increase in 2021. The slower growth in 2022 is not a surprise, 2021 was the year following the peak of the COVID-19 pandemic, and due to this the U.S. economy experienced a large bounce back in 2021 of economic activity, specifically in consumption spending. This

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[1] Felix Richter, "Infographic: The Components of GDP," Statista Infographics (Statista, June 28, 2019), https://www.statista.com/chart/18550/gdp-components/.

[2] Bureau of Economic Analysis, "Gross Domestic Product, Fourth Quarter and Year 2022 (Third Estimate), GDP by Industry, and Corporate Profits | U.S. Bureau of Economic Analysis (BEA)," www.bea.gov, March 30, 2023, https://www.bea.gov/news/2023/gross-domestic-product-fourth-quarter and-year-2022-third-estimate-gdp-industry-and.

growth naturally slowed in 2022, and it was also slowed by the Federal Reserve continuing to raise interest rates in light of steep inflation caused by the steep increase in consumption spending. Looking to the future, consumption spending is projected to continue to steadily increase in the next few years.[3] Historically, consumption spending has been exponentially increasing in the U.S. since around the 1950's, with large dips during the 2008 financial crisis and the 2020 pandemic.[4]

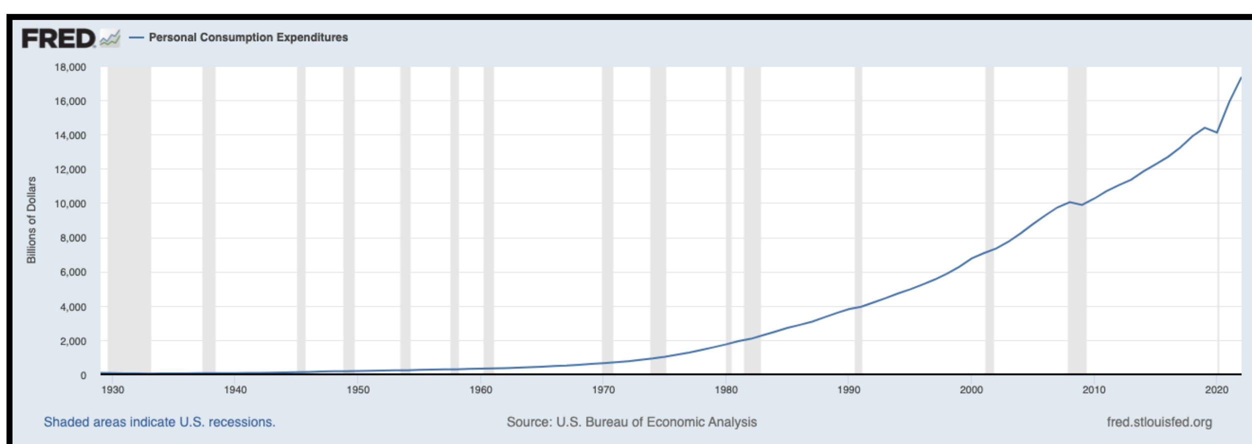

Figure 1.1: Personal consumption expenditures from 1930 to present.

The Federal Reserve's goal for consumption spending is to continue to have it increase at a rate of at least 2 percent each year. It is projected that consumption spending will stay above this rate until at least 2026.

Predictions for the Rest of 2023

Total real GDP growth in 2022 were lower numbers than the FED originally wanted to see as the economy rebounded from the COVID-19 pandemic. This slower than anticipated growth has impacted what the Congressional Budget office originally predicted U.S. GDP to be.

[3] Congressional Budget Office, "The Economic Outlook for 2023 to 2033 in 16 Charts | Congressional Budget Office," www.cbo.gov, February 21, 2023, https://www.cbo.gov/publication/58957.
[4] U.S. Bureau of Economic Analysis, "Personal Consumption Expenditures," FRED, Federal Reserve Bank of St. Louis, January 1, 1929, https://fred.stlouisfed.org/series/PCECA.

Their initial estimate was for GDP to grow by 2.3 percent in the coming year, but they have since revised that number to 0.1 percent.[5] This is slightly more pessimistic than the projection of a 0.5 percent increase in GDP by December, which is the number released by the Federal Reserve after their March Federal Open Market Committee meeting.[6] These low estimations account for the predicted high inflation numbers to come this year, and the subsequent high interest rates that will follow. These interest rates, while controlling for inflation, also decrease spending and hinder economic growth. The CBO predicts that this low growth rate in 2023 will be offset in 2024-2026, with GDP growth expected to return back to an average of 2.5 percent a year. The recent Federal Open Market Committee meeting on March 22nd 2023 announced another interest rate raise to 4.75 to 5 percent, which reflects the CBO's low GDP growth rate expectations.[7] The continued rise in interest rates is an appropriate reaction to the continued high inflation numbers, however it results in a negative impact on GDP and economic growth.

Solow Growth Model

The Solow growth model provides the Federal Reserve a way to estimate future growth in an economy with a growing population. Its focus is forecasting growth in the long run, and the model's main point is that an economy cannot have sustainable long-term growth in income through increases in capital.[8] The net gains from capital have diminishing marginal returns, and it eventually dips below the line of net zero. This model allows for the Federal Reserve to accurately predict GDP growth for the coming years.

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[5] Congressional Budget Office, "The Economic Outlook for 2023 to 2033 in 16 Charts | Congressional Budget Office," www.cbo.gov, February 21, 2023, https://www.cbo.gov/publication/58957.
[6] Federal Open Market Committee, "Summary of Economic Projections," April 22, 2023, https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20230322.pdf.
[7] Federal Reserve Open Market Committee, "Press Release," April 22, 2023, https://www.federalreserve.gov/monetarypolicy/files/monetary20230322a1.pdf.
[8] Fiona Maclachlan, "Solow Growth Model - Wolfram Demonstrations Project," Wolfram.com, 2011, https://demonstrations.wolfram.com/SolowGrowthModel/.

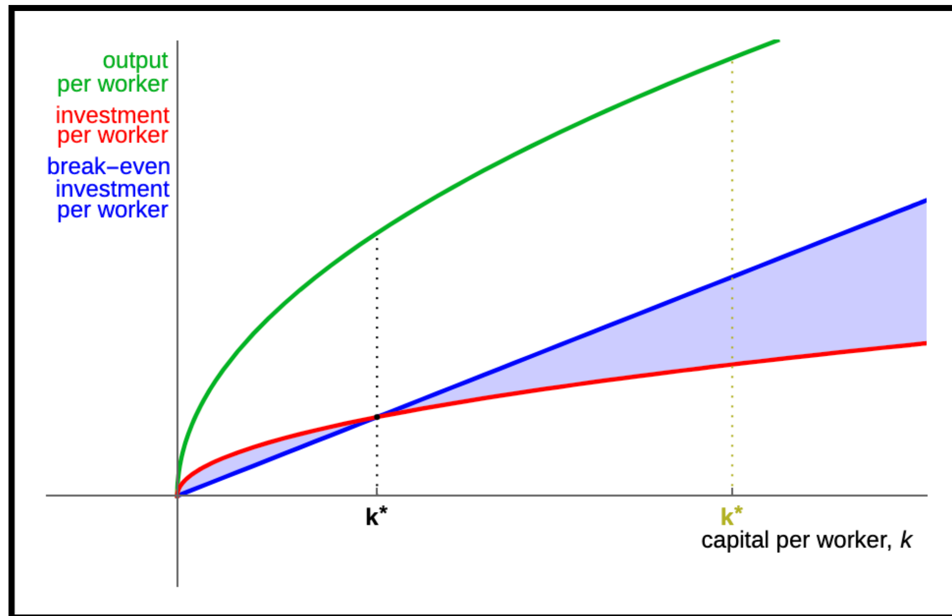

Figure 1.2: The Solow Growth Model

Durable and Nondurable Goods in GDP Calculations

An important component of consumption spending is the distinction between durable and non-durable goods. Durable goods are goods that are typically more expensive, and once they are bought, they last more than three years, while non-durable goods are goods like food or disposable products that are used up soon after they are bought. Higher levels of inflation, which have been observed in the years following the COVID-19 pandemic, have had negative short run effects on consumption of both durable and non-durable goods.[9]

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[9] Sushanta K. Mallick and Mohammed Mohsin, "Macroeconomic Effects of Inflationary Shocks with Durable and Non-Durable Consumption," *Open Economies Review* 27, no. 5 (June 28, 2016): 895–921, https://doi.org/10.1007/s11079-016-9405-0.

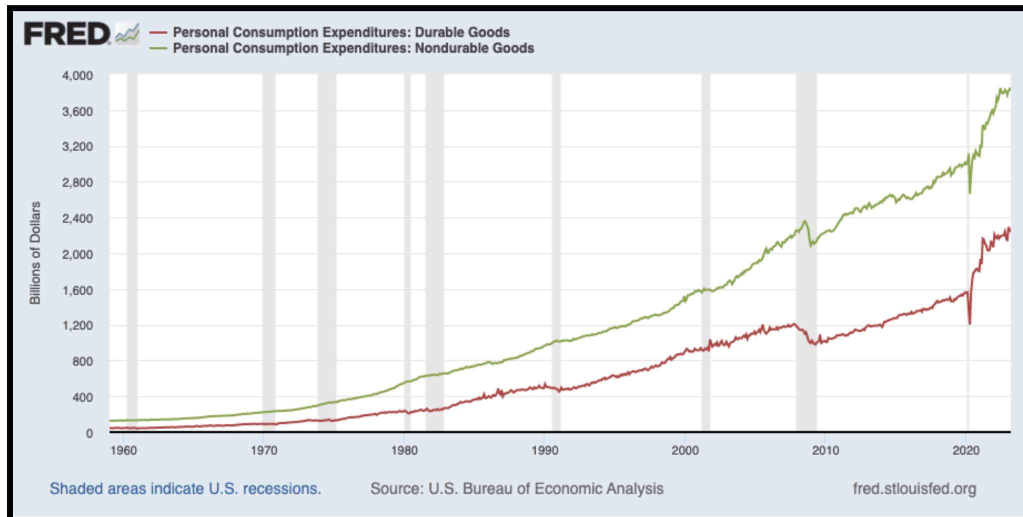

Figure 1.3: Personal consumption expenditures on durable and nondurable Goods.[10]

Consumer confidence in the economy has a strong influence on consumer spending on specifically durable goods.[11] Consumption of durable goods is a much better indicator for consumer confidence than non-durable goods, and this is reflected in the figure above, as consumption of durable goods has seen a slower increase in consumption than non-durable goods after the initial dip due to the COVID-19 pandemic. A person is more likely to buy durable goods when they believe the prices they are taking are good prices. The pandemic also had a large effect on non-durable/ fast moving consumer goods. After the pandemic, consumers sought more health and wellness products.[12]

[10] U.S. Bureau of Economic Analysis, "Personal Consumption Expenditures," FRED, Federal Reserve Bank of St. Louis, January 1, 1929, https://fred.stlouisfed.org/series/PCECA.
[11] Andzela Veselova, "THE FAST MOVING CONSUMER GOODS in the CONTEXT of the COVID 19 PANDEMIC," *New Challenges in Economic and Business Development in 2022* 14 (May 13, 2022): 255–61, https://www.bvef.lu.lv/fileadmin/user_upload/LU.LV/Apaksvietnes/Fakultates/www.bvef.lu.lv/Proceeding_of_Reports_2022.pdf#page=255.
[12] Ibid, 255-61

Government Spending

The Build Back Better Act was a government spending act focused on rebuilding and lifting up the middle class in light of the problems caused by the pandemic. The main components of it included providing accessibility to childcare, combating climate change & incentivizing clean energy, and increasing the affordability of healthcare, including prescription drugs. There were also raised taxes on nicotine, multinational corporations, stock buybacks and high-income households. The Build Back Better act was originally estimated to cost an extra 2.1 trillion in new spending.[13] The University of Pennsylvania Wharton budget model provides insight into the future economic impact of this act. It was projected to reduce the deficit by 1.8 trillion through budgetary offsets the bill worked upon. The model projected that by 2050, taking into account that certain provisions put into place by the act have a lifetime and will expire, that the act would increase public debt by 1.5 percent and decrease GDP by 0.2 percent. If the lifetime of the provisions were to be disregarded, the impacts would be even more severe, with public debt increasing by 24 percent and GDP decreasing by 3 percent. This government spending act, while providing relief to middle class citizens, has long term negative effects on the economy, specifically the national deficit and GDP.

The Inflation Reduction Act was signed into law in August of 2023 as a revised version of the Build Back Better Act. This slimmed down version of the Build Back Better act's main provisions were to create a 15 percent tax minimum for corporations with over 1 billion in income, give Medicare the power to negotiate prescription drug prices, give the Internal Revenue Service more funding to better enforce the new taxes implemented by the Build Back Better Act

[13] Jon Huntley, Maddison Erbabian, and John Ricco, "H.R. 5376, Build Back Better Act: Budget and Macroeconomic Effects," Penn Wharton Budget Model, n.d., https://budgetmodel.wharton.upenn.edu/issues/2021/11/15/hr-5376-build-back-better-budget-macro.

and the Inflation Reduction Act, increased the current subsidies for the Affordable Care Act until 2025, and it created more investments in climate change initiatives, including tax credits to offset the costs to businesses for switching to cleaner energy sources. This bill was projected by the University of Pennsylvania Wharton budget to reduce deficits by 248 billion, and have a very small overall impact on inflation. It would rise by 0.05 percent until 2024, and then it would decrease by 0.25 percent by the late 2020s, offsetting the initial inflation and creating an overall decrease in inflation. This scaling back of the Build Back Better act will have a much more beneficial effect on the U.S. economy and its future growth than originally planned. The overall level of confidence that this new legislation will have a large impact on the U.S. economy is very low.[14] These government spending acts may be important for social reasons that are not necessarily reflected in economic measures but will most likely have small impacts on long run GDP growth.

Debt as a Portion of Gross Domestic Product

Another tool the Federal Reserve can use to analyze the stability of the U.S. economy is calculating the national debt as a portion of G.D.P. The higher the percentage of national debt that takes up G.D.P, the less sustainable that economy is. The U.S. debt took up an all-time high percentage of G.D.P. in the second quarter of 2020, in the peak of the COVID-19 pandemic, at 134.8 percent.[15] As of the fourth quarter in 2022, the most recent estimate available, debt as a percent of G.D.P. This indicates how the economy is still recovering from the pandemic and in a very unstable state. The current national debt has hit the debt ceiling, which is the limit of debt

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[14] Jon Huntley and John Ricco, "Inflation Reduction Act: Preliminary Estimates of Budgetary and Macroeconomic Effects," Penn Wharton Budget Model, n.d., https://budgetmodel.wharton.upenn.edu/issues/2022/7/29/inflation-reduction-act-preliminary-estimates.

[15] U.S. Office of Management and Budget and Federal Reserve Bank of St. Louis, "Federal Debt: Total Public Debt as Percent of Gross Domestic Product," Stlouisfed.org, 2019, https://fred.stlouisfed.org/series/GFDEGDQ188S.

that the treasury is allowed to have, as governed by congress.[16] This debt ceiling was recently hit as of January 19, 2023. The U.S. Treasury has since been taking measures to borrow funds without going over the debt ceiling, however it is estimated that these measures will no longer be effective by around July to September of this year, 2023.[17]

Balance of Trade

The balance of trade, or current account, is calculated as exports minus imports. The United States is historically in a trade deficit, with imports being greater than exports. The trade deficit rose by 9.3 percent in 2022, reaching a total balance of $1,191.8 billion, and has been rapidly rising in previous years.[18] This increase was caused in part by global supply chain issues, on top of the U.S. trying to move away from relying on China so heavily for trade, causing some additional increase in the trade deficit. The overall impact the trade deficit has on the economy is debated, but it could possibly result in some lower employment numbers and slower domestic economic growth. Trump-era tariffs are still having a negative effect on U.S. trade and how much revenue the U.S. gains from trade as well.

Limitations of The Federal Reserve with Government Spending

Beginning in 2012, the Federal Reserve and the Federal Reserve Open Market Committee meetings were explicitly to curve inflation through interest rate increases.[19] In the FOMC meeting in January of 2012, the Fed announced that their target inflation rate in Personal

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[16] Congressional Budget Office, "Federal Debt and the Statutory Limit, February 2023 | Congressional Budget Office," www.cbo.gov, February 15, 2023, https://www.cbo.gov/publication/58906.
[17] Congressional Budget Office, "Federal Debt and the Statutory Limit, February 2023 | Congressional Budget Office," www.cbo.gov, February 15, 2023, https://www.cbo.gov/publication/58906.
[18] U.S. Bureau of Economic Analysis, "U.S. International Trade in Goods and Services, December and Annual 2022 | U.S. Bureau of Economic Analysis (BEA)," www.bea.gov, February 7, 2023, https://www.bea.gov/news/2023/us-international-trade-goods-and-services-december-and-annual 2022#:~:text=Exports%2C%20Imports%2C%20and%20Balance%20(exhibit%201).
[19] Florian Hüpper and Bernd Kempa, "Inflation Targeting and Inflation Communication of the Federal Reserve: Words and Deeds," *Journal of Macroeconomics* 75 (March 2023): 103497. https://doi.org/10.1016/j.jmacro.2022.103497.

Consumption Expenditures would be a headline rate of 2 percent annually, and in the August 202 FOMC meeting they further amended this by announcing a goal of an average of 2 percent annually, if there are inflation shortfalls in some years, they will be made up by overshoots in future years.[20]

Figure 1.4: Trimmed mean PCE inflation rate from Q4 1959 to present.[21]

The figure above graphs the Personal Consumption Expenditure inflation rate as percentage change from a year ago. As of February 2023, the percent change was 4.59, a slight decrease from the local peak at October 2022, which saw inflation of 4.75 percent compared to October of 2021.

Soft Versus Hard Landings

Soft landings are the goal of the Federal Reserve's monetary policy.[22] When the Fed begins monetary tightening, which is raising interest rates to control for inflation, the ideal "soft" landing is to minimize the impacts these high interest rates will have on unemployment rates and

[20] Ibid.

[21] Federal Reserve Bank of Dallas, "Trimmed Mean PCE Inflation Rate," FRED, Federal Reserve Bank of St. Louis, January 1, 1978, https://fred.stlouisfed.org/series/PCETRIM12M159SFRBDAL.

[22] Alan S. Blinder, "Landings, Soft and Hard: The Federal Reserve, 1965–2022," *Journal of Economic Perspectives* 37, no. 1 (February 1, 2023): 101–20, https://doi.org/10.1257/jep.37.1.101.

GDP. Typically, monetary tightening naturally leads to higher unemployment rates and negative impacts on GDP growth, which the Fed wishes to avoid. High inflation became the main concern of the Fed in the March 2022 FOMC meeting, where they began the process of raising the Effective Federal Funds Rate in order to control inflation. As shown on the graph below, a steep raise in the Effective Federal Funds Rate indicates a period of time where the Fed is controlling for anticipated or already occurring high interest rates.

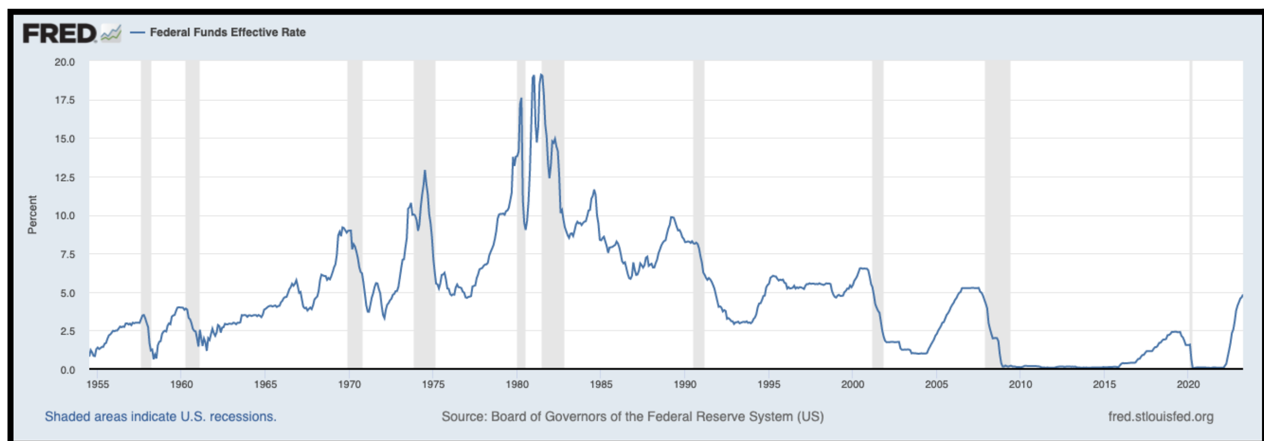

Figure 1.5: Effective federal funds rate from 1955 to present.[23]

Throughout the subsequent FOMC meetings since the March 2022 meeting, the Fed has continued to raise the FFR to 4.65 in the March 2023 meeting. The Fed is facing multiple challenges in order to have a "soft" landing, the COVID-19 supply chain disruptions, oil shocks, and food shocks are all contributing to the difficult to control inflation rates that the U.S. is experiencing.

[23] Federal Reserve Bank of Dallas, "Effective Federal Funds Rate," Stlouisfed.org, 2023, https://fred.stlouisfed.org/series/FEDFUNDS.

Monetary Policy Recommendations

The biggest issue the Federal Reserve currently faces is attempting to control inflation while still attempting a "soft" landing. In order to continue to curb inflation, the Federal Reserve must continue to raise interest rates on a 25-point basis in the May and June FOMC meetings, to reach a terminal rate between 5.25 percent to 5.5 percent, followed by no increase in the July and September meetings. The current interest rates set by the Federal Reserve are 4.75 to 5 percent, which are already high rates compared to previous years, but the 25-point hikes are less steep compared to the 75-point hikes seen in the June, July, September, and November meetings of 2022.[24] The goal of a soft landing is to minimize the impact on GDP and unemployment rates that these high interest rates will naturally have.

The Federal reserve's "perfect" soft landing took place during the period from December 1993- April 1995.[25] In anticipation of high inflation rates, the Fed began to preemptively raise interest rates. The Fed raised interest rates seven times within one year, including a very high 75-point rate hike. They also publicly announced these rate hikes for the first time, previously they did not. This resulted in a perfect soft landing, inflation slowly reduced from 3 percent, while unemployment went from 6.6 percent to 3.8 percent over the next 6 years and there was no major impact on GDP growth.[26] Soft landings are also heavily dependent on external factors. These external factors are out of the Federal Reserve's control, things like supply chain disruptions, oil shocks, and food shocks are further barriers that the Federal Reserve is currently facing from the pandemic and war in Ukraine that will make it difficult to navigate a soft

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[24] Taylor Tepper, "Federal Funds Rate History 1990 to 2022," Forbes Advisor, August 3, 2022, https://www.forbes.com/advisor/investing/fed-funds-rate-history/.

[25] Alan S. Blinder, "Landings, Soft and Hard: The Federal Reserve, 1965–2022," *Journal of Economic Perspectives* 37, no. 1 (February 1, 2023): 101–20, https://doi.org/10.1257/jep.37.1.101.

[26] Ibid, 101-20.

landing. Another factor that impacts a soft landing is where the economy started before the monetary tightening began.[27] The U.S. is currently facing all-time-high inflation rates that will make it difficult to control how soft or hard the landing will be.

SUPPLY CHAINS

Introduction

Supply chains use lagging indicators, causing this economic model to miss potential market downfalls, making it a model that is very relative to markets and market demands. Issues within supply chains have been ongoing since the start of the COVID-19 pandemic, which saw a drastic shift in how consumers spent their money and how products were transported around the globe. Some recent programs and legislation have worked to fuel the economy, including the use of stimulus checks and the July 2022 CHIPs Act; however, over half of senior business decision-makers[28] surveyed by the German System Analysis Program Development (SAP) group predict that supply chain woes will continue through Q3. The Federal Reserve Board works to support supply chains through interest rates. When there is a large demand for products and services, but low supply due to unforeseen circumstances, the Fed raises interest rates. These raised interest rates cause consumers to spend less, creating less demand and allowing supply chain producers to catch up. This is an endless cycle that demonstrates the significant role that the Fed plays in the globe's interconnected economy, made increasingly difficult by current global political unrest.

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[27] Alan S. Blinder, "Landings, Soft and Hard: The Federal Reserve, 1965–2022," *Journal of Economic Perspectives* 37, no. 1 (February 1, 2023): 101–20, https://doi.org/10.1257/jep.37.1.101.

[28] SCMR Editorial Staff, "Supply Chain Issues Not Over Yet," *Supply Chain Management Review*, accessed May 16, 2023, https://www.scmr.com/article/supply_chain_issues_not_over_yet.

When deciding how much, or even if, the Fed wants to raise interest rates, they examine various factors, including growth predictions and trends within consumer spending, population fluctuations, current geopolitical trends, and the current governmental role in the economy. This paper will examine how these factors influence the Fed and will conclude with a supply chain policy prediction for the coming year.

The Solow Growth Model

The Solow Growth Model provides an excellent way for the Fed to understand how the economy and supply chains will change over time due to changes in variables such as the population growth rate, the savings rate, and the rate of technological progress[29]. Like many economic models, the Solow Growth Model incorporates many assumptions that make it an imperfect prediction of the economy's future, though it provides a good estimate for the short term. The model predicts a point at which funding and consumption are equal in which the level of capital per worker does not change. It finds this point by combining factors such as investment, productivity, and capital per worker. The model and point at which investment and level of capital per worker are illustrated below in Figure 2.1.

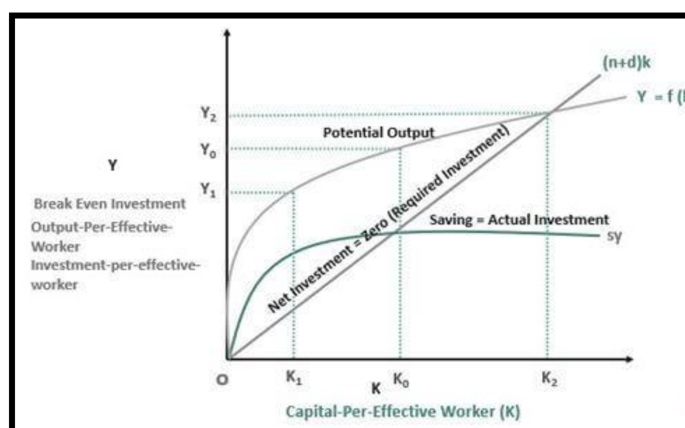

Figure 2.1: Solow Growth Model graph, courtesy of Wall Street Mojo

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[29] Corporate Finance Institute, "Solow Growth Model," Corporate Finance Institute, accessed May 16, 2023, https://corporatefinanceinstitute.com/resources/economics/solow-growth-model/.

Value Chain Versus Supply Chain

Additional aspects of the supply chain that can be analyzed involve the difference in the value chain versus the supply chain and the difference between offshoring and outsourcing. The value chain is the process in which businesses receive raw materials, add value to them through production and manufacturing to create a finished product, and then sell the finished product to consumers. This is interrelated within a company and allows companies to cut back on shortages by preparing product plans and working with other firms in the value chain to add value to the final product[30]. The value chain focuses on the steps that it takes to get the final product or service to the customer and is distinctly different from the supply chain as it involves all parties in fulfilling customer needs. Logistics and transportation are the most important aspects of the supply chain, though there are many other mechanisms, including freight coordination and customer relationship management. One way that firms can improve their supply chain management is by using outsourcing or offshoring. Outsourcing involves the movement of internal operations to a third party to allow organizations the capacity to focus on their expertise while they move transactional activities to other experts[31]. This allows companies to reduce their research and development costs, which allows further funding for the transportation of their products. Offshoring can also provide a reduction in production costs, as offshoring takes advantage of cost differentials by relocating factories from costly Western countries to cheaper economies, where they can then sell the goods back to the more developed countries. This aspect of supply chain management can provide jobs for those in developing countries, though it also can exploit vulnerable populations, which producers should ensure does not occur. To secure the

[30] Tarver, Evan, "What Is the Difference Between a Value Chain and a Supply Chain?" Investopedia, accessed May 16, 2023, https://www.investopedia.com/ask/answers/043015/what-difference-between-value-chain-and-supply-chain.asp.

[31]Webb, Jonathan, "What Is Offshoring? What Is Outsourcing? Are They Different?" Forbes, July 28, 2017, accessed May 16, 2023,
https://www.forbes.com/sites/jwebb/2017/07/28/what-is-offshoring-what-is-outsourcing-are-they-different/?sh=5e0105fc2a2e.

most profit and improve supply chain management, it is highly beneficial for a company to combine offshoring and outsourcing.

The Pandemic's Impact on Supply Chains

The pandemic upended many aspects of the supply chain as consumer interests switched overnight. Since early 2020, balancing and managing supply chains has exposed issues within the US supply chain approach, as the US is a net importer that suffered dramatically from the halt of global supply chains. Consumers desired different products overnight, including personal protective equipment and 'work from home' items, causing a shortage of products and an imbalance of supply that raised prices dramatically in the early days of the pandemic. Inflation surged in early 2021 as producers continued to struggle to manage consumer demand as changes in consumer needs continued to drastically shift. Governments, including the US, worked to provide financial support to consumers by providing stimulus packages that would then support producers; however, the Russian invasion of Ukraine in February 2022 has only caused further supply chain disruptions.

War in Ukraine Impact on Supply Chains

The Ukraine-Russia conflict has drastically impeded the international flow of goods, causing oscillations in the price and supply of goods such as grain and oil. The world depended on Russia and Ukraine for a third of global wheat production and a quarter of barley production[32] and depended on Russia for a significant portion of oil and gas production, however, the ongoing conflict in Ukraine has caused shifts in these vital supply chains, dramatically impacting the US. Energy and food products formerly sourced from these countries are the main causes of the

[32] "Ripple Effects: Russia-Ukraine War to Test Global Economies." MIT Sloan School of Management: Ideas Made to Matter. Accessed May 18, 2023. https://mitsloan.mit.edu/ideas-made-to-matter/ripple-effects-russia-ukraine-war-test-global-economies.

United State’s inflationary surge,[33] though low and middle-income countries are feeling the impacts of these food shortages most severely. Supply chain managers are struggling to optimize their maintenance, repair, and operating (MRO) supplies in the continuation of this conflict, as more than 600,000 businesses rely on Ukrainian and Russian suppliers. Optimization of MRO in this era of conflict is vital, as poorly managed MRO can lead to unnecessary costs. Additionally, proper MRO allows producers to know exactly where supplies are within their supply chain networks which further helps in understanding material data and potential supply chain issues. This can allow producers to reevaluate their supply chains during this crisis to consider alternative diversified sourcing, capitalization on new opportunities, understand challenges, and accept that rapidly shifting supply chains will be the new normal[34].

The CHIPs Act

The pandemic also unveiled that the United States was far too dependent on overseas production of vital semiconductors and chips, as seen through the July 2022 CHIPs Act. There was a boom in demand for chips, as these vital pieces of technology power electric vehicles, renewable energy, everyday personal technology, and more. Disruptions to global chip supply chains caused many cars to be stranded on the assembly line, though the average production times for chips[35] have improved drastically, even since December 2022. The chip production industry’s average lead time is still nearly six months long, but chip companies are rapidly expanding their production lines within the US, largely due to the $200 billion investment[36] from the CHIPs Act. This Act will be instrumental in the test of the US government’s ability to reverse

[33] "Supply Chain Issues Contribution to Inflation." U.S. Bank Financial Perspectives. https://www.usbank.com/investing/financial-perspectives/market-news/supply-chain-issues-contribution-to-inflation.html. Accessed May 18, 2023.
[34] "Ripple Effects: Russia-Ukraine War to Test Global Economies." MIT Sloan School of Management: Ideas Made to Matter. Accessed May 18, 2023. https://mitsloan.mit.edu/ideas-made-to-matter/ripple-effects-russia-ukraine-war-test-global-economies.
[35] "EVs Boost Chip Demand Despite Semiconductor Makers' Woes." The Wall Street Journal. https://www.wsj.com/articles/evs-boost-chip-demand-despite-semiconductor-makers-woes-74203c31?page=1. Accessed May 18, 2023.
[36] Ibid.

the overseas exodus of the domestic semiconductor industry, but experts worry that this Act will not be enough to meet the challenges the US faces in this industry. Fortunately, early 2023 reports indicate an easing of the chip shortage due to eases in freight congestion, falling shipping costs, and factories in Asia going back to production following ZERO COVID policies[37].

Unemployment and Supply Chains

The continued difficulties within the US supply chains are attributed to labor shortages. Unemployment is near its lowest in 50 years, at 3.6% as of March 2023[38], but job openings remain high, indicating that a rise in wages may be on the horizon as a method to attract more workers. Additionally, it can be useful to implement Okun's law here, which is a proven theory relating unemployment to a nation's productivity. This law states[39] that "for every 1% increase in the unemployment rate, a country's GDP will be at an additional roughly 2% lower than its potential GDP." While this relationship is impacted by many variables, it demonstrates the importance and significance of unemployment on productivity, and therefore, supply chains.

The availability of in-demand products eased throughout 2022[40], leading to fewer supply shortages, though the Fed has now been tasked with managing the rising interest rates and securing the goal interest rate of 2%. In early 2023, there was growth in spending and production but returning to the 2% inflation rate goal will require raising federal interest rates to quell the rapid growth in spending and inflation. Interest rate hikes work to slow the demand for goods and services as it begins to cost more to purchase the desired products that are contributing to the inflationary landscape. The Fed can control the demand for these goods, but it cannot control the

[37] Ibid.
[38] "United States Unemployment Rate," Trading Economics, Accessed May 18, 2023, https://tradingeconomics.com/united-states/unemployment-rate
[39] Kabanova, Ekaterina and Ilona V. Tregub, "Okun's Law Testing Using Modern Statistical Data," Russian Finance University, Accessed May 18, 2023, https://www.freit.org/WorkingPapers/Papers/Development/FREIT488.pdf
[40] "Supply Chain Issues Contribution to Inflation." U.S. Bank Financial Perspectives. https://www.usbank.com/investing/financial-perspectives/market-news/supply-chain-issues-contribution-to-inflation.html. Accessed May 18, 2023.

supply, therefore these policies are hoping to aid in eventually easing supply chain pressures. This delicate act of slowly raising interest rates to quell demand without triggering a recession is a vital part of the dual mandate[41], a theory focused on keeping employment maximized while ensuring interest rates stay low.

The Federal Open Market Committee (FOMC) meets 8 times a year to discuss interest rates, and March's meeting just concluded. At this second FOMC meeting of the year,[42] participants agreed that inflation remains elevated therefore the FOMC decided to raise interest rates to 4.9%. This increase in interest rates is not surprising considering the continued difficulties with supply chains and inflationary pressures, though further supply bottlenecks must ease.

Reaching the target interest rate of 2% by the year's end will be increasingly difficult if spending habits remain the same. While the Fed cannot directly control supply, it can work to suggest and implement changes within supply chains to match the increasing consumer spending habits. The pandemic and the Ukraine crisis, and their resulting inflationary periods, have demonstrated deep issues within the US's supply chains, offering a domestic turning point in how the economy functions. One way the Fed can support this turning point is by encouraging firms to diversify their supply chains. Diversification can help US firms that produce the same goods and services, while also employing offshoring, which would help LMIC countries that are struggling due to the various geopolitical tensions and the pandemic[43]. Firms must understand that a new aspect of their MRO involves incorporating a degree of uncertainty into their supply

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[41] Federal Reserve Bank of Chicago, "The Federal Reserve's Dual Mandate," Federal Reserve Bank of Chicago, Accessed May 18, 2023, https://www.chicagofed.org/research/dual-mandate/dual-mandate
[42] Board of Governors Federal Reserve, "Federal Reserve Press Release March 2023," The Federal Reserve, March 22, 2023, https://www.federalreserve.gov/monetarypolicy/files/monetary20230322a1.pdf
[43] Charles Davidson, "Rethinking of Supply Chains May Be At Hand," Federal Reserve Bank of Atlanta, May 26, 2022, https://www.atlantafed.org/economy-matters/regional-economics/2022/05/26/rethinking-supply-chains

chains, and diversification of primary producers helps support this ahead of the next supply chain disruption.

Forecasts

The supply chain issues will likely continue to decrease[44] throughout the end of the year, and interest rates will fall accordingly as consumers have greater access to the goods they desire. Additionally, the onset of artificial intelligence could offer a resource to producers by providing an automated supply chain. This would in turn support US supply chains through the CHIPs Act because AI use depends on semiconductor and chip use. Additionally, the Fed can employ other methods of measuring supply chain issues, such as the Global Supply Chain Pressure Index[45]. Instead of measuring supply chain problems by port pile-ups, the GSCPI focuses on variables that capture pressure on global supply chains, both domestically and internationally. The GSCPI draws upon indicators such as cross-border transportation costs using the Baltic Dry Index, Harper index, and costs of air transportation/freight to and from the US and country-level manufacturing data using purchase manager index surveys which helps measure supply bottlenecks. While the GSCPI focuses on supply components, sometimes elements of the demand side seep through. Figure 2.2 below demonstrates how the GSCPI is beginning to level out.

[44] Federal Reserve Bank of New York, "Global Supply Chain Pressure Index (GSCPI)," Federal Reserve Bank of New York, April 2023, https://www.newyorkfed.org/research/policy/gscpi#/interactive

[45] Federal Reserve Bank of New York, "A New Barometer of Global Supply Chain Pressures," Federal Reserve Bank of New York, January 4, 2022, https://libertystreeteconomics.newyorkfed.org/2022/01/a-new-barometer-of-global-supply-chain-pressures/

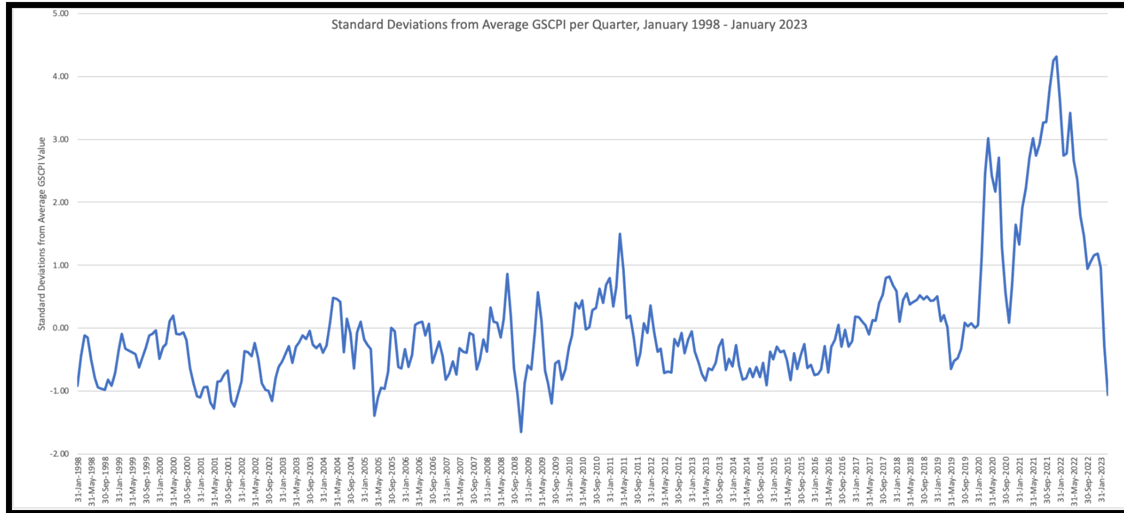

Figure 2.2: Standard deviations from average GSCPI per quarter, January 1998 - January 2023

An additional index that the Federal Reserve Board has recently introduced is the Supply Chain Bottleneck Sentiment (SCB Sentiment), which builds off the GSCPI and examines how the public feels about supply chain issues through the use of natural language processing and deep learning techniques.[46] The SCB Sentiment identifies words indicative of supply chains, such as “supply,” “chain,” “supply chain,” “bottlenecks,” and more. It additionally is able to detect tone of verbiage, which helps further determine the sentiment around supply chain issues. The SCB Sentiment works within the 12 FRB districts, pulling data from these districts and business contracts to find words and perspectives related to supply chain issues. This index aids in successfully indicating and identifying recession-related sentiment, therefore adding to provide a more comprehensive method of assessing supply chain issues.

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[46] Paul Soto, “Measurement and Effects of Supply Chain Bottlenecks Using Natural Language Processing,” Board of Governors of the Federal Reserve System, February 6, 2023, https://www.federalreserve.gov/econres/notes/feds-notes/measurement-and-effects-of-supply-chain-bottlenecks-using-natural-language-processing-20230206.html

Monetary Policy Recommendations

Experts believe supply chain pressures will begin to ease by the end of summer 2023. The New York Fed noted that "a mix of supply and demand forces is driving the easing of net pressure at the level of the global supply chain,"[47] and data from the GSCPI's negative movements indicate that supply conditions have generally normalized following the issues in fall 2022[48]. Therefore, it is in the Fed's best interest to take a conservative, hawkish stance on this issue and increase the interest rate by .25 bpm in the June and July meetings. The terminal rate will be reached at the end of July, right when the supply chain issues will begin to ease. This will help combat inflationary pressures that the supply chain issues had been supporting. Supply chain issues have been working to quell consumer demand, as consumers are dissuaded to purchase goods when they see the long wait and delivery times, attributable to the continued supply chain bottlenecks[49]. However, experts believe these issues will dissipate come the end of summer, therefore, we recommend that the Fed hold the interest rate constant during the following FOMC meeting to observe if these predictions become reality. During the October/November and December meetings we recommend that the Fed pursues a dovish perspective, dropping the interest rate back down .25 bpm at each meeting, with an end of the year goal of 4.5 - 5.0 bpm.

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[47] Federal Reserve Bank of New York, "A New Barometer of Global Supply Chain Pressures," Federal Reserve Bank of New York, January 4, 2022, https://libertystreeteconomics.newyorkfed.org/2022/01/a-new-barometer-of-global-supply-chain-pressures/

[48] Federal Reserve Bank of New York, "Global Supply Chain Pressure Index (GSCPI)," Federal Reserve Bank of New York, April 2023, https://www.newyorkfed.org/research/policy/gscpi#/interactive

[49] Janet Nguyen, "Why is the Federal Reserve raising interest rates if supply chain issues are fueling inflation?," Marketplace, March 16, 2022, https://www.marketplace.org/2022/03/16/why-is-the-federal-reserve-raising-interest-rates-if-supply-chain-issues-are-fueling-inflation/

INFLATION

Introduction

In 2022, the United States experienced higher and more persistent inflation than in past years. After years of sliding by unperceived, inflation started skyrocketing in 2021, reaching a high of a 9.1% yearly CPI increase in June 2022, making it the largest increase in 40 years[50]. While the effects of inflation on consumers can vary depending on several factors, such as the severity of the inflation, the types of goods and services being affected, and the behavior of consumers and businesses, in general, the impact is felt quickly. Thus, inflation became a concern for economists and the general public, prompting a closer look, and has been the main focus of the Federal Reserve's policy making. When inflation is high, the Federal Reserve typically raises interest rates to slow the economy and reduce inflation. Hence, the Federal Reserve began aggressively raising the target range of the federal funds rate in the March 16, 2022, Federal Open Market Committee meeting.

Causes of Inflation

The current inflation can be attributed to a blend of demand and supply-side factors. Consumer demand, which underwent shifts during and after the COVID-19 lockdowns, has contributed to inflation on the demand side. During the initial year of the pandemic, there was a surge in the total demand for goods (particularly durable goods), surpassing the supply, and resulting in a shortage. [51] In March 2020, the Personal Consumption Expenditures (PCE) of durable goods totaled $1.3715 trillion, while in March 2021, it reached $2.1613 billion,

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[50] Bureau of Labor Statistics. "Consumer prices up 9.1 percent over the year ended June 2022, largest increase in 40 years." TED: The Economics Daily, 13 July 2022, https://www.bls.gov/opub/ted/2022/consumer-prices-up-9-1-percent-over-the-year-ended-june-2022-largest-increase-in-40-years.htm.

[51] International Monetary Fund. "U.S. Economy: Inflation Challenge." Accessed April 17, 2023. https://www.imf.org/en/News/Articles/2022/07/11/CF-US-Economy-Inflation-Challenge.

indicating a year-over-year increase of almost 58%[52]. The resulting excess demand exerted upward pressure on prices, contributing to inflation. Table 1 below illustrates these changes in consumer demand for durable goods from 2020-2022.

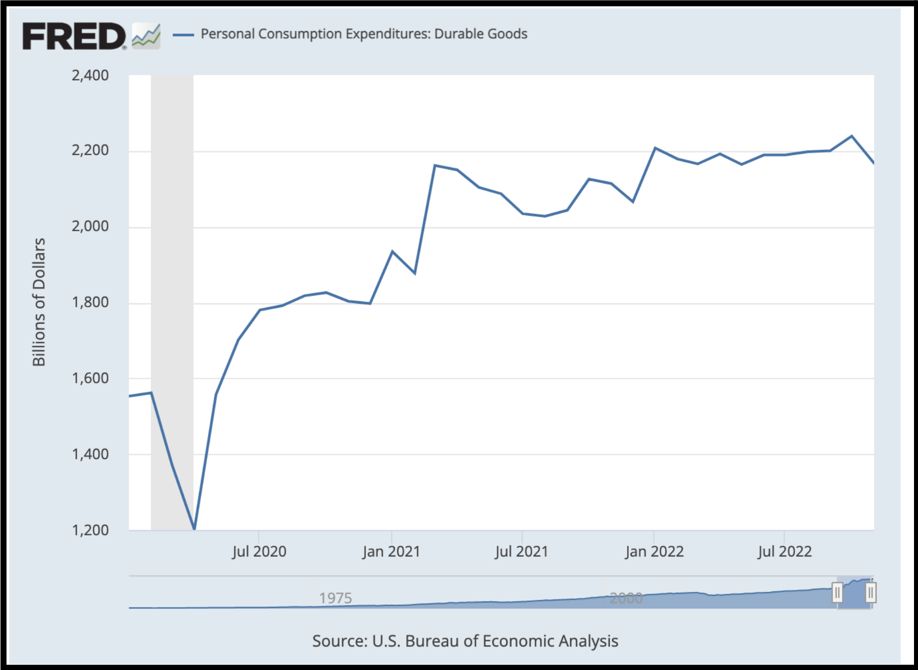

Figure 3.1: Changes in consumer demand for durable goods, 2020-2022

Conversely, increased input costs on the economy's supply side resulted in shortages, driving up prices. The Producer Price Index (PPI), which measures the price changes that domestic producers receive for their goods and services, increased by 7.8% from April 2020 to April 2021. Some of the input costs that increased during the pandemic in the same year included raw materials' price, which increased by 26.2%; energy price, which increased by 44.6%; and transportation price, which increased by 6.3%, all driven by a combination of increased demand

[52] U.S. Census Bureau. "Advance Monthly Retail Trade and Food Services Survey." Accessed May 1, 2023. https://www.census.gov/retail/marts/www/marts_current.pdf.

and supply chain disruptions[53]. The resulting mismatch in supply and demand led to increases in prices and inflation which surged to levels not witnessed since the early 1980s.[54]

Despite the decline in COVID-19 restrictions in 2022, the persistent bottlenecks in supply chains continued to cause disruptions across multiple industries, including healthcare, food and agriculture, retail, and automotive. The situation was further intensified by the Russian invasion of Ukraine, subsequent economic sanctions, and potential retaliation that significantly impacted global markets, causing oil, gas, and agricultural prices to rise and intensifying inflation pressures. As a consequence, the average price of gasoline in the United States surged past $5 per gallon in mid-2022, an unprecedented high[55]. This sudden surge in prices highlights the need for the Federal Reserve to utilize core CPI as a means to neutralize the volatility of energy prices.[56]

The increase in gasoline prices and its impact on overall inflation prompted research into the drivers of inflation in the United States, a New York Federal Reserve study suggested that supply constraints have played a significant role in exacerbating the effects of higher demand on inflation. The results showed that without supply bottlenecks, inflation in the US would have been 6 percent instead of 9 percent at the end of 2021[57]. Hence, the ongoing easing of supply bottlenecks could cause a substantial drop in inflation in the near term.

Although there are ongoing debates about easing the supply chain stressors, the dominant theory among experts [58] believes that in July 2023, the supply chain stressors are

[53] Bureau of Labor Statistics. "Producer Price Indexes." Accessed on May 1, 2023. https://www.bls.gov/ppi/.
[54] "Complex Supply Chains, Bottlenecks and Inflation." Federal Reserve Bank of St. Louis Open Vault, January 2023, https://www.stlouisfed.org/open-vault/2023/january/complex-supply-chains-bottlenecks-and-inflation.
[55] NPR. "Gas Prices 5% High: Inflation, Explained." NPR.org, 11 June 2022, https://www.npr.org/2022/06/11/1104364665/gas-prices-5-high-inflation#:~.
[56] Wallace, Alicia "Consumer health, labor shortage, inflation: 2023 could be another tough year for the US economy." CNN Business. Cable News Network, 28 Dec. 2022, https://www.cnn.com/2022/12/28/economy/consumer-health-2023/index.html.
[57] Julian di Giovanni, "How Much Did Supply Constraints Boost U.S. Inflation?," Federal Reserve Bank of New York Liberty Street Economics, August 24, 2022, https://libertystreeteconomics.newyorkfed.org/2022/08/how-much-did-supply-constraints-boost-u-s-inflation/.
[58] JPMorgan. "Global Supply Chain Issues." JPMorgan, 2022, https://www.jpmorgan.com/insights/research/global-supply-chain-issues.

anticipated to gradually alleviate in the near term. The Global Supply Chain Prices Index (GSCPI) generated by the New York Fed suggests that global supply chain conditions have largely normalized after experiencing temporary setbacks around the turn of the year.[59] Yet, the demand and supply shocks brought about by COVID-19 continue to ripple through the economy and factor into consumers' decision-making, habits, and attitudes. [60] The scenario of consumer demand in 2023 is still greatly unpredictable given the number of factors besides supply influencing consumer spending.

Measures of Inflation

The most well-known indicator of inflation is the Consumer Price Index (CPI), a weighted average that measures the percent change in prices paid by consumers for goods and services from one period to the next. It only accounts for the expenses that consumers directly pay. On the other hand, the Personal Consumption Expenditures (PCE) price index tracks the price changes of all consumption items, regardless of whether they are paid for out-of-pocket or not.[61] As a result, The Personal Consumption Expenditures (PCE) index provides a more comprehensive measure of price fluctuations compared to the Consumer Price Index (CPI) because it takes into account a wider range of goods and services consumed by households, including those purchased by businesses and government entities on behalf of households. In addition to its ability to account for substitutions between similar items, the PCE index is also preferred by the Federal Reserve as a measure of inflation because it tends to be less volatile than the CPI. This means that it is better able to capture underlying trends in price movements and provides a more stable basis for policy decisions.

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[59] Federal Reserve Bank of New York. "Global Sectoral Corporate Price Indexes (GSCPIs) Interactive Tool." Accessed [insert date accessed]. https://www.newyorkfed.org/research/policy/gscpi#/interactive.
[60] PwC. "Consumer Insights Survey." PwC, accessed May 4, 2023, https://www.pwc.com/gx/en/industries/consumer-markets/consumer-insights-survey.html.
[61] Cheng, Jeffrey and Louise Sheiner. "How does the government measure inflation?" Brookings Institution, June 28, 2021. Accessed April 17, 2023. https://www.brookings.edu/blog/up-front/2021/06/28/how-does-the-government-measure-inflation/.

Furthermore, headline inflation refers to the results of the CPI and describes the change in the value of all items included in the basket. On the other hand, core inflation is calculated by excluding food and fuel items from the basket of goods.[62] Core inflation provides a more stable and reliable measure of inflation trends over time by excluding these items with large price volatilities. Seasonally adjusted data have been changed to eliminate seasonal and calendar influences, allowing for more meaningful comparisons of economic conditions across periods.[63] Therefore, when measuring inflation, the Fed prefers to use seasonally adjusted data for a more accurate assessment of inflationary pressures.

Current situation

The US Labor Department released data regarding the annual inflation rate for the 12 months ending in March 2023. According to the report, the yearly Unseasonally Adjusted Consumer Price Index for All Urban Consumers (CPI-U) increased by 5.0 percent in CPI, which indicates a decrease from the 6.0 percent increase recorded in the preceding period. Additionally, the (CPI-U) experienced a 0.1 percent monthly increase on a seasonally adjusted basis in March, following a 0.4 percent rise in February and a 0.5 percent increase in January. The data is being closely monitored by the Federal Reserve as it continues to evaluate and adjust its monetary policy in response to the changing economic conditions. Table 3.2 below shows the one-month percent change in CPI for All Urban Consumers (CPI-U), seasonally adjusted in the month of March.

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[62] ET CONTRIBUTORS. "What are headline and core inflation?" The Economic Times. https://economictimes.indiatimes.com/wealth/save/what-are-headline-and-core-inflation/articleshow/80071229.cms (accessed April 17, 2023).

[63] Bureau of Labor Statistics. "Using Seasonally Adjusted Data." Accessed April 17, 2023. https://www.bls.gov/cpi/seasonal-adjustment/using-seasonally-adjusted-data.htm.

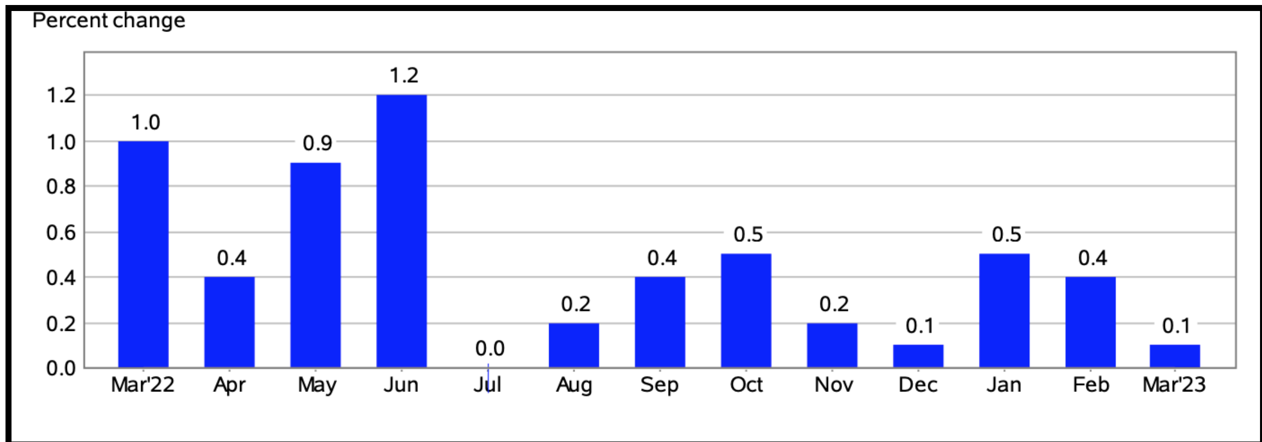

Figure 3.2: One month percent change in Consumer Price Index Mar 2022-2023

The March 0.1 percent increase in the CPI-U has been driven primarily by rising prices for shelter, which was the largest contributor to the monthly all-items increase. Since experiencing a 0.5 percent increase in February, the core Consumer Price Index (cCPI) saw another increase of 0.4 percent in March.[64] This led to an annual increase of 5.6 percent in March, up from 5.5 percent in February; which was the largest in over a decade. The table below gives a good specific breakdown of the item categories.

[64] USA Today. "Inflation tracker: The latest CPI data shows consumer prices up 2.8% over the past year." Updated 12 April 2023, www.usatoday.com/story/money/economy/2023/04/12/cpi-inflation-data-today-live-updates/11607115002/.

	Seasonally adjusted changes from preceding month							Un-adjusted 12-mos. ended Mar. 2023
	Sep. 2022	Oct. 2022	Nov. 2022	Dec. 2022	Jan. 2023	Feb. 2023	Mar. 2023	
All items	0.4	0.5	0.2	0.1	0.5	0.4	0.1	5.0
Food	0.8	0.7	0.6	0.4	0.5	0.4	0.0	8.5
Food at home	0.7	0.5	0.6	0.5	0.4	0.3	-0.3	8.4
Food away from home(1)	0.9	0.9	0.5	0.4	0.6	0.6	0.6	8.8
Energy	-1.7	1.7	-1.4	-3.1	2.0	-0.6	-3.5	-6.4
Energy commodities	-4.1	3.7	-2.1	-7.2	1.9	0.5	-4.6	-17.0
Gasoline (all types)	-4.2	3.4	-2.3	-7.0	2.4	1.0	-4.6	-17.4
Fuel oil(1)	-2.7	19.8	1.7	-16.6	-1.2	-7.9	-4.0	-14.2
Energy services	1.2	-0.7	-0.6	1.9	2.1	-1.7	-2.3	9.2
Electricity	0.8	0.5	0.5	1.3	0.5	0.5	-0.7	10.2
Utility (piped) gas service	2.2	-3.7	-3.4	3.5	6.7	-8.0	-7.1	5.5
All items less food and energy	0.6	0.3	0.3	0.4	0.4	0.5	0.4	5.6
Commodities less food and energy commodities	0.0	-0.1	-0.2	-0.1	0.1	0.0	0.2	1.5
New vehicles	0.7	0.6	0.5	0.6	0.2	0.2	0.4	6.1
Used cars and trucks	-1.1	-1.7	-2.0	-2.0	-1.9	-2.8	-0.9	-11.2
Apparel	0.0	-0.2	0.1	0.2	0.8	0.8	0.3	3.3
Medical care commodities(1)	-0.1	0.0	0.2	0.1	1.1	0.1	0.6	3.6
Services less energy services	0.8	0.5	0.5	0.6	0.5	0.6	0.4	7.1
Shelter	0.7	0.7	0.6	0.8	0.7	0.8	0.6	8.2
Transportation services	1.9	0.6	0.3	0.6	0.9	1.1	1.4	13.9
Medical care services	0.8	-0.4	-0.5	0.3	-0.7	-0.7	-0.5	1.0

Figure 3.3: Seasonally adjusted CPI

As shown in Table 3.3, there was no change in the food index in March. However, the food-at-home index declined 0.3 percent, the first drop since September 2020. Three of six major grocery store food group indexes decreased during the month. The food away from home index rose by 0.6 percent in March, as it did in the previous two months[65]. The index for full-service meals increased by 0.7 percent over the month, and the index for limited-service meals increased by 0.5 percent. Over the last 12 months, the food-at-home index rose by 8.4 percent.

In March, the energy index fell by 3.5 percent, following a 0.6 percent decrease in February. The gasoline index decreased by 4.6 percent in March after increasing by 1.0 in February[66], the natural gas index decreased by 7.1 percent, and the electricity index Decreased by 0.7 percent. The energy index fell by 6.4 percent over the past 12 months. The gasoline index decreased by 17.4 percent, while the fuel oil index fell by 14.2 percent. In contrast, the index for

[65] U.S. Bureau of Labor Statistics. "Consumer Price Index - April 2023." News Release, 12 May 2023, https://www.bls.gov/news.release/cpi.nr0.htm.
[66] Bureau of Labor Statistics. (2023, May 5). Employment Situation Summary. Retrieved May 5, 2023, from https://www.bls.gov/opub/ted/2023/

electricity rose by 10.2 percent over the last year, and the index for natural gas increased by 5.5 percent over the same period. [67]

The index for all items less food and energy rose by 0.4 percent in March, following a 0.5 percent increase in February. The shelter index was the main factor in the monthly increase in the index for all items, less food and energy in the monthly change; it increased by 0.6 percent over the month, while the sub-indexes for rent and owners' equivalent rent both rose by 0.5 percent in March. The percent increase in the shelter index offset the decline in energy prices, which fell 3.5 percent over the month, as all major energy component indexes, including gasoline, declined.[68] Furthermore, over the last 12 months, the index for all items less food and energy rose by 5.6 percent. The shelter accounted for more than 60 percent of the total increase in all items, less food and energy, rising by 8.2 percent over the last year. Other indexes with notable increases over the last year include; motor vehicle insurance by 15.0 percent, household furnishings, and operations by 5.6 percent, and recreation by 4.8 percent. On the other hand, the medical care index fell by 0.3 percent in March after falling 0.5 percent in February.

Projections

During the March recent Federal Open Market Committee (FOMC) meeting, officials from the Federal Reserve revised their economic projections, raising their inflation expectations from 3.1 percent to a projected rate of 3.3 percent for the year 2023.[69] As for inflationary trends, the median estimate for core Personal Consumption Expenditures (PCE) rose to 3.6 percent in 2023, followed by a decrease to 2.6 percent in 2024 and a further drop to 2.1 percent in 2025. [70]

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[67] Bureau fédéral du Plan. (2022). Consumer price index and inflation forecasts. Plan.be. https://www.plan.be/databases/17-en-consumer_price_index_inflation_forecasts#:~:text=On%20the%20basis%20of%20these,2022%20and%202.44%25%20in%202021.

[68] "Consumer Price Index - April 2023." U.S. Bureau of Labor Statistics, 12 May 2023, https://www.bls.gov/news.release/cpi.nr0.htm.

[69] "The Fed projections call for just one more rate hike this year." CNBC, 22 Mar. 2023, https://www.cnbc.com/2023/03/22/the-fed-projections-call-for-just-one-more-rate-hike-this-year.html.

[70] TD Economics. “US FOMC Statement.” TD Bank Group, 16 March 2023, https://economics.td.com/us-fomc-statement.

The Federal Reserve established the median forecast for the Federal Funds rates at 5.1 percent in 2023, followed by 4.3 percent in 2024 and 3.1 percent in 2025, as shown in Table 3.4 below. Projections for the federal funds rate are determined based on either the midpoint of the anticipated target range for the federal funds rate or the anticipated target level for the federal funds rate at the culmination of the specified calendar year.

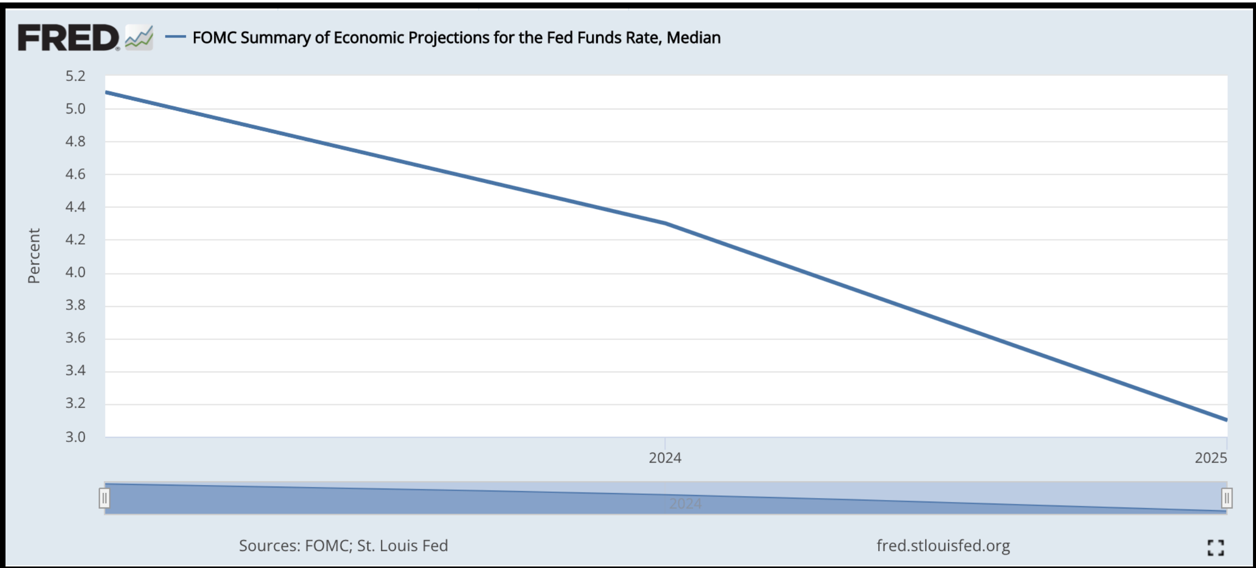

Figure 3.4: Economic Projections for the Federal Funds Rate through 2025

According to the Congressional Budget Office's (CBO) projections, the price of goods is anticipated to experience a decelerated rate of growth in 2023 relative to 2021 and 2022, primarily as a result of the ongoing amelioration of supply chain disruptions and a contraction in domestic demand. Concerning services, the CBO has forecasted that the Federal Reserve's imposition of higher interest rates will impede the escalation of prices for shelter services, which are major contributors to overall increases in the Consumer Price Index, commencing in the second half of 2023.

Recommendations

In the beginning of 2023, we witnessed an increase in spending and production, with retail sales rising by 3% in January[71]. Still, achieving the 2% inflation rate goal will require the Federal Reserve to raise interest rates to slow down the rapid growth in spending, and thus, inflation. Since the commencement of 2022, the Federal Reserve has employed its authority to adjust the targeted interest rate to mitigate inflationary pressures. This balancing act of gradually increasing interest rates to curb demand without triggering a recession is an essential aspect of the dual mandate of the Federal Reserve.

In light of the Federal Reserve's recent decision to raise rates by 25 basis points in the May FOMC meeting, as well as current and forecasted economic changes in the coming months, we recommend a cautious approach to interest rate hikes going forward. Therefore, it is advised to limit target federal funds hikes to a single hike of 0.25 basis points in September to allow for the assessment of the impact of current and future changes on the economy. Ultimately, the target should be to reach an interest rate of 4.5 to 5.0 basis points by the end of the year.

UNEMPLOYMENT

Introduction

The idea of the "dual mandate" set out by the Federal Reserve represents their idea of an ideal economy: stable prices and maximum employment. Maximum employment does not refer to 100% employment - instead, it refers to the amount of employment that the economy can handle without inciting a boom in inflation - and stable prices are defined by a balance struck between inflation and deflation in which the currency remains steady and at a high value. The

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[71] CNBC. "Retail sales surge 3% in January, beating estimates." CNBC, 15 Feb. 2023, https://www.cnbc.com/2023/02/15/retail-sales-january-2023-.html.

unemployment rate, which is the focus of this section, is unable to be set directly by the Federal Reserve. When aiming to control employment, the Federal Reserve often relies upon altering the Federal Funds Rate. When altering the Federal Funds Rate, businesses are no longer able to borrow as much money as they previously were enabled to do. As such, they are unable to expand as rapidly as they could prior to the hike in interest rates and instead must limit their hirings more than they would otherwise. This, in turn, leads to lower employment. As such, when the Federal Reserve aims to expand employment, it is customary to lower the Federal Funds Rate to allow businesses to borrow - which promotes expansion and rises in hirings - more.

In light of the end of the pandemic, the labor market has been experiencing a massive boom overall since the Great Resignation. The Great Resignation is a term coined by Anthony Klotz to describe the enormous exodus of workers from their jobs during the COVID-19 pandemic, whether it be layoffs or otherwise leaving their jobs. Since the mass hiring began in January 2023, all forms of unemployment have steadily fallen. This mass hiring was caused by a number of factors, with some of the primers including decreased gas prices, increases in wages, and expansion of employee support programs such as mental health and other sects of overall employee well-being. As reported by the Aon Global Wellbeing Report 2022-2023, 63% of companies declared that COVID had increased their focus on employee well-being, and currently, 87% of American companies have ongoing well-being-centered initiatives. 85% of companies now have a formal well-being strategy announced - a massive increase of 28% since 2020. Even before the mass hiring, factoring in seasonal adjustment, the rate of U-3 unemployment fell from 4.0% to 3.4% from January 2022 to January 2023. Jobless claims have

continued to fall as the year marches on. In late early February, jobless claims hung around 192,000, and they continued to fall, reaching 190,000 on February 25th.[72]

An Overview of the US Unemployment Rate

Leading up to the mass hiring in January, the unemployment rate fluctuated but steadily leaned towards declining, as observed by the Bureau of Labor Statistics.[73] In the graph below the various forms of unemployment are depicted with seasonal adjustments from January 2022 until January 2023. It can be observed that the level of U-1 unemployment fell steadily while the rates for U-2, U-3, U-4, U-5, and U-6 fell, rose again slightly, and steadied out until January 3. The various forms of unemployment can be defined as follows: U-1 (Persons unemployed for 15 weeks or longer), U-2 (People who completed temporary jobs or lost their jobs), U-3 (Total unemployed), U-4 (Total unemployed added to the number of discouraged workers), U-5 (discouraged workers added to total unemployed as well as all others attached to the labor force), and U-6 (Total unemployed added to the number of discouraged workers, those marginally attached to the labor force, and part-time workers that work part-time for economic reasons).

[72] Aon. "Global Wellbeing Survey." Aon, accessed April 29, 2023. https://www.aon.com/global-wellbeing-survey.
[73] U.S. Bureau of Labor Statistics. “Employment Projections: Charting the Labor Market,” Current Population Survey, Economic News Release, March 2022, https://www.bls.gov/web/empsit/cpseea04.htm.

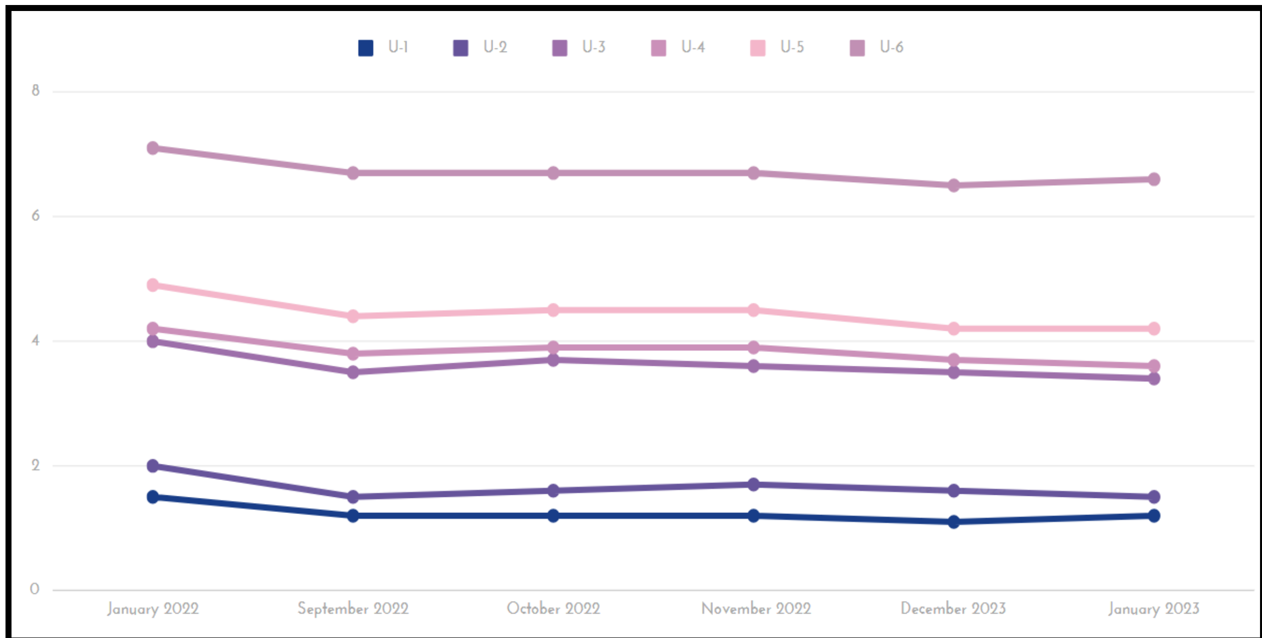

Figure 4.1: Unemployment Rates Jan 2022 - Jan 2023[74]

When assessing the changes in unemployment rates, it is important to note that the form of unemployment that is assessed and discussed most regularly is the U-3 unemployment rate. This rate, like the others, is measured using data from the four previous weeks but assesses the simple total unemployment rate.The formula for U-3 unemployment is as follows:

$$\text{U-3 Unemployment Rate} = \frac{\text{Total Number of People Searching for a Job} * 100}{\text{Total Individuals in Labor Force}}$$

Focusing on the U-3 unemployment rate, it can be noted that a steady decline has been visible since January 2022. Where it once stood at over 4%, the U-3 rate has since fallen to approximately 3.6% in January.

[74] Bureau of Labor Statistics. "Employment Situation Summary." News Release, U.S. Department of Labor, https://www.bls.gov/news.release/pdf/empsit.pdf.

Despite the U-3 being the most commonly used metric for analyzing unemployment, it has its limitations. For example, it does not include factors such as gender, ethnic background, age, and other information that is often necessary to complete economic analyses. The Bureau of Labor Statistics published information regarding unemployment among various demographics, which the following graphics aim to assess.

When assessing U-3 unemployment, it is important to note that there are three forms of U-3 unemployment - cyclical, structural, and frictional. Frictional unemployment refers to when the individual is presently unemployed but searching for a job. Structural unemployment refers to when the individual is unemployed as a result of technological advancement or otherwise innovation that changes the structure of the industry to make their job obsolete. For example, many taxi drivers were victims of structural unemployment as a result of the foundation of Uber and Lyft. Lastly, cyclical unemployment refers to a loss of employment as a result of changes in the economy as a whole, such as recessions.

In addition, it is important to assess short-term and long-term employment separately at this time. The long-term unemployment rate is measured by totaling those who do not have a job but have been unsuccessfully searching for one for above 27 weeks, and dividing it by the total civilian labor force.

Labor Force Participation Rates

In "The Employment Situation", a summary report filed by the Bureau of Labor Statistics, the BLS released participation rates statistics that showed an overall increasing trend, but some notable differences based upon sex and ethnic backgrounds. It can be noted from the graph that the participation rates for Hispanic/Latinx males fly high above the other

backgrounds, reaching far beyond that of Hispanic/Latinx females, and significantly above white females, the second-highest group.

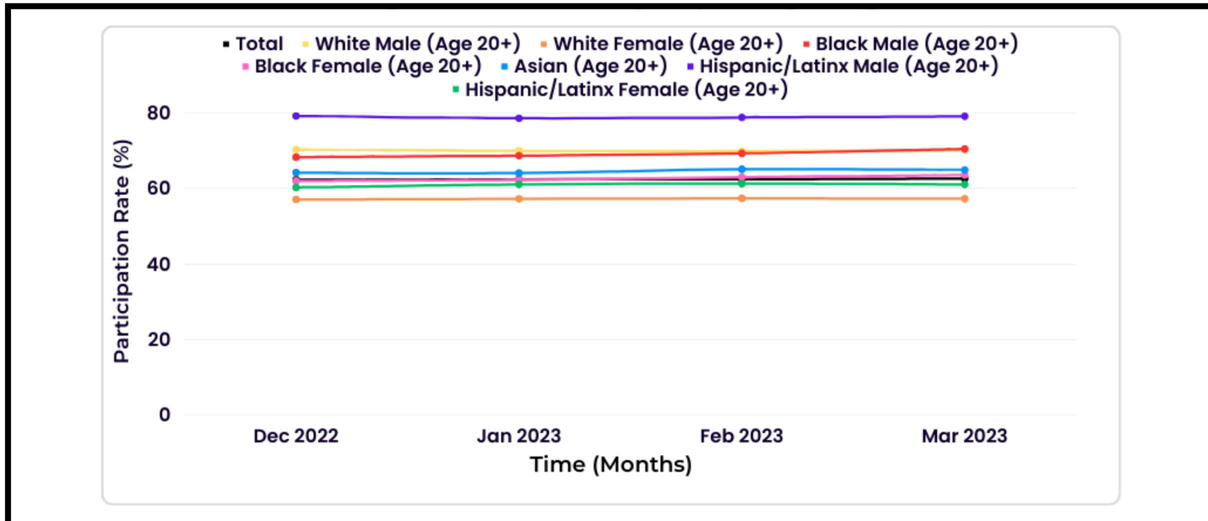

Figure 4.2: Participation Rates by Ethnic Background and Sex, Dec. 2022 - Mar. 2023

Also important to discuss is the variation based on age. As projected by the BLS, the labor force participation rate projections are displayed below.

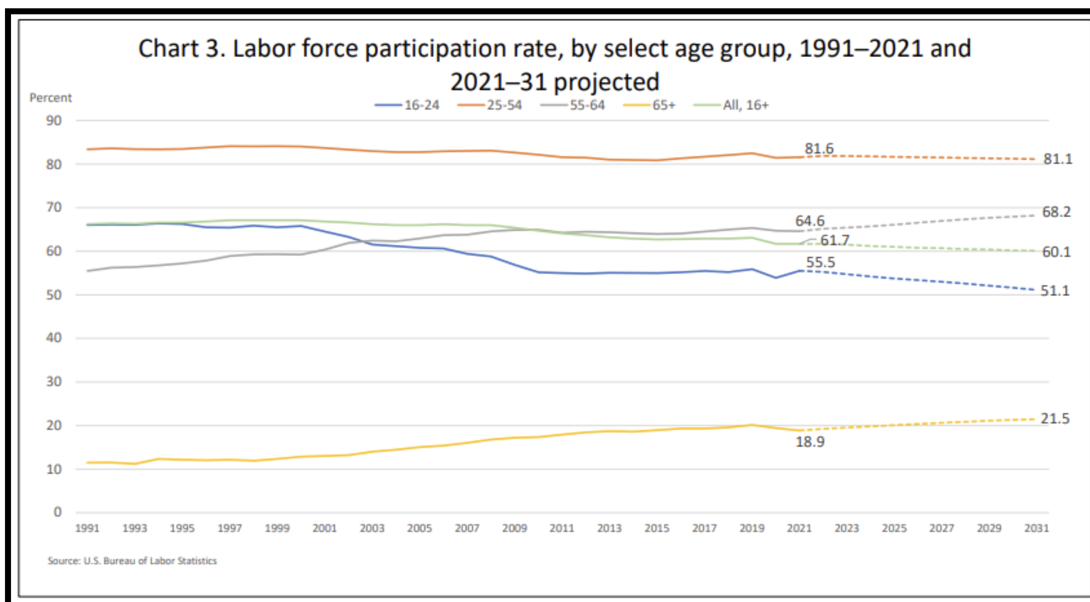

Figure 4.3: Participation Rates, by Select Age Group, Projected.[75]

[75] Bureau of Labor Statistics. "Productivity and Costs, Fourth Quarter and Annual Averages 2020." Economic News Release, U.S. Department of Labor, 4 Feb. 2021, https://www.bls.gov/news.release/pdf/ecopro.pdf.

From the graph, it can be noted that the participation rate for the various age groups is expected to fluctuate greatly throughout the next ten years, with the effects shown over the next two years including a lowered participation rate in citizens age 16-24 as well as a slight decline in those ages 25-54, accompanied by increased participation rates in those ages 55 and older. This shift has been attributed to declining immigration rates as well as fertility rates, slowing US population growth and, as such, shifting the labor towards an older demographic.

Unemployment and the War in Ukraine

How have current world events affected the unemployment rate? One factor that is integral to note is the Ukraine conflict. As much of the American gasoline industry relied on trade from the region, the conflict caused increased booms in gasoline prices. In addition, the fear it caused in American workers may also be noted when discussing the Great Resignation. A poll by the American Psychological Association found that ⅔ of their respondents were very concerned about the American “economy, money, and work” amidst the Ukraine crisis. This continued fear may factor in bringing unemployment back up later this year.

Where the Federal Reserve aims to go in the future, depends on where they aim to shift the labor market. Currently, the projected future of unemployment rates in the US displays an incline after this series of declines, to about 4.6% later in 2023.[76] This higher rate can possibly lead to a recession, so it is up to the Federal Reserve to aim to strike a balance, fighting the still-high inflation rate while not causing massive unemployment. While continuing rising wages may sound attractive when considering the labor market, if allowed to rise too far this can lead to the exodus of small businesses that cannot afford to pay ever-rising wages. On March 22nd, the Federal Reserve announced through their FOMC statement that they would raise the federal

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[76] Insurica. “How the Ukraine Crisis Is Affecting the U.S. Workforce,” Insurica, March 23, 2022, https://insurica.com/blog/how-the-ukraine-crisis-is-affecting-the-u-s-workforce/.

funds rate to 4.75-5%, in a plan to continue their hawkish policy and reduce inflation while not causing massive rebounds in unemployment.

Unemployment in the Tech Sector

Since the mass hiring in January, many large sector tech companies such as Amazon, Alphabet, Inc.'s Google, and Facebook have announced layoffs.[77] Facebook, for example, took a firm stance in support of defining 2023 as the "year of efficiency", laying off over 20,000 workers. Presently, the unemployment rate in the tech sector lies low at approximately 2.2%, which signals that large-scale rehirings are still being undergone. However, it is important to note that in recent months, the section of the tech sector that held the most hiring was not the large companies, but the startups and consulting firms. Many workers who had been laid off by these tech giants have shifted to companies such as Walmart and Kraft.

In addition to mass layoffs, hires of recent college graduates have been largely reduced in the tech sector. Amazon, Inc. postponed start dates for many 2023 graduates while Wayfair cut 10% of its workforce and plans to reduce hires and internships greatly.[78] In a survey conducted by iCIMs, a software firm, it was found that 97% of college seniors surveyed planned to not immediately search for work and instead search for graduate study, part-time work, or other work outside their undergraduate study. Some other companies, such as one that recruits at the Ohio State University, have offered alternative plans in which the company pays for the tuition for the student to receive graduate-level education before joining the workforce a year later. The unemployment rate for recent college graduates in February 2023 was double that of December 2022, a drastic increase from 2.3% to 4.6%. 2.3% was the recent five-year low, posing a large contrast against the current rate.

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[77] Bindley, Katherine. "As Tech Jobs Disappear, Silicon Valley Veterans Reset Their Careers." Wall Street Journal, June 24, 2020, https://www.wsj.com/articles/as-tech-jobs-disappear-silicon-valley-veterans-reset-their-careers-dbdb983.

[78] Ellis, Lindsay; Rhone, Kailyn. Job Openings Outnumber New College Graduates." Wall Street Journal, May 9, 2016

Forecasts

Over the course of the year, the unemployment rate is expected to rise above the non cyclical rate of unemployment while the labor force participation rate is expected to linger mostly unchanged at around 62% for years to come. A long-term forecast released by the Congressional Budget Office aimed to describe and predict the unemployment trends over the coming years. In 2023, the forecast predicted a rise in unemployment from the current 3.6% to around 5.1% by the end of 2023. This is predicted to be a high point for unemployment in the coming years, as it is forecasted to fall again and level out at around 4.7%.[79] Early into the second half is when the forecast predicts the unemployment rate will exceed the non cyclical unemployment rate, which is defined by the rate of unemployment calculated from all but changes in demand. This change in unemployment can work to combat the rises in inflation that come with rising over-maximum employment. Over the course of 2023, the rise in unemployment can likely be associated with issues such as the tech sector's mass firings. This may be more sustainable for the economy, as the stress on businesses that are associated with maintaining massive numbers of workers will be lessened.

[79] Congressional Budget Office. "The Budget and Economic Outlook: 2021 to 2031." 2 Feb. 2021, https://www.cbo.gov/publication/58957.

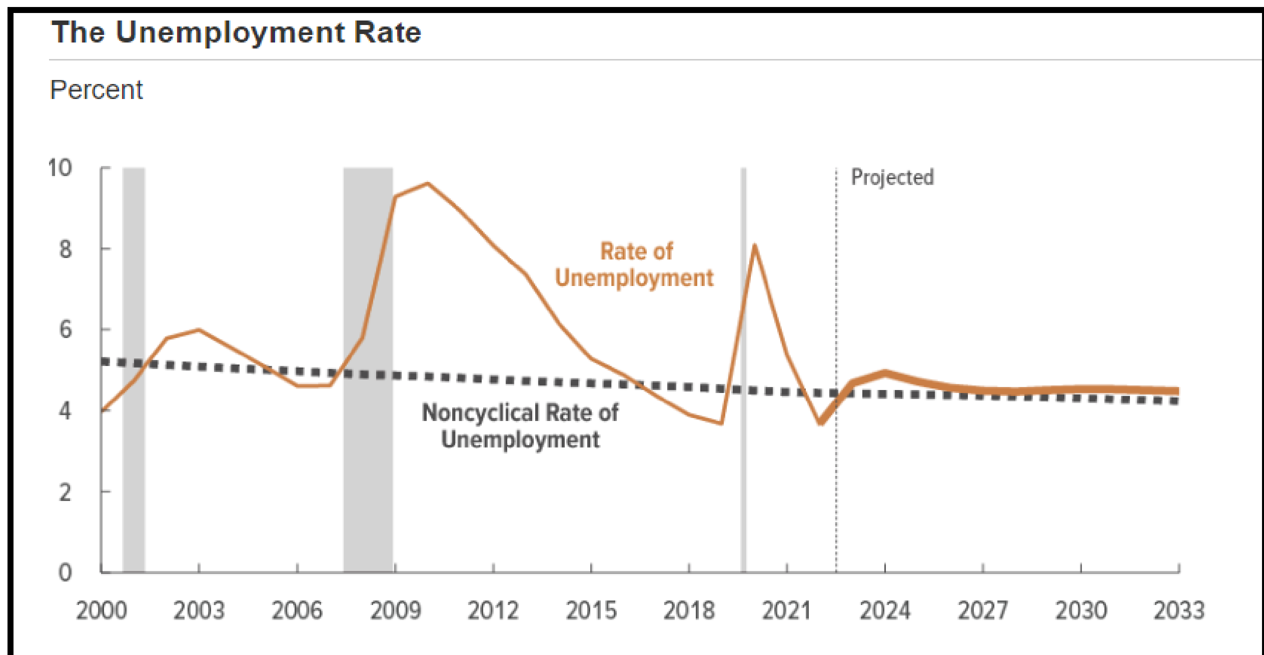

Figure 4.4: Unemployment Rate Forecast Through 2033 (Congressional Budget Office)

Policy Recommendations

As the possibility of recession looms over the economy, these forecasts mostly support that theory. The decline in wage growth rate, alongside the growth in unemployment and decline in labor force participation rate all support the theory that a recession may happen soon in 2023.

As of March 2022, the unemployment rate does not match the Federal Reserve's goal of maximum employment. Although many external factors are at play in the current labor market, such as Ukraine, the FOMC may still have the power to shift the labor market in a more sustainable direction. In the next FOMC meeting, the Federal Reserve can work to fight the unemployment issues by raising the Federal Funds Rate. As the FOMC has raised the federal funds rate by 25 BP already at the May 3 meeting, the advice for the future is based upon this update.[80] The FOMC should raise the FFR by 25 BP at the next meeting in June, reaching

[80] Wall Street Journal. "Federal Reserve Raises Interest Rates for First Time in Three Years." Wall Street Journal, May 17, 2023, https://www.wsj.com/livecoverage/federal-reserve-meeting-interest-rate-hike-expected-may-202

between 5.25% and 5.5%, then leaving it stable to assess whether or not lowering the rate is necessary. This can not only maintain the decline in inflation but can work to stabilize the labor market by slowing mass hiring and allowing for more stable jobs. This can allow for greater expansion in skilled labor, as companies that hired en masse after the pandemic now have the opportunity to fire employees who are not as efficient, and not risk their business. With massive-scale employment, few companies have the money available to pay high wages, and this reduction in employment can allow for a wage hike for skilled laborers. After continuously raising the FFR, the FOMC should assess the success of their movement at the November meeting, and if successful, steadily decline the FFR back to a more stable level.

To reach the goal of maximum employment, the Federal Reserve's control of the Federal Funds Rate will prove undeniably useful, as steady rises in the rate allow for continued assessment over the course of the year. In addition, the Fed can utilize forward guidance to steady the labor participation rate, ease the unemployment rate back towards full employment, and cool inflation related to wage increases.

FEDERAL FUNDS MARKET

Introduction

Interest rate levels are a continuous measure of the supply and demand of credit in an economy and is determined primarily by the supply of funds available for lenders and the demand by borrowers. These levels are indicative of present economic activity, influence its levels, and can forecast future economic activity as well. Specifically, monetary policy is used as a leading indicator of economic activity, given the lags with which it affects activity. Interest rates are measured by "basis points" and are set by the Federal Reserve using a variety of

monetary policy tools, often in tandem with other federal agencies and the private sector, in response to indicators of inflation and unemployment. Calculations to raise or lower interest rates will also factor external shocks, most importantly, uncertainty in financial markets.

Current Events in the Federal Funds Market

Rising inflation and steady unemployment rates were predicted to trigger a major increase in the federal funds rate in the Federal Reserve's Monetary Policy Report on March 3, 2023.[81] Fed officials warned that strong readings of the two measures would push interest rates higher than previously planned. However, the bank run on Silicon Valley Bank (SVB) and the subsequent financial panic have created reasons for rethinking the tightening of monetary policy. High interest rates at a time of financial uncertainty may exacerbate the effects of contagion and will disincentivize lending. As regional bank stocks plummeted, the Federal Reserve was cautious to avoid taking action that could trigger a risk of recession.

In an attempt to balance the two incongruous goals of stability in global financial markets and price stability, the Federal Open Market Committee revealed on May 3, 2023 that they would be increasing the target FFR to a rate between 5.00 and 5.25 percent, reaffirming that the U.S. banking system is "sound and resilient" while nodding to conditions of tighter credit for households and businesses.[82] This goal is to be undertaken by conducting overnight repurchase agreement operations, reinvesting agency mortgage-backed securities (MBS) and auctioning Treasury securities.[83] The Board of Governors of the Federal Reserve also voted unanimously to approve a quarter percentage point increase in the primary credit rate.

[81] Board of Governors of the Federal Reserve. 2023. "Monetary Policy Report." Washington, D.C.
[82] 2023. "Federal Reserve issues FOMC statement." Federal Reserve. March 23. Accessed May 4, 2023. https://www.federalreserve.gov/newsevents/pressreleases/monetary20230322a.htm.
[83] Board of Goverors of the Federal Reserve. 2023. "Implementation Note issued March 22, 2023." Federal Reserve. March 22. Accessed May 4, 2023. https://www.federalreserve.gov/newsevents/pressreleases/monetary20230322a1.htm.

Picking Priorities: Inflation or Bank Turmoil?

The "dual mandate" of the Federal Reserve to pursue the economic goals of maximum employment and price stability can be in direct conflict with the central bank's third responsibility of the financial system.[84] Recognition of this split accountability has pushed the Federal Reserve to use its monetary tools in differing ways to counter high inflation and banking panic; the quarter percentage point increase in interest rates – as well as a forecast of a second increase – was accompanied by generous lending in the discount window to banks in an attempt to curtail the damage caused by the failure of SVB.[85] However, the phrase "The Fed tightens until something breaks" recognizes the limitations of pursuing opposing goals. As interest rates rise, cooling the economy and lowering inflation, the cost of borrowing for financial institutions goes up, which causes a reduction in their lending. Federal Reserve Chairman Jerome Powell identifies the tightening of credit conditions somewhat akin to rate hikes. However, when banks are close to failing, their assets are worth less, their depositors panic, and they are unable to secure funds to reassure depositors, thus causing bank runs. Furthermore, precedent shows that the results of actions separating monetary policy from financial stability may be the opposite of what was intended: in 2007, former Fed Chairman Ben Bernanke attempted to maintain this separation by cutting the discount rate while keeping the federal funds rate constant.[86] However, the mortgage crisis worsened and Bernanke was forced to ease monetary policy. This unconventional approach will be discussed in later sections with its applicability to current financial panic.[87]

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[84] Federal Reserve Bank of St. Louis. 2020. "Making Sense of the Federal Reserve: The Fed and the Dual Mandate." Federal Reserve Bank of St. Louis. August 27.
[85] Ip, Greg. 2023. "Fed Walks Tightrope Between Inflation and Bank Turmoil—but for How Long?" Wall Street Journal. March 22. Accessed May 4, 2023.
https://www.wsj.com/articles/fed-walkstightrope-between-inflation-and-financial-instabilitybut-for-how-long789283d0?mod=economy_lead_pos5.
[86] Reis, Ricardo. 2009. "Interpreting the Unconventional U.S. Monetary Policy of 2007-09." Brookings papers on economic activity 119-165.
[87] Ibid, 119-165.

As the repercussions of the largest bank failure since the 2008 financial crisis unfold, Chairman Powell's decision to raise interest rates could be the most important choice of his tenure. Ellen Meade, an economist at Duke University notes that Powell has fought to gain credibility as the 'inflation fighter' and his decision to keep faith in the resilience of the banking system may be explained by this.[88] This credibility may serve as an implicit measure of forward guidance; interest rate expectations are likely to be at least partially dependent upon the market's perception of Powell's priorities. If Powell's assumption of a secure financial system holds true, inflation will decline closer to the 2% target with little to no widespread damage in the financial system. There are, however, two notable economic instances where either this assumption does not hold or Powell's faith in this assumption was insufficient. First, the failure of SVB revealed inherent risks in many institutions that are made more dangerous through the increase in interest rates. Banks with unrealized bond losses and overdependence on uninsured deposits have seen the latter move to institutions that are too-big-to-fail (SIFIs) or higher yielding money-market funds. As interest rates rise, these deposits will increase. Second, if the Fed had overestimated the magnitude of the consequences of SVB's collapse, the lowering of the interest rate hike from previously planned may have set back the fight against inflation. Furthermore, the expansion of the banking safety net for an isolated problem could have systemic repercussions; expanding deposit insurance for all depositors may increase moral hazard.

International Consensus on Rate Rises

Powell's outlook of inflation being the greater threat to the American economy is shared by the Organization for Economic Cooperation and Development (OECD) and echoed by the Bank of England, which also lifted rates by a quarter percentage point. OECD chief economist

[88] Timiraos, Nick. 2023. "Federal Reserve Faces Tough Decision on Rate Increase." Wall Street Journal. March 23. Accessed May 4, 2023. https://www.wsj.com/articles/federal-reserve-faces-tough decision-on-rate-increase-681d6abc.

cautioned against a pause in the increase in interest rates, noting that he did not see a systemic risk at this stage, unlike in 2008.[89]

Understanding the Interest Rate: Control

The interest rate is set by a number of parameters and target rates and is not a single percentage number. Changes made to the interest rate by the Federal Reserve are in terms of basis points, which are one-fourth of a percentage point.

Federal Funds Rate (FFR)

This refers to the target interest rate set by the Federal Open Market Committee (FOMC) and is the rate at which commercial banks borrow and lend their excess reserves to each other overnight. It also helps set the basis for the prime rate, the rate at which commercial banks charge their most creditworthy customers. The prime rate is typically set at FFR+3%.The prime rate affects the cost of access to small business loans, lines of credit, consumer loans, credit card interest rates, and mortgages.

The FFR can also influence short-term rates on consumer loans and credit cards. The highest that the FFR has reached is 20% under the Nixon Administration in response to high inflation resulting from the removal of the U.S. from the gold standard. The lowest that the FFR has reached is 0%-0.25% during the Great Recession of 2008 to encourage growth. Currently, the FFR target stands at 4.75% to 5.00% as set by the FOMC at its March 2023 meeting. Accordingly, the prime rate most recently published is 8.00%.

Discount Window and Discount Rate

The discount window allows eligible institutions to borrow from the Federal Reserve to meet temporary liquidity shortages. The interest rate charged on these loans are referred to as the

[89] Hannon, Paul. 2023. "Central Banks Should Press Ahead With Rate Rises Despite Bank Pains, Says OECD." *Wall Street Journa*l. March 17. Accessed May 4, 2023.
https://www.wsj.com/articles/central-banks-should-press-ahead-with-rate-rises-despite-bank
pains-says-oecd-43c84783?mod=economy_more_pos12.

“discount rate,” “policy rate,” “repo rate,” or “base rate.” This rate is typically a percentage point above the federal funds rate. The rate at which an institution is charged through the discount window depends on how financially secure it is. The reserve requirement is the required amount of funds a deposit institution must hold to be able to meet liabilities in the case of sudden withdrawals. With higher reserve requirements, there would be less funds available for lending. Reserve requirements were suspended during COVID.

Monetary Policy Tools

The most important monetary policy instruments used to modify interest rates are open market operations, interest paid on reserve balances, and the overnight reverse repurchase agreement (ON RRP).

Open Market Operations

Open market operations refer to the purchase and sale of securities in the open market. The short-term objective for OMOs is specified by the Federal Open Market Committee (FOMC). Prior to the financial crisis (2008), OMOs were used to adjust the supply of reserve balances to keep the federal funds rate around the target rate. Holding longer-term securities through open market purchases can exert a downward pressure on long-term interest rates, stimulating economic activity, and thus, making the policy popular during recessions.

Interest on Reserve Balances (IORB)

This is the interest paid by the Federal Reserve on reserve balances held by eligible institutions and helps steer the federal funds rate into the FOMC’s target range. While it is legally required for banks to hold a deposit account at the Federal Reserve to meet reserve requirements, it is also economically efficient to pay interest on these funds; the opportunity cost to banks of holding reserves should be eliminated.

The IORB also plays an important role in times of financial crises.[90] In times of crises, such as in 2008, the Fed may need to provide emergency lending provisions during bailouts. These provisions are financed by the creation of new reserves, which typically exerts downward pressure on the FFR. However, when the Fed pays interest on excess reserves (IOER), they effectively create a "price floor" beneath which the FFR cannot fall. This is because banks will not lend at a rate lower than what they receive on excess reserve holdings at the Fed. This policy also shifts the demand curve for reserves to the right, thus allowing for a simultaneous shift in the supply curve of reserves to the right without creating an increase in the aggregate nominal price level. Former Fed chairman, Ben Bernanke recognizes this approach as "conceptually distinct from quantitative easing" as it focused both on assets (loans and securities held) and liabilities (bank reserves), instead of simply the latter. Bernanke further declared the IOER to be the "most important tool" for raising interest rates.[91]

However, non-depository institutions (U.S. government-sponsored enterprises, Federal Home Loan Banks) are simultaneously eligible to hold deposits at the Fed and ineligible to receive interest payments on these deposits, creating an operational complication of potential arbitrage. Specifically, these institutions with reserve accounts had an incentive to lend funds in the federal funds market at rates lower than the IORB rate, undermining the established floor. This would move the FFR lower than the FOMC's target.

The problem of "liftoff" also raised the question of whether the Fed could expect that the fed funds rate would increase along with the IOER if the Fed attempted to control the fed funds rate only through increases in the IOER.[92] While the IOER did create a floor during the financial

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[90] Ireland, Peter. 2019. "Interest on Reserves: History and Rationale, Complications and Risks." Cato Institute. Accessed May 4, 2023. https://www.cato.org/cato-journal/spring/summer 2019/interest-reserves-history-rationale-complications-risks.
[91] Bernanke, Ben. 2009. "Semiannual Monetary Policy Report to the Congress." Federal Reserve. July 21. Accessed May 4, 2023. https://www.federalreserve.gov/newsevents/testimony/bernanke20090721a.htm.
[92] The Fed and Interest Rates." Federal Reserve Bank of St. Louis. July 5. Accessed May 4, 2023. https://www.stlouisfed.org/on-the-economy/2016/july/fed-interest-rates-floor-subfloor.

crisis, moving away from the 0% interest rate required more extensive tools. This led to the creation of a "floor with a subfloor" in 2014, where the subfloor was the overnight reverse repurchase agreement (ONRPP), which is set below the IOER.

Overnight Reverse Repurchase Agreement

When the Federal Reserve conducts an overnight RRP, it sells a security to an eligible counterparty and simultaneously agrees to buy the security back the next day. The FOMC sets the ON RRP offering rate, which is the maximum interest rate the Federal Reserve is willing to pay in an ON RRP operation; the actual interest rate that a counterparty receives is determined through an auction process. The Fed introduced ONRPPs to improve its control over the FFR. While it was originally intended to serve as a temporary measure, the take-up of the facility neared $1 trillion in the summer of 2021. This provision allowed a broader range of institutions, including GSEs, to earn interest on reserves, thereby facilitating greater control over the FFR. By setting the ONRPP rate as the lower bound of the FFR target, the Fed creates a hard floor for the policy rate.

There was a surge in ONRPPs after the expiration of supplementary leverage ratio (SLR) during the COVID-19 pandemic.[93] The Supplementary Leverage Ratio (SLR) is a risk-insensitive capital requirement that compares a bank's equity to the value of its assets irrespective of the underlying risk of those assets, implemented after the Basel III accords were signed. This requirement was waived after the onset of the pandemic. This was done to ease strains in the Treasury market (by facilitating bond market liquidity) and to promote lending to households and businesses. Specifically, the Fed modified the SLR to exclude U.S. Treasury securities and central bank reserves from the denominator of the SLR.[94] The exclusion of reserve

[93] Ibid.

[94] Regulatory standards measure the capital/asset ratio – for a certain amount of assets, a predetermined amount of capital must also be held. When one class of assets is excluded from the regulatory ratio, the amount of capital that is required to be held to meet the required ratio will reduce, thereby increasing liquidity.

balances and Treasuries from the SLR denominator disincentivized banks to push deposits to other banks and money funds (via the ON RRP facility), because they are typically riskier than holding reserves at the Fed. However, these changes expired on March 31, 2021, which caused a short-term reduction in market liquidity. Banks pushed clients out of deposits and into MMFs, which incidentally have a large demand for reverse repos.[95] This led to the Fed borrowing at a zero rate from MMFs through the ON RPP facility.[96] Usage of the ON RPP facility reached a record high of $2.2 trillion on December 30, 2022 but has declined since.[97]

Monetary Policy Forecasts

As noted by Jia et al in their paper, Monetary policy rules and opinionated markets, the direction of future interest rates remains a source of disagreement between the Federal Reserve and the market.[98] The size of this disagreement can be measured by the gap in Greenbook forecasts – predictions by the Federal Reserve – and the Blue-Chip data – predictions by the private sector. This is best explained by differing interpretations of the Taylor Rule.[99] Expectations about the interest rate typically use a lagged time-series regression of inflation against past interest rate through the Taylor Rule formula. Specifically note the regression coefficients below will vary between Blue-Chip data and Greenbook data: where i_t denotes interest rates at time t, π denotes inflation at time t, and the parameter set $\{\alpha, \varphi_y, \varphi_\pi\}$ are indicative of how different forecasters have different beliefs about the monetary policy rule captured by the data set.[100]

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[95] A money market fund is a kind of mutual fund that invests in highly liquid, near-term instruments. These instruments include cash, cash equivalent securities, and high-credit-rating, debt-based securities with a short term maturity (such as U.S. Treasuries). MMF have high liquidity and low risk. Investment restrictions push MMFs to invest a large share of assets in prime repos.

[96] Viktoria Baklanova, Isaac Kuznits, Trevor Tatum. 2021. Money Market Funds and the Repo Market. Primer, Washington, D.C.: Securities and Exchange Commission.

[97] "Federal Reserve issues FOMC statement." Federal Reserve. March 23. Accessed May 4, 2023. https://www.federalreserve.gov/newsevents/pressreleases/monetary20230322a.htm.

[98] Jia, Pengfei, and Haopeng Shen. 2023. "Monetary policy rules and opinionated markets." *Economics Letters* 1-8.

[99] Ibid, 1-8.

[100] Ibid, 1-8.

$$i^{\tau}_{t+j|t} = \alpha^{\tau} + \varphi^{\tau}_{\pi}\pi^{\tau}_{t+j+h|t} + \varphi^{\tau}_{y}y^{\tau}_{t+j+h|t}$$

Upon performing the Blinder-Oaxaca decomposition, Jia et al reported -0.73 as the difference between the two forecasts, using the estimators $\hat{\varphi}^{g}_{\pi} - \hat{\varphi}^{b}_{\pi}$ to conclude that Greenbook forecasters predict the interest rate will be set lower than Blue Chip forecasters predict.[101] These results are visually represented in Fig. 5.1.

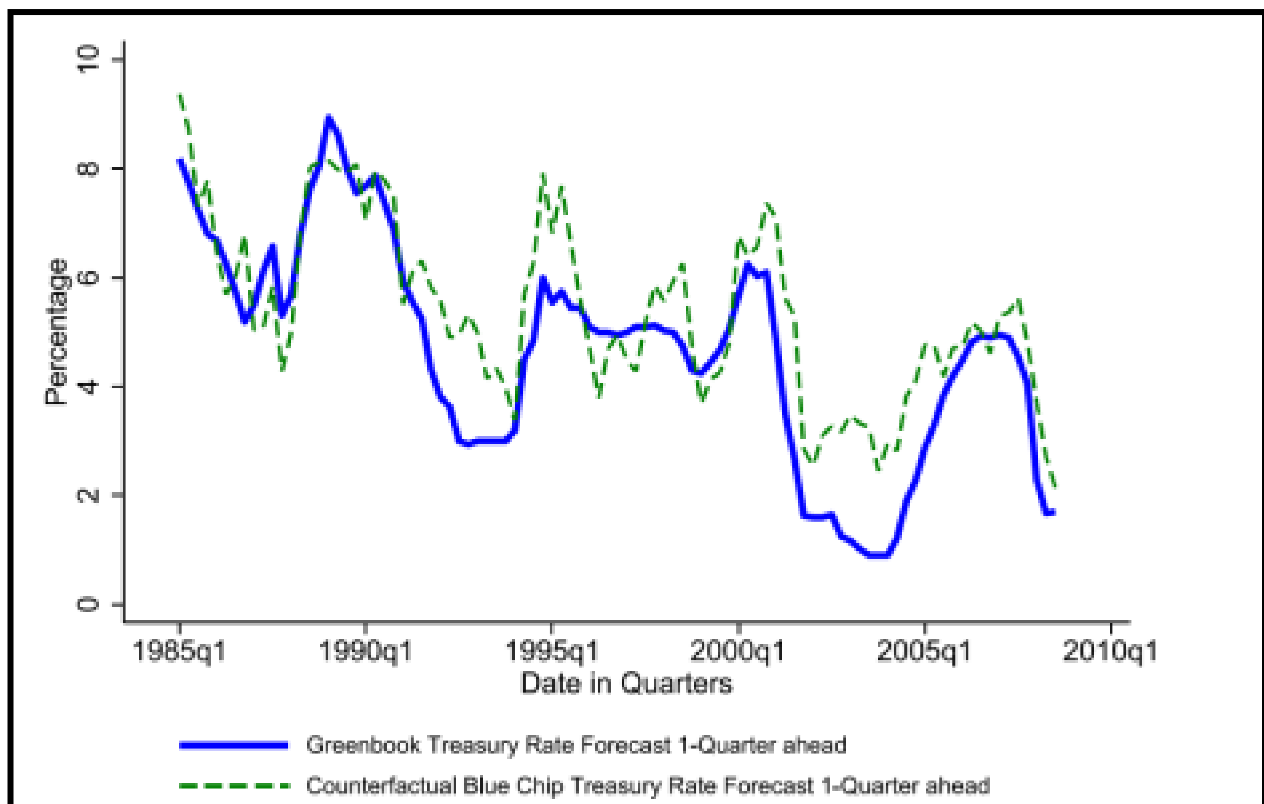

Figure 5.1: The Greenbook Treasury rate forecast compared with Blue Chip forecast[102]

[101] The Blinder-Oaxaca decomposition is a statistical method used to describe the difference in the means of a dependent variable between two groups by decomposing the gap into that part that is due to differences in the mean values of the independent variable within the groups, on the one hand, and group differences in the effects of the independent variable, on the other hand.
[102] Jia, Pengfei, and Haopeng Shen. 2023. "Monetary policy rules and opinionated markets." Economics Letters 1-8.

This difference is critical in predicting the market's response to the current rise in interest rate, and subsequently, in forecasting future market turmoil. Specifically, given that the private sector predicts that future interest rates will be set higher than what Fed estimates predict, this may increase the risk of contagion within the banking sector. High interest rates, as aforementioned, hold inherent risk for banks with poor quality assets that are on the verge of failure, which may prompt bank runs, thus pushing them over the edge. Given the timing of the failure of Signature Bank and Credit Suisse after SVB's bank run, a systemic banking crisis is plausible. This, in turn, may change the Federal Reserve's actual policy on interest rates and cause them to lower rates in response to the crisis. The situation is uniquely opposite to the self-fulfilling prophecy.

Inflation rates will be another important component for forecasting interest rate policy for the remainder of the year. Three critical uncertainties underscore the direction of and rate of change of inflation: supply chain disruptions, effects of inflation expectations on wage negotiation, and consumer spending habits. Forecasts by the Bank of International Settlements noted that supply chain "bottlenecks" have been easing up as consumers of Russian goods move away from their imports and pandemic-era shortages have reduced.[103] Figure 5.2 reflects these observations using Citi and New York Fed data. Furthermore, the Fed core Personal Consumption Expenditure (PCE) inflation prediction for 2023 is 3.2-3.7%.[104] In conclusion, inflation persists but is no longer the most worrisome issue in the economy.

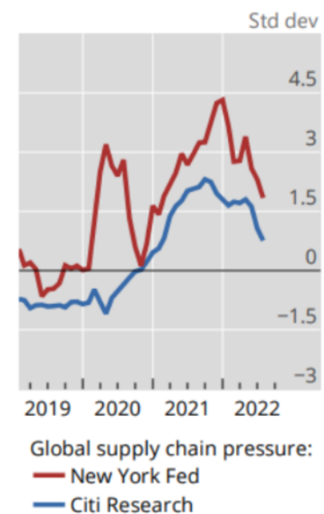

Fig. 5.2: Supply chain pressures are easing but remain at an all time high.

[103] Igan, Deniz, Phurichai Rungcharoenkitkul, and Koji Takahashi. 2022. Global supply chain disruptions: evolution, impact, outlook. Basel: Bank of International Settlements.
[104] Ibid.

Monetary Policy Recommendations

Recommendations for future monetary policy will rely wholly on the market's response to the moderate rate increase. It may prove helpful to follow global bank failures and takeovers, as they may be the best available forecaster for measuring the risk of contagion.[105] The S&P 500 Banks index, an indicator of banking stock performance, is steadily recovering from the dramatic drop following the March 10 collapse of SVB. This indicates current expectations that contagion is not likely and Fed forecasts on banking stabilities are correct, thus far.

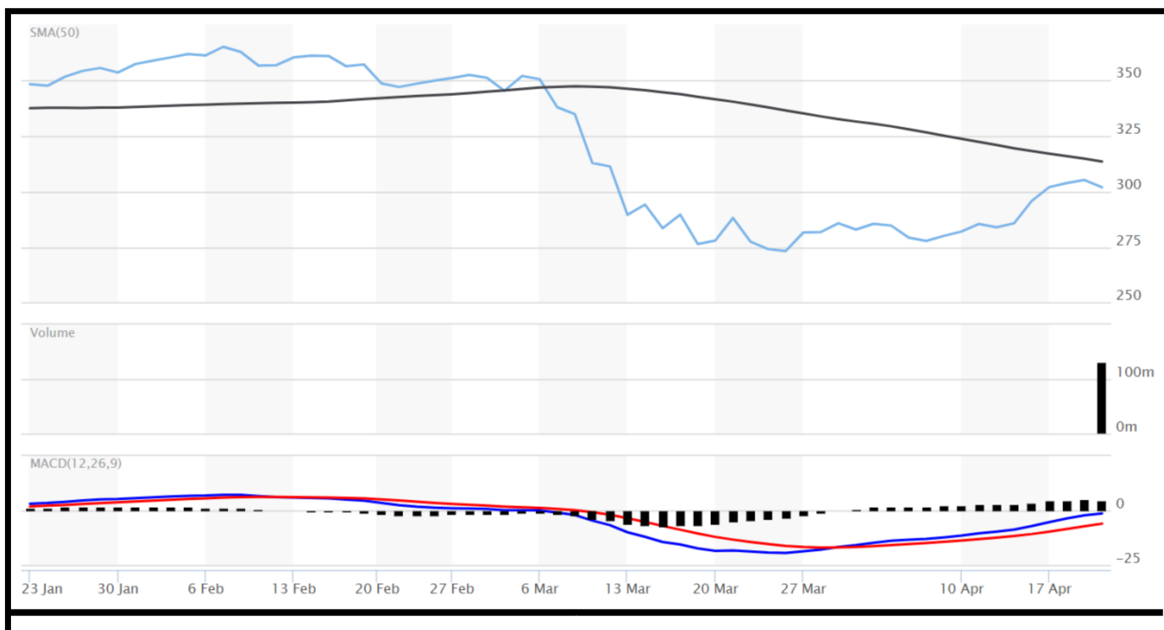

Figure 5.3: S&P 500 Banks Index as of April 20, 2023

When the central bank decreases the supply of reserves, while keeping the rate it pays on those reserves fixed, it raises the equilibrium interbank rate.[106] The amount by which the rate increases depends, ceteris paribus, on the interest elasticity of banks' reserve demand, as seen in

[105] Smith, Elliot. 2023. "This is not another banking crisis, analysts say ." CNBC. March 28. Accessed May 4, 2023. https://www.cnbc.com/2023/03/28/this-is-not-another-banking-crisis-analysts-say-itssentiment-contagion-instead

[106] Friedman, Benjamin. 2010. "Implementation of Monetary Policy: How Do Central Banks Set Interest Rates?" Handbook of Monetary Economics 1345-1438.

the following equation.[107] Here, *i* refers to the logarithm of yield of prime commercial paper, D is a dummy variable that is {D = 0 if non-member bank} or {D = 1 if member bank}.

$$R = \alpha_1 + \alpha_2 D + \beta_1 i + \mu$$

The reserve ratio interest elasticity is determined by a logarithmic function of the yield on prime commercial paper and has a negative correlation. Recent Fed estimates reveal these yield rates to be, on average, increasing.[108] This would indicate that the interest elasticity of banks' reserve demand is currently negative, thereby revealing that the equilibrium interbank rate does not increase by much. Future recommendations for interest rate increases will depend on the rate of change of commercial paper yields.

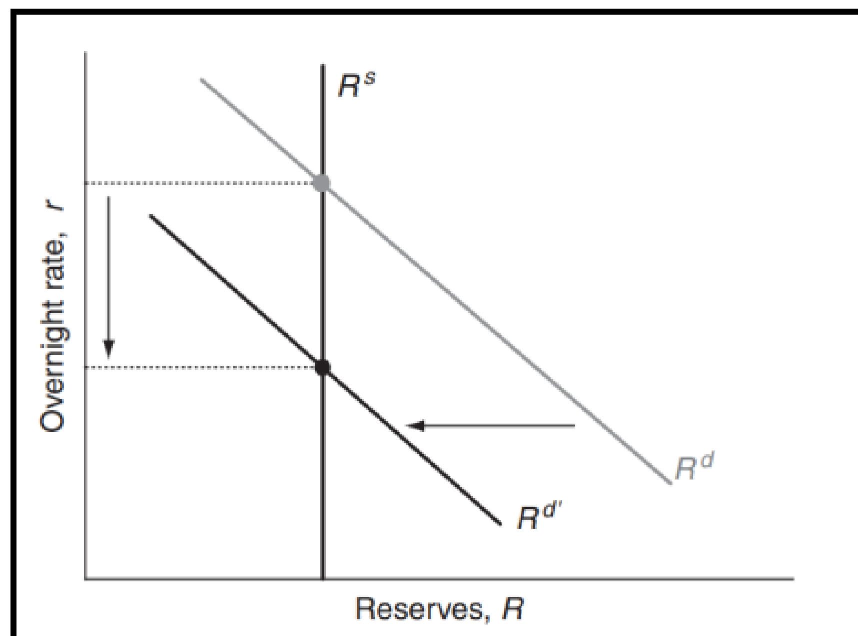

Figure 5.4: Implementing monetary policy by changing reserve demand

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[107] Vernon, J.R. 1990. "Interest on reserves and reserve interest elasticity: Evidence and macroeconomic implications." Journal of Macroeconomics 323-331.
[108] Board of Governors of the Federal Reserve. 2023. "Commercial Paper Rates and Outstanding Summary." Federal Reserve. May 3. Accessed May 4, 2023.
https://www.federalreserve.gov/releases/cp/.

The current FFR, as of May 4, 2023 is 4.83%.[109] Given these analyses, the Federal Reserve should further increase interest rates by 25 basis points by the end of 2023. The new target range should be 5.25-5.50%, consistent with a balanced approach towards inflation and financial uncertainty.

Using the Discount Window

The discount window is important as a conventional tool in setting interest rates and maintaining market liquidity. Most recently, the directors of the Federal Reserve Board of Atlanta, Boston, San Francisco, Richmond, Chicago, and Dallas voted to establish the primary rate of credit at 5% and the secondary credit rate at 5.50% and appears to be steadily increasing as seen in the graph below.

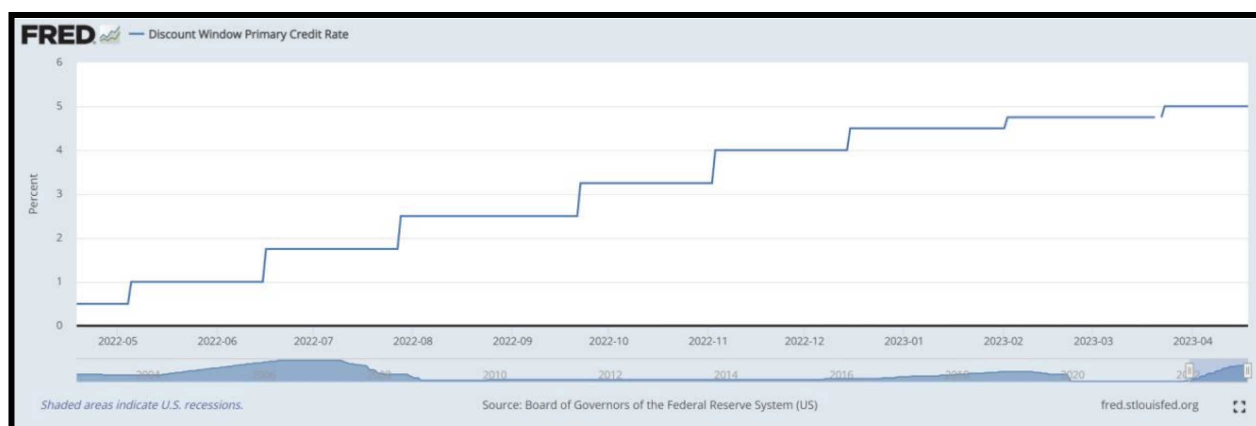

Figure 5.5: Discount window primary credit rate

Adopting Unconventional Approaches: Lessons from 2008

Quantitative easing was a critical part of Bernanke's monetary policy following the 2008 financial crisis. A highlight of his QE strategy was the Maturity Extension Program (MEP), which involved the purchase of $400 billion of 6-to-30-year Treasuries and the simultaneous sale of 1-to-3-year securities of the same value in 2011.[110] This put downward pressure on longer term

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[109] Federal Reserve Bank of New York. n.d. "Effective Federal Funds Rate." New York Fed.
[110] Kuttner, Kenneth. 2018. "Outside the Box: Unconventional Monetary Policy in the Great Recession and Beyond." Journal of Economic Perspectives 121–146.

interest rates to "help make broader financial conditions more accommodative."[111] Given the split objective in 2023, adequate policy responses could include an interest rate increase of 25 basis points using conventional measures, as discussed above, at the May and June FOMC meeting, while simultaneously performing sterilized asset purchases, similar to the MEP, to relieve the longer term interest rate pressures to protect financial institutions whose stability is dependent upon lower long-term interest rates. Because the policy entails buying and selling assets of the same value, the operation would be balance sheet neutral.[112]

REAL ESTATE MARKET

Currently, housing demand continues to outpace supply. Residential real estate prices continue to rise, raising fears of a housing bubble, while commercial real estate struggles to return to pre-pandemic levels. As the Federal Reserve raises interest rates, we should expect to see prices for residential real estate continue to level off in conjunction with a decline in the value of mortgage backed securities due to higher mortgage rates. Commercial real estate is of more concern because of high office vacancy rates, and increases in the federal funds rate could significantly affect this sector. The decline in value of MBS and CMBS products because of the rate increases in the past year are expected to add stress to an already strained banking system.

Residential Real Estate

Housing prices have continued to rise but the pace of growth has slowed down in 2023 compared to 2022. Mortgages are higher at above 6 percent[113]. As the Fed continues to tighten conditions in the economy, housing prices are expected to level off, which is confirmed as the

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[111] "Federal Reserve issues FOMC statement." Federal Reserve. June 20. Accessed May 3, 2023. https://www.federalreserve.gov/newsevents/pressreleases/monetary20120620a.htm.
[112] Ehlers, Torsten. 2012. The effectiveness of the Federal Reserve's Maturity Extension Program. Working Paper, Basel: Bank of International Settlements.
[113] "Mortgage Rates." n.d. Accessed April 16, 2023. https://www.freddiemac.com/pmms.

median existing home price in February 2023 is at $363,000, 1.3 percent higher than in February 2022 but down 13% from an all time high of $413,800 in June of 2022. Median sale prices of houses sold in the United States is higher than the median existing home price however (Figure 6.1). Total houses sold rose 12% in February compared to a month prior, but is down 22.6% from a year ago[114].

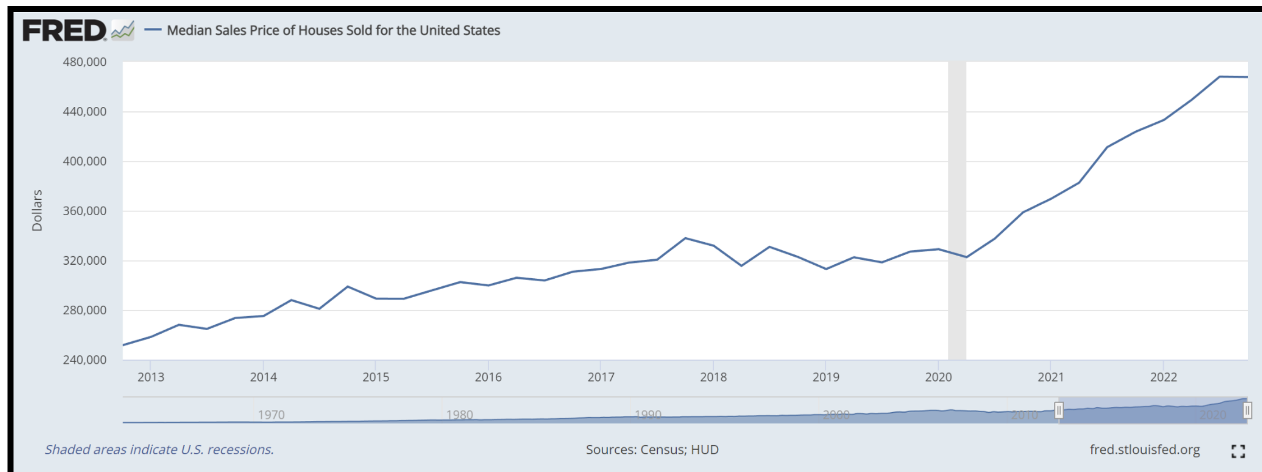

Figure 6.1: Median Sales Price of Houses Sold for the United States[115]

The availability of housing inventory continues to be a problem due to a lack of housing supply in many metropolitan areas. Low housing supply has plagued the housing market ever since 2008 due to investor ownership of homes and more recently, supply chain issues due to COVID-19. Experts predict that low housing inventory will continue to be a problem in 2023, but conditions are expected to slightly improve as supply chain bottlenecks, which caused a lack of available building materials during 2020-2021, continue to be resolved.

Inflated prices of housing may indicate that the housing market has entered a bubble, although this bubble is less severe than in the years leading up to 2008. This bubble is different

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[114] "Housing Market Predictions For 2023: Will Home Prices Drop? – Forbes Advisor." n.d. Accessed April 16, 2023. https://www.forbes.com/advisor/mortgages/real-estate/housing-market-predictions/.

[115] Median Sales Price of Houses Sold for the United States from U.S. Census Bureau and U.S. Department of Housing and Urban Development. 1963. "Median Sales Price of Houses Sold for the United States." FRED, Federal Reserve Bank of St. Louis. FRED, Federal Reserve Bank of St. Louis. January 1, 1963. https://fred.stlouisfed.org/series/MSPUS.

from 2008 as there is little indication of rampant speculation in mortgage backed securities as the prices of these MBS products continue to decline.[116] The higher prices are more likely due to investors purchasing larger proportions of single family homes and the growth of suburban areas that began with the COVID pandemic.

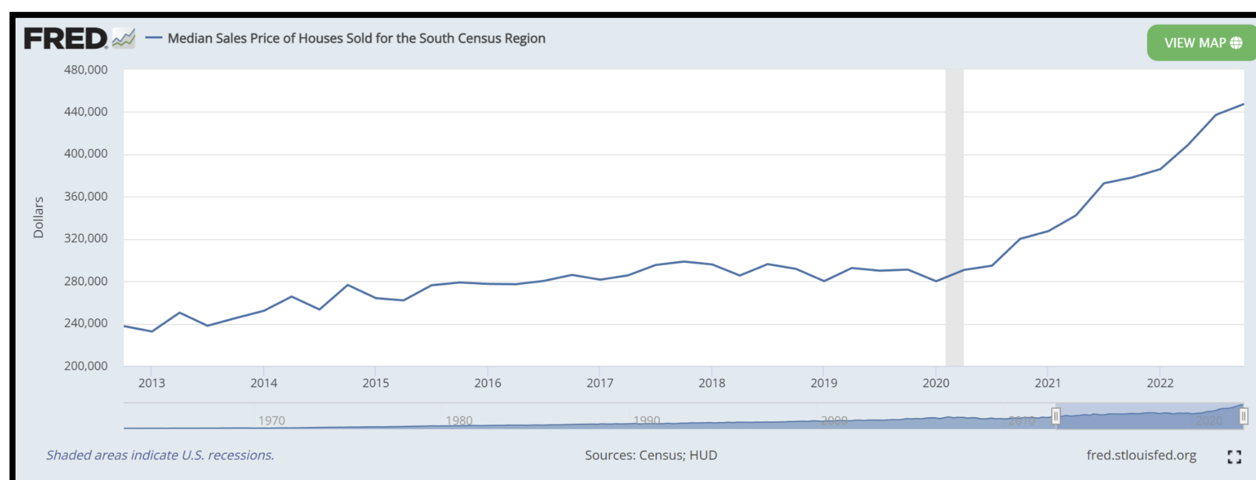

Figure 6.2: Median Sales Price of Houses Sold for the South Census Region[117]

During the pandemic, migration outflows occurred from large cities such as New York and Chicago and into more rural and suburban areas. Net migration to smaller counties increased while it decreased for larger counties. The Sun Belt continues to see net inflows in migration, driving up housing demand especially in the south.[118] The trends of migration to the south is consistent with the rapid continuous increases in housing prices in the Southern United States census region, as seen in Figure 6.2. Single family homes are in demand for more and more Americans, which combined with higher institutional ownership of single family homes, is causing prices to increase substantially.

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[116] "S&P U.S. Mortgage-Backed Securities Index." n.d. S&P Dow Jones Indices. Accessed March 31, 2023. https://www.spglobal.com/spdji/en/indices/fixed-income/sp-us-mortgage-backed-securities-index/.
[117] Median Sales Price of Houses Sold for the South Census Region from U.S. Census Bureau and U.S. Department of Housing and Urban Development. 1963a. "Median Sales Price of Houses Sold for the South Census Region." FRED, Federal Reserve Bank of St. Louis. FRED, Federal Reserve Bank of St. Louis. January 1, 1963. https://fred.stlouisfed.org/series/MSPS
[118] Bureau, US Census. n.d. "Nation’s Urban and Rural Populations Shift Following 2020 Census." Census.Gov. Accessed April 16, 2023a. https://www.census.gov/newsroom/press-releases/2022/urban-rural-populations.html.

Investors owned 24% of single family homes in 2021. Investor ownership in fast growing states are higher at close to 33%,[119] driving up prices in the sun belt significantly. Investors are able to outcompete individual homeowners by paying for houses using cash, driving up housing bids and housing prices. This trend began after the 2008 financial crisis and continues to this day because even though regulations prevented banks from writing subprime mortgages where the likelihood of repayment was very low, mortgage regulations do not apply to cash payments, and investors mainly buy housing through cash. This is why even though housing prices are increasing significantly faster than the years leading up to 2008, the likelihood of high MBS speculation is low. However, this increase in investment spending is driving large growth in rents, which is causing housing to become increasingly unaffordable in many places.

Mortgage Backed Securities and the 2023 Banking Crisis

The state of mortgage backed securities is rather precarious due to a whole different set of reasons than in 2008. Excluding illegal activities, Mortgage backed securities are inversely related to the mortgage rates because of the fact that high mortgage rates discourage individual homeowners to refinance their homes. As refinancing rates lower, investors realize that mortgages will be paid off at a later date than if these mortgages were to be refinanced in a low interest rate environment. Because mortgage backed securities are bundles of mortgages combined together, the result of a large number of homeowners not refinancing is a decline in the price of mortgage backed securities[120]. The rapid increases in the federal funds rate has resulted in the value of mortgage backed securities falling precipitously over the past year. Banks of all sizes did not anticipate this rapid rise in the federal funds rate, and this has posed significant risk to the entire banking industry. In the working paper, “Money Tightening and US Bank Fragility

[119] “Investors Bought a Quarter of Homes Sold Last Year, Driving Up Rents.” 2022. July 22, 2022. https://pew.org/3Pt64yx.
[120] https://www.capitaliq.spglobal.com/interactive/lookandfeel/4017464/3.pdf

in 2023," through analysis on bank exposure to higher interest rates, it was concluded that 190 banks are at risk of impairment to their insured depositors if only half of all uninsured depositors withdrew. The monetary value of what is at risk is more than $250 billion[121]. The paper above confirms that the banking industry is in an extremely precarious position and further banking contagion could result in significant financial turmoil in the near future.

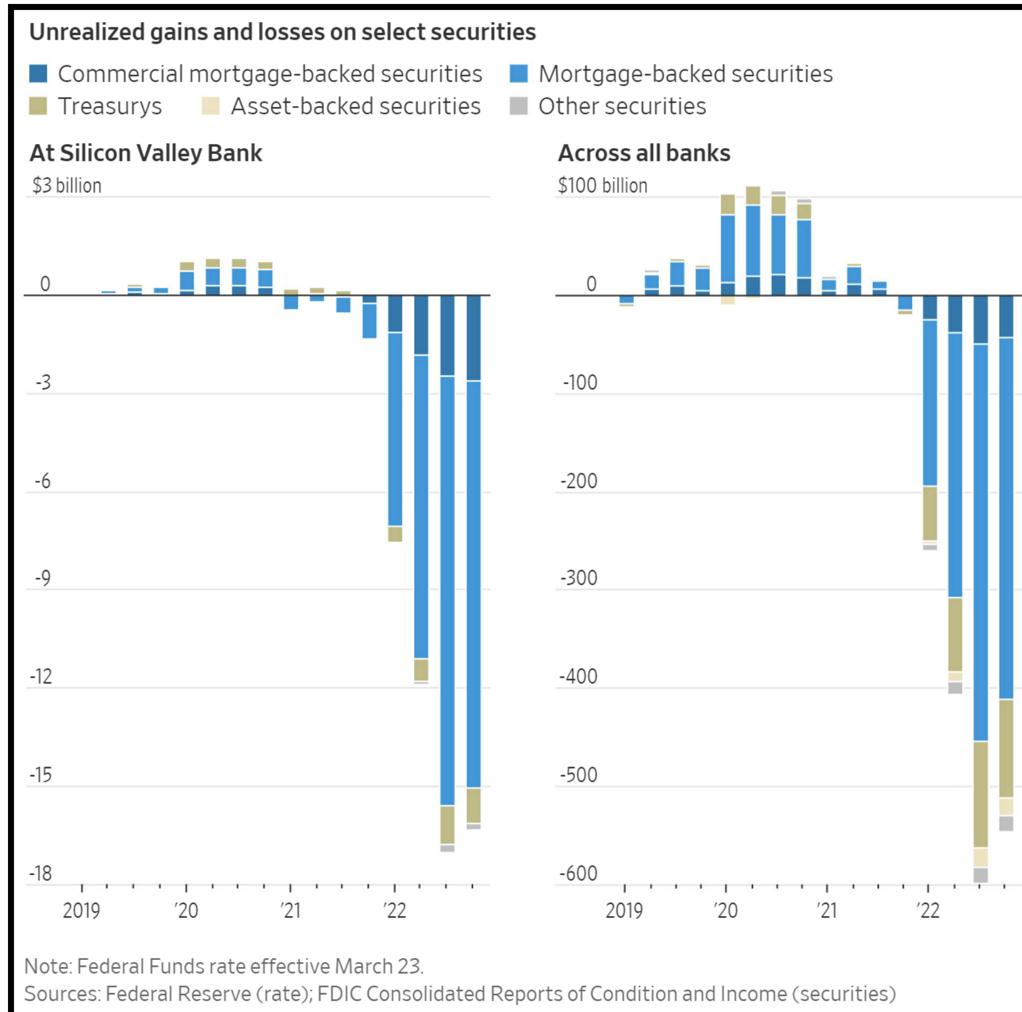

Figure 6.3: Unrealized gains and losses on select securities[122]

[121] Jiang, Erica Xuewei, Gregor Matvos, Tomasz Piskorski, and Amit Seru. 2023. "Monetary Tightening and U.S. Bank Fragility in 2023: Mark-to-Market Losses and Uninsured Depositor Runs?" SSRN Scholarly Paper. Rochester, NY. https://doi.org/10.2139/ssrn.4387676.
[122] Unrealized gains and losses on select securities from Shifflett, Shane, and Danny Dougherty. 2023. "Where Financial Risk Lies, in 12 Charts." Wall Street Journal, March 26, 2023, sec. Markets. https://www.wsj.com/articles/where-financial-risk-lies-in-12-charts-792bca35.

As shown in Figure 6.3, all banks have significant unrealized losses on mortgage backed securities. The Wall Street Journal created the graph in Figure 3 based on data from the FDIC, who stated that by the end of fiscal year 2022, unrealized losses in held-to-maturity securities were about $620 billion.[123] If all securities are counted, total unrealized losses in banking are around $1.7 trillion.[124] The Silicon Valley Bank failure in March 2023 has been in the news more than the other banks for good reason, however, it is untrue to assert that the risk of banking failures is contained to a few midsize regional banks when data clearly shows that these unrealized losses are an endemic problem in the banking industry. Figure 6.3 shows that the heavy investment in mortgage backed securities during previous periods of low interest rates resulted in significant unrealized losses across all banks, not just mid-size regional banks such as SVB or First Republic. From the contagion of the banking crisis in Europe, it is a safe assumption to state that other regional banks and even international investment banks such as Credit Suisse and Deutsche Bank held a similar set of investments as Silicon Valley Bank did. Keep in mind that Credit Suisse, a global investment bank, was bought out by UBS in a deal funded by the Swiss government. Government-funded buyouts only occur for struggling banks on the verge of collapse, such as with First Republic Bank on May 1st, 2023 (SVB collapsed too quickly for the US government to intervene in a buyout by the next market-open day).

According to SVB's 10k filing for FY2022, SVB had $91.32 billion in held-to-maturity securities, which include treasury securities, MBS and CMBS products, and various other bonds. The majority of their held-to-maturity assets, $86 billion, had a maturity date after 10 years, and the market value of those assets declined significantly due to the rise of the federal funds rate

[123] "Remarks by FDIC Chairman Martin Gruenberg at the Institute of International Bankers." n.d. Accessed May 3, 2023. https://www.fdic.gov/news/speeches/2023/spmar0623.html.
[124] "U.S. Banks Are Sitting on $1.7 Trillion in Unrealized Losses, Research Says. That's Not a Problem—until It Is." n.d. Fortune. Accessed May 3, 2023.
https://fortune.com/2023/03/23/banks-unrealized-losses-nearly-2-trillion-treasuries-mortgage-backed-securities/.

over the past year. What is especially concerning is that SVB considered their risk of credit loss for their held-to-maturity securities to be zero, citing that they were guaranteed by the US government.[125] In hindsight, we now know that the risk of credit loss for SVB's held-to-maturity securities was not zero. Since other banks most likely held a similar amount of held-to-maturity assets, and since other banks are likely to have labeled them with zero risk, this poses systemic risks to the health of the American economy. The precipitous rise in discount lending, breaking the previous record in 2008, confirms that unrealized losses in the banking industry became significant realized losses in the balance sheets of many banks due to a cascading series of bank runs following the collapse of SVB. It is highly plausible that the banking crisis was worsened by labeling HTM securities as zero risk because it allowed banks such as SVB to make risky investments in HTM securities, or to label as many investment products as possible as HTM securities. There is a high possibility of further banking contagion if another regional bank were to have liquidity issues because of the declining values of held-to-maturity assets, and if that happens, it will have significant financial consequences as covered in the working paper "Money Tightening and the US Bank Fragility in 2023."

Commercial Real Estate

The state of commercial real estate is rather concerning, especially after the banking crisis of 2023. Signature and First Republic Bank were heavy lenders of commercial mortgages.[126] Signature was closed by the FDIC on March 12, 2023, two days after the collapse of SVB, and First Republic Bank was closed by the FDIC and sold to JP Morgan on May 1st, 2023. The instability in the banking industry adds to an already problematic commercial

[125] "SVB Financial Group Form 10 k." n.d. Accessed April 28, 2023. https://www.sec.gov/Archives/edgar/data/719739/000071973923000021/sivb-20221231.htm.

[126] Goldstein, Matthew. 2023. "Bank Crisis Could Cast Pall Over Commercial Real Estate Market." *The New York Times*, March 22, 2023, sec. Business. https://www.nytimes.com/2023/03/22/business/svb-signature-commercial-real-estate.html.

mortgage backed securities market, and with these new developments, the likelihood of a significant downturn in the commercial mortgage market is growing.

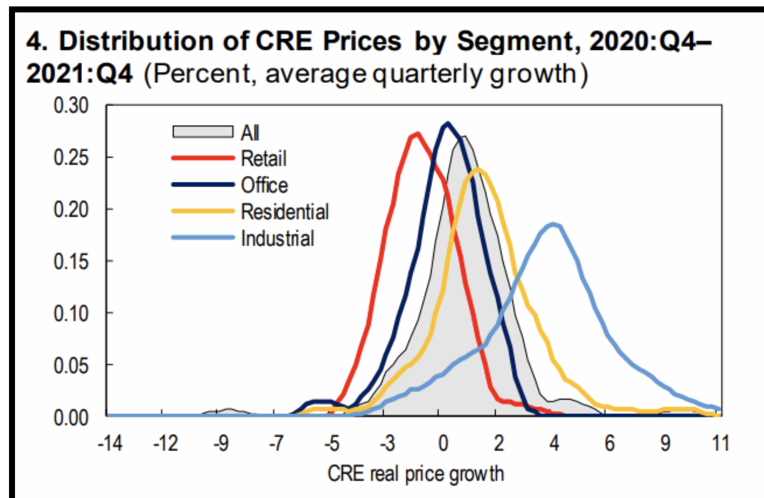

Figure 6.4: Global price growth distribution in 2021[127]

Commercial real estate has already been in a slump post-COVID due to the rise of remote work. Nationally, office vacancy rates sit at 19.1%,[128] the highest on record. In New York City, some offices in Manhattan have vacancy rates at 29%,[129] which is double what it was four years ago. Many other cities, such as Boston, Atlanta, and San Francisco are experiencing similar declines in the occupation of office space. Internationally, with the exception of industrial real estate, prices for offices and retail have barely recovered, but in the United States, the prices for office and retail space is much lower due to remote work and e-commerce (Figure 6.4). The industrial sector may remain strong in the future if demand for goods continues to stay strong, but that may be uncertain if economic conditions continue to tighten. Office space is also projected to only be more vacant as large tech firms are continuing with layoffs.

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[127] Global price growth distribution in 2021 from Qureshi, Andrea Deghi, Fabio M. Natalucci, Mahvash S. n.d. "Commercial Real Estate Prices During COVID-19: What Is Driving the Divergence?" IMF. Accessed March 24, 2023. https://www.imf.org/en/Publications/global-financial-stability-notes/Issues/2022/08/01/Commercial-Real-Estate-Prices-During-COVID-19-What-is-Driving-the-Divergence-521593.

[128] Eavis, Peter, Julie Creswell, and Joe Rennison. 2022. "Why Office Buildings Are Still in Trouble." *The New York Times*, November 17, 2022, sec. Business. https://www.nytimes.com/2022/11/17/business/office-buildings-real-estate-vacancy.html.

[129] *Bloomberg.com*. 2022. "New York's Empty-Office Problem Is Coming to Big Cities Everywhere," September 25, 2022.https://www.bloomberg.com/graphics/2022-remote-work-is-killing-manhattan-commercial-real-estate-market/.

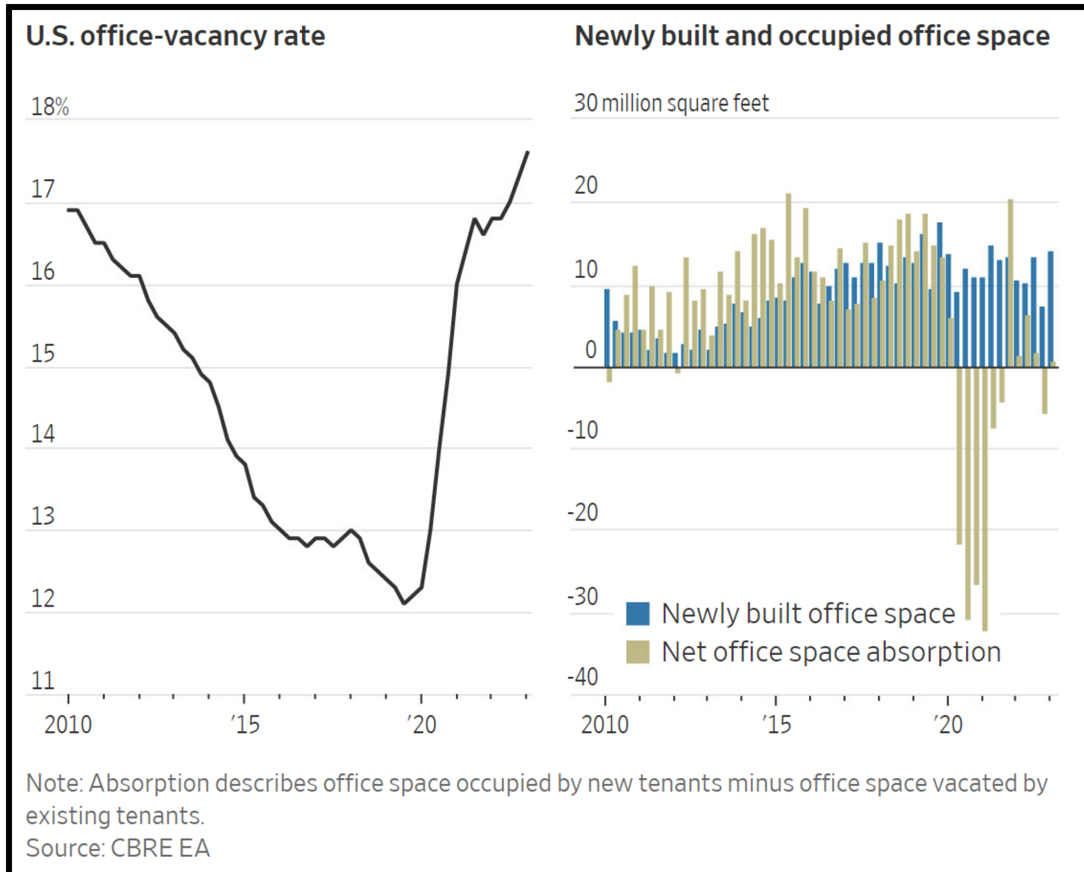

Figure 6.5: Risks in Commercial Real Estate[130]

As shown in Figure 6.5, office vacancies are at the highest point since 2010. Newly built office space continues to be built, however they are not being filled, causing pressure on landlords. The rise of work from home and the cooling of the labor market has not helped the commercial real estate market at all. To add to the problems in commercial real estate, delinquency rates are starting to rise, and if they rise too much, this will cause a decline in the commercial real estate market.[131] Further declines in the values of commercial real estate will further strain the banking industry by increasing unrealized losses in CMBS products, which will worsen the fallout if another shock to the banking industry were to occur.

[130] Risks in Commercial Real Estate from Shifflett, Shane, and Danny Dougherty. 2023. "Where Financial Risk Lies, in 12 Charts." Wall Street Journal, March 26, 2023, sec. Markets.
[131] "New Interest Rate Hikes Are Anything But Music To The Ears of Delinquent CRE Investors And Over Leveraged Banks." 2023. Yahoo Life. March 9, 2023. https://www.yahoo.com/lifestyle/interest-rate-hikes-anything-music-210439161.html.

Commercial Mortgage Backed Securities

The securitization of commercial mortgages adds another layer of concern on an already concerning market. In a study written by Professor John M. Griffin and PhD student Alex Priest, 40,000 CMBS loans were sampled, stretching from 2013 to 2019.[132] This paper corroborates whistleblower complaints to the SEC about the overstatement of commercial mortgage backed securities by large investment firms. In an article in the Wall Street Journal about this study, the commercial real estate finance council called this study "flawed" and that the industry underwriting practices were solid, although this viewpoint may be biased due to the fact that the council represents the commercial real estate finance firms that take part in overstatement.[133] The researchers discovered that overall, income was overstated by 5% in 29% of the CMBS loans. Firms such as Goldman Sachs, UBS, Ladder Capital, Citigroup, and Morgan Stanley had incomes overstated by 5% or more in over 35% of loans (Figure 6.3).

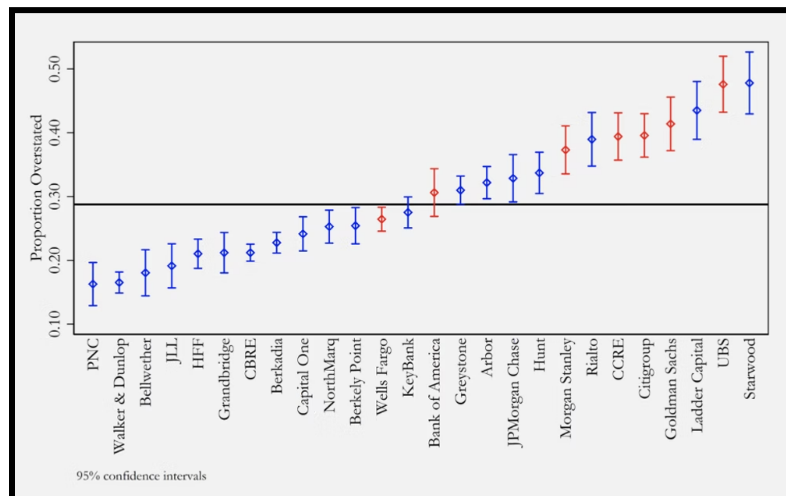

Figure 6.6: Overstatement by Originator[134]

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[132] Griffin, John M., and Alex Priest. 2021. "Is COVID Revealing a Virus in CMBS 2.0?" SSRN Scholarly Paper. Rochester, NY. https://doi.org/10.2139/ssrn.3671162.

[133] Podkul, Cezary. 2020. "WSJ News Exclusive | Commercial Properties' Ability to Repay Mortgages Was Overstated, Study Finds." *Wall Street Journal*, August 11, 2020, sec. Markets. https://www.wsj.com/articles/commercial-properties-ability-to-repay-mortgages-was-overstated-study-finds-11597152211.

[134] Overstatement by Originator from Griffin, John M., and Alex Priest. 2021. "Is COVID Revealing a Virus in CMBS 2.0?" SSRN Scholarly Paper. Rochester, NY. https://doi.org/10.2139/ssrn.3671162.

The researchers determined that this practice is most likely not done by coincidence, and there must be some economic motive for these large firms to overstate incomes. The researchers also proved that "there is an economically and statistically significant relation between originator income overstatement and distress" and that "loans from lenders in the top tertile of income overstatement are more likely to experience distress" (Griffin, 2020). The Dodd-Frank Act may have created differences between commercial mortgages today than in 2008, but the fact that firms continue to overstate incomes for commercial mortgage backed securities and are aware of the practice reflects a failure of Dodd-Frank to regulate these firms in the CMBS market. This amount of overstatement is a cause for concern due to the COVID crash, where inflated loans were quicker to enter troubled loan lists, and even though we are long past the COVID crash, the banking crisis of 2023 results in even more uncertainty in an already unstable CMBS market.

The overstatement of commercial mortgage backed securities largely resembles the decline in standards for residential mortgages that preceded the 2008 financial crisis (Griffin, 2020), even as regulations have increased. It is very likely that the nature of commercial mortgage backed securities have not changed, given that Signature and First Republic Bank conducted heavy securitization of CMBS loans, signature being one of the most active commercial real estate lenders in New York. Declines in commercial mortgage backed securities are already in full force, as unrealized losses in CMBS are up to 43 billion dollars in the last quarter.[135] If the ongoing banking instability worsens, then the number of overstatements in commercial real estate could put the economy in a very precarious position, especially as the overstatement of CMBS in the past 10 years amplifies the negative economic effects of an already unstable commercial real estate market.

[135] Shifflett, Shane, and Danny Dougherty. 2023. "Where Financial Risk Lies, in 12 Charts." *Wall Street Journal*, March 26, 2023, sec. Markets. https://www.wsj.com/articles/where-financial-risk-lies-in-12-charts-792bca35.

Recommendations

The banking crisis of March 2023 is a significant cause for concern. We do not know exactly the extent of how much of the banking sector is at risk, but a conclusion can be drawn that the banking crisis will exacerbate problems with the commercial real estate sector. The residential sector seems healthier than the commercial sector, but significant increases in housing in the past 10 years, driven largely by institutional ownership of residential real estate, continues to price many people out of affordable housing. A soft landing for the economy is becoming less possible, and the Fed will have to choose between entrenched inflation or the continuation of the banking crisis. In this case, our opinion is that a commitment to tackle inflation is the better move even if it may risk further banking instability.

The Fed should aim to raise the federal funds rate to between 5.25 and 5.5 percent at the end of the year, aiming to raise rates by 25 basis points one more time at the September FOMC meeting. Raising by 25 basis points once during the September meeting rather than an earlier FOMC meeting allows more time for markets to fully price in the banking crisis. Even though there seems to be endemic problems in the US banking sector, and even though further contagion has the potential to cause significant negative economic effects, inflation remains persistently high and higher interest rates are necessary to lower inflation, even if that risks the health of the banking sector. If further rate hikes cause another banking crisis, it may be better to carry through with this "shock treatment" rather than wait and worsen the endemic problems in the banking sector. Even though the risks of another banking crisis are high, focusing on inflation will improve economic conditions in the long run, even if economic conditions will be worse in the more recent future. If the Fed commits to one more rate increase before the end of this year at

the September meeting, raising the federal funds rate to between 5.25 and 5.5 percent, that will be consistent with the Fed's continual commitment to fighting inflation.

UNCONVENTIONAL MONETARY POLICY

Introduction

The interaction and overlap between the Federal Reserve and the Federal government has been a contentious one, historically and contemporarily. Fiscal dominance is loosely defined as central banks' ability to manipulate currency and affect government securities.[136] These government securities include, but are not limited to: debt issuances used to fund daily operations, special infrastructure projects, and military projects. The Federal Reserve's operations shift according to the state of the economy; however, the relationship between the Fed and the Government has become blurred. Although the Fed might not call their own monetary policies "unconventional" specifically, James Dorn of the Cato Institute stated that "there is no doubt that the distance between fiscal and monetary policy has narrowed since the 2007–2008 financial crisis, and especially since the pandemic."[137]

Historically, unconventional monetary policy has occurred numerous times. In Schwarz et. al's *Monetary History of the United States,* they report that the Fed "strongly favored" maintaining the price of the government's debt in 1933 – while realizing the inverse pressure placed on monetary policy with regard to controlling inflation.[138] Such "unconventional monetary policy" also came and went during the 1960s and 1970s especially during the Johnson administration. Leaning on Fed Chairman William McChesney Martin to keep the marginal

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[136] James A. Dorn, "Fiscal Dominance and Fed Complacency," CATO Institute, last modified April 8, 2021, accessed April 13, 2023, https://www.cato.org/blog/fiscal-dominance-fed-complacency.
[137] Dorn, "Fiscal Dominance," CATO Institute.
[138] Friedman Schwartz, "A Monetary History of the United States," ScribD, accessed April 13, 2023, https://www.scribd.com/document/372876418/Friedman-Schwartz-A-Monetary-History-of-the-United-States.

interest rates low, the Fed was used as a policy chip to bolster the popularity of a sitting president. In the increasingly polarized world that we live in today, understanding the limitations of the Fed takes on an increasingly important role in maintaining governmental and fiscal stability.[139]

Federal Reserve Recessionary Unconventional Policy

The most significant event that has impacted the Fed's adoption of increasingly unconventional monetary policy measures was the 2008 financial crisis. With the federal funds rate at virtually zero, the Federal Reserve turned to some unconventional monetary policies. The two primary unconventional measures were "quantitative easing and increasingly explicit and forward‐leaning guidance for the future path of the federal funds rate" – in order to provide added monetary policy accommodations.[140] The primary reason to turn to these unconventional actions was to place downward pressure on real longer-term interest rates, and to improve overall financial conditions by bolstering prices for corporate equities and residential properties. They believed that this would boost aggregate demand and "check undesirable disinflationary pressures by providing increased support for consumer spending, construction, business investment, and net exports."[141]

Unconventional Policy #1: Quantitative Easing and Tightening (QE & QT)

The Fed's QE programs are generally a monetary policy tool that stimulates the economy by increasing the money supply and lowering interest rates. When first theorized in the 2008 downturn, they were mainly for larger-scale asset purchases (LSAPs) of longer-term Treasury and agency mortgage-backed securities.[142] Agency debt rose from 500 billion prior to the

[139] Schwartz, "A Monetary," ScribD.
[140] Kenneth K. Kuttner, "Outside the Box: Unconventional Monetary Policy in the Great Recession and beyond," Journal of Economic Perspectives, last modified 2018, accessed April 13, 2023, https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.32.4.121.
[141] Kuttner, "Outside the Box," Journal of Economic Perspectives
[142] Anna Louis Jackson, "Quantitative Easing Explain," Forbes Advisor, last modified 2021, accessed April 13, 2023, https://www.forbes.com/advisor/investing/quantitative-easing-qe/.

financial crisis to over 4$ trillion when the most recent LSAP program ended back in October of 2014. This was to increase the amount of cash in circulation and lower interest rates, increasing economic activity. However, liabilities were mainly confined to substantial increases in short-term ones. According to Bill Merz – head of fixed income research at the U.S Bank Wealth Management – “It’s a powerful signal that the Fed wants to stimulate economic growth and that it is an influential force on capital markets and asset prices. “That signaling effect so far has been the most influential component of quantitative easing.”[143]

Signaling confidence in the Fed’s ability to buy large scale assets (government securities, etc), the Fed – as previously stated by Merz – signals stability and confidence in the financial and work sector; this is certainly an example of unconventional monetary policy. Luke Tiley, chief of economics at Wilmington Trust and former Fed advisor confirms this by saying “it’s intended to both address immediate concerns in the financial markets and stave off an even worse crisis.[144]

The Fed also indicated (most recently on March 23rd) an ongoing commitment to reversing a previous policy of quantitative easing (QE) that involved purchases of Treasury and mortgage-backed securities. QE was aimed at providing more liquidity to capital markets, and so the Fed began trimming its balance sheet of those assets, from its peak near $9 trillion. This so-called “quantitative tightening” approach, combined with interest rate hikes, is designed to temper inflation by slowing economic growth.” When the Fed is utilizing a QT policy, they let government treasuries run off the balance sheet when they reach maturity – instead of reinvesting as they would otherwise do.[145]

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[143] Eric Freedman, "Federal Reserve Recalibrates Monetary Policy to Fight Inflation," US Wealth Management, last modified March 23, 2023, https://www.usbank.com/investing/financial-p

[144] Michelle W. Bowman, "Forward Guidance as a Monetary Policy Tool: Considerations for the Current Economic Environment," Board of Governors of the Federal Reserve System, last modified October 12, 2022, accessed April 13, 2023, https://www.federalreserve.gov/newsevents/speech/bowman20221012a.htm.

[145] Eric M. Engen, "The Macroeconomic Effects of the Federal Reserve's Unconventional Monetary Policies," The Federal Reserve Website, last modified January 14, 2015, accessed April 13, 2023, https://www.federalreserve.gov/econresdata/feds/2015/files/2015005pap.pdf.

Unconventional Policy #2: Forward Guidance

In addition to QE programs, the FOMC (Fed Committee) also began the process of essentially "guiding" the forward, future path of the federal funds rate in late 2008. Forward guidance, more generally defined, is a communication tool used by the Fed to provide guidance to financial markets and the public about future monetary policy initiatives. Communication is loosely defined due to the somewhat complex nature of forward guidance.[146]

However, analyzing the statements and words of Jerome Powell's statements about federal reserve spending and policy, as well as other press-releases and policy memos can both be used to interpret forward guidance policy. For example, a 2011 statement stated that economic conditions would likely "warrant exceptionally low levels of the federal funds rate at least through mid‑2013." Thus, date-based forward guidance was probably complicated and difficult for the public to interpret due to the differing forecasts between the FOMC's private firm forecasts. We can see the manifestation of such forward guidance in the Fed's current policy of 2023; however, there are other reasons to believe the presence of such "forward guidance" in current policy potentials.[147]

The Fed has also been open about utilizing forward guidance. This statement directly from a Federal Reserve report states: "over about the past 10 years, the use of explicit forward guidance has become an integral part of the Federal Reserve's monetary policy toolkit. In fact, explicit forward guidance is generally seen by many as especially helpful when "use of the Committee's main monetary policy tool (changes to the federal funds rate) is constrained."[148]

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[146] Michelle W. Bowman, "Forward Guidance as a Monetary Policy Tool: Considerations for the Current Economic Environment," Board of Governors of the Federal Reserve System, last modified October 12, 2022, accessed April 13, 2023, https://www.federalreserve.gov/newsevents/speech/bowman20221012a.htm.
[147] Bowman, "Forward Guidance," Board of Governors of the Federal Reserve System.
[148] Jackson, "Quantitative Easing," Forbes Advisor.

Both the quantitative easing programs and the forward guidance of the Fed were intended to further help support economic activity, and stifle disinflationary pressures that were undesirable – after the federal funds rate had been "lowered to its effective lower bound."[149]

Jerome Powell's March 22nd, 2023 Statement

The FOMC's recent press conference was marked by cautious optimism backed by some positive recent data trends within the macroeconomic environment in the United States. During the conference, the FOMC announced that it has decided to maintain, mainly, its current monetary policy stances, and that no major changes would need to be made due to the uptrend in a few measures. For example, interest rates will be kept to relatively the same levels that they are currently at due to a tight labor market. The FOMC backed up this reasoning due to their belief that the policy will support economic recovery and help continue the goal of maximal employment and price stability. Furthermore, they stated that they expect inflation to maintain its target level of 2% and that the labor market will continue to improve as a result.[150]

Forward Guidance as a Primary Motive for FOMC Conferences

Powell: "The Fed's monetary policy actions are guided by our mandate to promote maximum employment and stable prices for the American people. My colleagues and I are acutely aware that high inflation imposes significant hardship, as it erodes purchasing power, especially for those least able to meet the higher costs of essentials like food, housing, and transportation. We are highly attentive to the risks that high inflation poses to both sides of our mandate, and we are strongly committed to returning inflation to our 2 percent objective."

[149] Benjamin Curry, "What Happens When the Fed Raises Interest Rates?," Forbes Advisor, last modified April 12, 2023, accessed April 13, 2023, https://www.forbes.com/advisor/investing/fed-raises-interest-rates/.
[150] Jerome Powell, "Chairman Jerome Powell's Press Conference," Federal Reserve Website, last modified March 22, 2023, accessed April 13, 2023, https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20230322.pdf.

This statement indicates that Powell is aware of the problems that potentially raising interest rates can provide for those under hardships with regard to food, housing, and transportation. The statement indicates the recognition of such issues; however, it appears that interest rates will continue to rise to combat inflation.

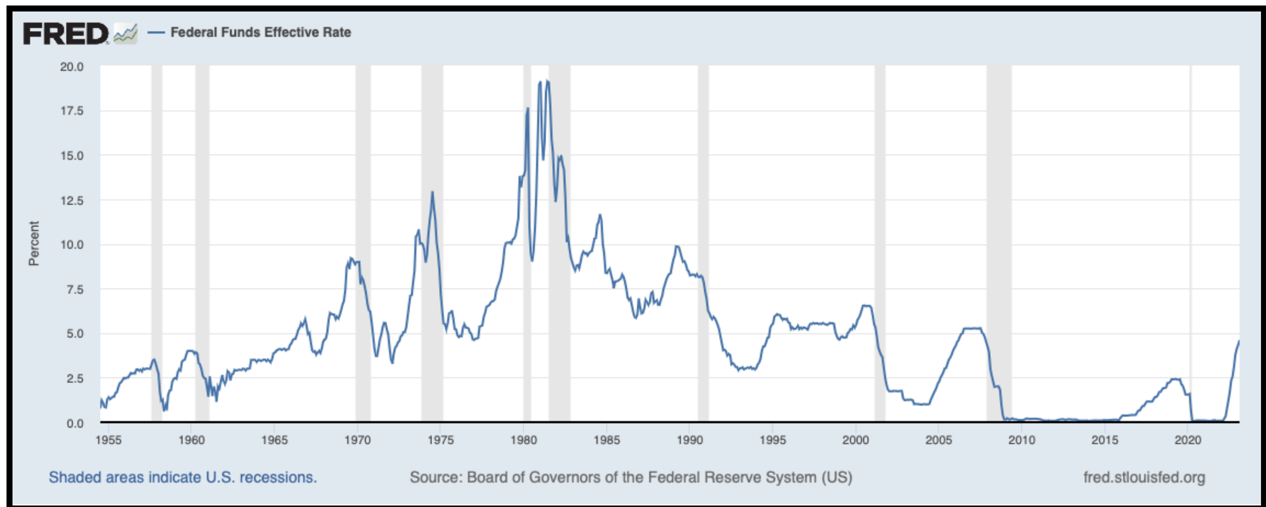

Figure 7.1: Federal Funds Effective Rate

We can see in Figure 7.1 in the time period from 2020-present the increase in the federal funds rate, and it appears that this will not be decreasing any time soon due to this statement. His exact number for the FFR will be at 5% percent. According to Forbes, the Fed's reduction of the amount of money in the economy when it raises rates impacts the stock and bond markets, credit cards, personal loans, student loans, and auto loans."[151]

"Events in the banking system over the past two weeks are likely to result in tighter credit conditions for households and businesses," the Fed chair said. "It is too soon to determine the extent of these effects and therefore too soon for the Fed to know how or whether its plans for interest rates might be affected."

[151] Benjamin Curry, "What Happens When the Fed Raises Interest Rates?," Forbes Advisor, last modified April 12, 2023, accessed April 13, 2023, https://www.forbes.com/advisor/investing/fed-raises-interest-rates/.

This is an acknowledgement by Powell that some banks may reduce their pace of lending at a time of high-stress in the financial system. He said that any pullback of this lending could slow the economy and possibly act as the equivalent of an additional quarter-point rate hike. This statement represents some hint at unconventional monetary policy due to its intrinsic interaction with the financial sector. While the Fed is meant to limit their policy to that of purely monetary changes, Powell indicates that banks should not change spending which implies some semblance of fiscal effects. Given the power of the chairman of the Fed's statements to move markets and impact the lending behavior of banks, this could be seen as an example of federal reserve overreach and the power of the Fed to change aspects of the economy out of their traditional jurisdiction.

Alternative View of Unconventional Monetary Policy with Powell's Fed

While there seems to be the basic underpinnings of future unconventional monetary policy and influence by Powell, many experts believe that this is the last idea on Powell's mind, and that his statements regarding the financial sector are more to provide reassurance and not forecast future policy. Ron Insana states, (pertaining to unconventional monetary policy undertaken in the '08 and '76 crises) "In each instance, first under Ben Bernanke, an expert in unconventional monetary policy, and then again under Jerome Powell, the Fed was forced to take interest rates to zero, launch quantitative easing policies and use never-before-tried extraordinary measures to ward off complete and systemic collapses of both the global financial system and the global economy."[152]

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[152] Kenneth K. Kuttner, "Outside the Box: Unconventional Monetary Policy in the Great Recession and beyond," Journal of Economic Perspectives, last modified 2018, accessed April 13, 2023, https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.32.4.121.

He argues that the desire to never go back to a zero-interest rate environment could also be one of the keys to why so many Fed officials insist that they want to keep rates “higher for longer” than financial markets, and even consumers, may desire.[153]

Unconventional Monetary Policy: QE and QT Programs

When looking back to the Fed’s QE programs, they are characterized most generally by large-scale asset purchases of government treasury securities. We can see in the figure here that treasury securities (blue) have gone up tremendously; COVID19 was a special example of this where the Federal Reserve resorted to unusual policy measures (500 billion prior to the financial crisis to over 5$ trillion by the end of COVID19’s peak). However, we can see that recently there has been a slight tapering off of the purchasing of Treasury securities held outright. We can also see QT at play here, with the most recent tapering off of assets – part of the Fed’s fight with inflation by slowing economic growth.[154]

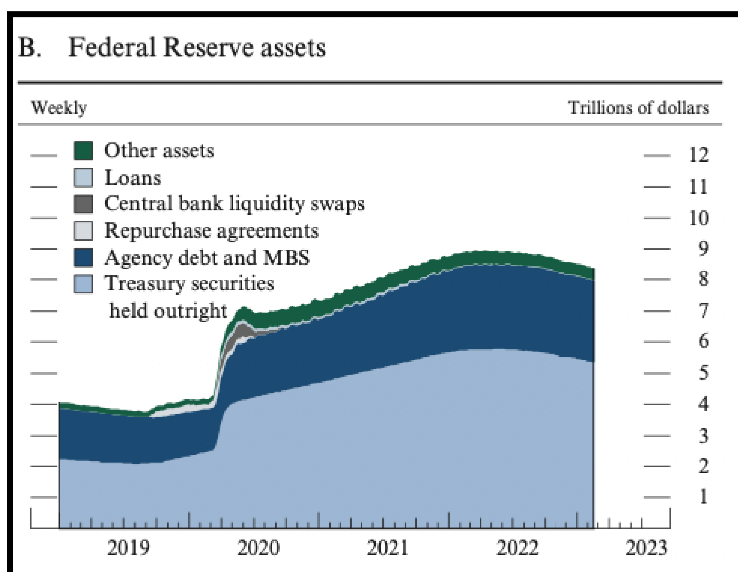

Figure 7.2: Federal Reserve assets

[153] Kuttner, "Outside the Box," Journal of Economic Perspectives.
[154] "Monetary Policy Report," Federal Reserve Website, last modified March 3, 2023, accessed April 13, 2023, https://www.federalreserve.gov/monetarypolicy/files/20230303_mprfullreport.pdf.

FOMC Press-Conference Impact on Markets

The purpose of FOMC press-conferences (since inception in 2011) has been to “enhance the clarity and timeliness of the Federal Reserve’s monetary policy communication.” However, given the ability of these conferences to impact markets, they have evolved – and could be interpreted as Federal Reserve over-reach (unconventional policy & fiscal dominance); especially when they delve into issues such as fiscal policy and speak of market impacts.[155]

For example, Figure 7.3 below shows the market volatility on FOMC press conference days – comparing Janet Yellen to Jerome Powell’s words. We can see how the spikes of Powell are far greater than Yellen, leading to the conclusion that these FOMC meetings are taking on an even more important role. This is especially pertinent at a time like now, as the relationship between monetary policy (rate hikes & fighting inflation) has such a great impact on the labor market – and vice versa. Figure 7.4 confirms the data from figure one, comparing the volatility of the market during a placebo conference to a Powell press conference.[156]

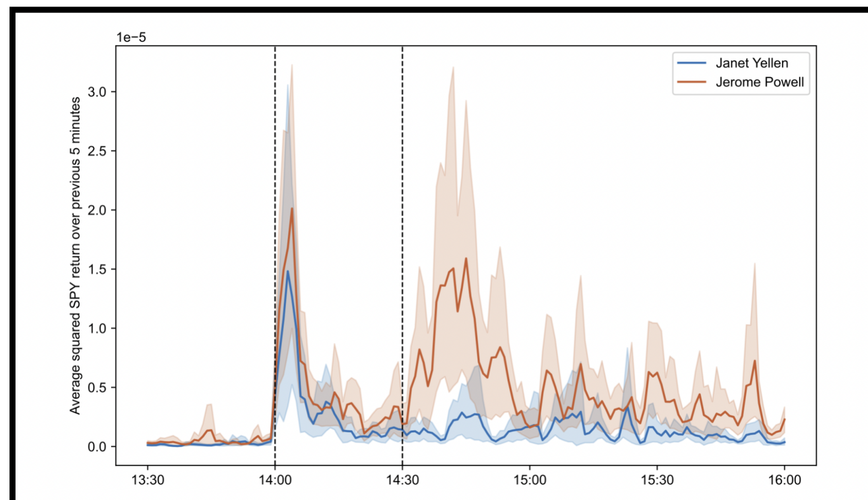

Figure 7.3: Market Volatility of Press Conference Days

[155] Namrata Narain, "The Market Impact of the Fed Press Conference," CEPR, last modified November 21, 2023, accessed April 13, 2023, https://cepr.org/voxeu/columns/market-impact-fed-press-conference.
[156] Narain, "The Market," CEPR.

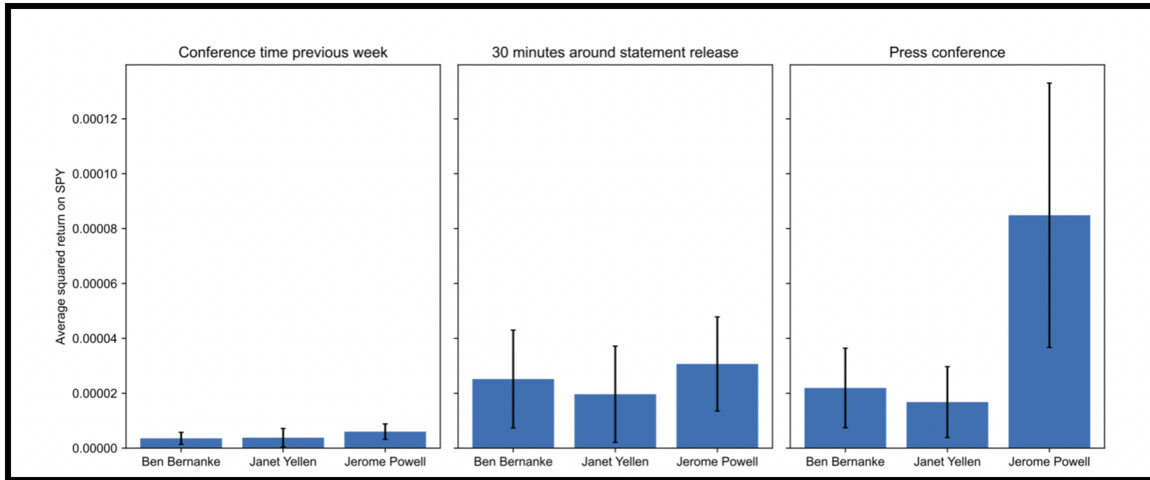

Figure 7.4: Market Volatility; Placebo Conferences versus Chair Powell press conferences

Recommendation

With interest rates continuing to rise and inflation pressures still remaining, Jerome Powell and the Federal Reserve should be careful with their remarks about interest rate hikes, as well as their statements pertaining to the future of inflation. For example, at the recent Senate Banking Committee meeting which Powell testified in front of, he forecasted and outlined future interest rate hikes (which have since been put into place). Following his remarks, several major indexes dropped steeply (S&P500, Dow, and Nasdaq); this begs the question as to whether Powell should have provided such in-depth forecasts. By looking at previously provided figures in this report, we can also see the specific impact that the words of Powell have on the economy – in comparison with other Fed chairman. We would recommend that FOMC conferences stray from forecasting economic growth, and stick more with providing information on policy measures.[157]

[157] Narain, "The Market," CEPR.

Furthermore, It will be important to keep in mind the inherently causal relationship between the Federal Funds rate and inflation. With inflation being the most important factor of our current economy, the Fed must do everything it can to quell it. We would say that given the effectiveness of their QT measures already in slowing economic growth – that they should continue them. However, given the advent of the spring and summer season – which is historically a booming time for the economy – the Fed might have to partake in even more aggressive tightening measures to make sure the progress is not set back.

It will also be very important for the Fed, during conferences and other times, to remind the public of the danger that inflation presents. While interest rate hikes certainly will be felt in all aspects of the economy (negatively for now) including the housing market, retail market, etc – an "out-of-control" inflationary rate would be far worse.

Forecast

As for a direct forecast about the Federal Funds Rate for the next few months, we believe that with the current Federal Funds rate currently at 5% and increasing to 5.25% in May, we should first wait for markets and the economy to adjust from the past rate – before inducing another 25 point hike.[158] Even taking into account the recent hawkish press conference by Powell, a further 25 or 50 point rate hike does not support the data that projections have the federal funds rate at, and moving towards.[159] The spring and incoming summer will also cause the Fed to be less aggressive with their hikes – especially with the seasonal impact that the summer has on the economy and markets. We believe that for this reason, we will not see a terminal rate above 5.5%.

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[158] "Summary of Economic Projections," Federal Reserve, last modified March 22, 2023, accessed April 13, 2023, https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20230322.pdf.
[159] "Summary of Economic," Federal Reserve.

Percent

Variable	Median[1]				Central Tendency[2]				Range[3]			
	2023	2024	2025	Longer run	2023	2024	2025	Longer run	2023	2024	2025	Longer run
Change in real GDP	0.4	1.2	1.9	1.8	0.0–0.8	1.0–1.5	1.7–2.1	1.7–2.0	-0.2–1.3	0.3–2.0	1.5–2.2	1.6–2.5
December projection	0.5	1.6	1.8	1.8	0.4–1.0	1.3–2.0	1.6–2.0	1.7–2.0	-0.5–1.0	0.5–2.4	1.4–2.3	1.6–2.5
Unemployment rate	4.5	4.6	4.6	4.0	4.0–4.7	4.3–4.9	4.3–4.8	3.8–4.3	3.9–4.8	4.0–5.2	3.8–4.9	3.5–4.7
December projection	4.6	4.6	4.5	4.0	4.4–4.7	4.3–4.8	4.0–4.7	3.8–4.3	4.0–5.3	4.0–5.0	3.8–4.8	3.5–4.8
PCE inflation	3.3	2.5	2.1	2.0	3.0–3.8	2.2–2.8	2.0–2.2	2.0	2.8–4.1	2.0–3.5	2.0–3.0	2.0
December projection	3.1	2.5	2.1	2.0	2.9–3.5	2.3–2.7	2.0–2.2	2.0	2.6–4.1	2.2–3.5	2.0–3.0	2.0
Core PCE inflation[4]	3.6	2.6	2.1		3.5–3.9	2.3–2.8	2.0–2.2		3.5–4.1	2.1–3.1	2.0–3.0	
December projection	3.5	2.5	2.1		3.2–3.7	2.3–2.7	2.0–2.2		3.0–3.8	2.2–3.0	2.0–3.0	
Memo: Projected appropriate policy path												
Federal funds rate	5.1	4.3	3.1	2.5	5.1–5.6	3.9–5.1	2.9–3.9	2.4–2.6	4.9–5.9	3.4–5.6	2.4–5.6	2.3–3.6
December projection	5.1	4.1	3.1	2.5	5.1–5.4	3.9–4.9	2.6–3.9	2.3–2.5	4.9–5.6	3.1–5.6	2.4–5.6	2.3–3.3

Figure 7.5: Economic Projections of Federal Reserve Board members and Federal Reserve Bank presidents under their individual assumptions of projected appropriate monetary policy, March 2023

Figure 7.5 supports this vision – in that the median projection of the terminal federal funds rate for December of 2023 is at 5.1% – which makes any semblance of larger hikes for now, unreasonable. By sticking with the rate that May will bring, and waiting for seasonal adjustments in the economy and labor market, the Fed could then hike at a later time – and let inflation adjust accordingly.[160]

FEDERAL RESERVE BALANCE SHEET

Introduction

On the Federal Reserve's balance sheet, which consists of assets and liabilities and capital, all transactions, policy changes, and significant financial events are reflected. The Federal Reserve's balance sheet has grown significantly in recent years due to its efforts to support the economy during the COVID-19 pandemic.

[160] "Summary of Economic," Federal Reserve.

As of March 2023, the Federal Reserve's asset balance sheet stood at approximately $23.9 trillion, up from just over $21.3 trillion in March 2020.[161] This increase is due to several factors, including the Federal Reserve's efforts to stabilize financial markets and support the economy during the pandemic.

One of the primary ways the Federal Reserve has done this is by purchasing assets such as Treasury securities and mortgage-backed securities. These purchases increase the money supply and help to lower interest rates, which can encourage borrowing and spending.
In addition to its asset purchases, the Federal Reserve has also established several lending facilities to provide support to various sectors of the economy. For example, the Main Street Lending Program provides loans to small and medium-sized businesses, while the Municipal Liquidity Facility provides short-term loans to state and local governments.[162]

The Federal Reserve's balance sheet has also grown due to its efforts to support financial institutions and ensure that they have sufficient liquidity. One way it has done this is by providing large amounts of overnight and short-term loans to banks and other financial institutions through its discount window and other lending facilities.

While the Federal Reserve's actions have been critical in supporting the economy during the pandemic, its effects have created a new economic issue. The large amount of money the Federal Reserve has created led to inflation. This has contributed immensely to inflationary issues today and the Fed balance sheet must be adjusted very technically to combat these pressures. As the inflation rate continues to be an issue, the Federal Reserve will embark on credit-tightening measures to reduce the money supply. Evidence of this is seen by an overall

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[161] Federal Reserve Bank, Federal Reserve Balance Sheet: Factors Affecting Reserve Balances - H.4.1, H.R. Misc. Doc. No. H.4.1 (Apr. 7, 2023). Accessed April 7, 2023. https://www.federalreserve.gov/monetarypolicy/bst_fedsbalancesheet.htm.
[162] *The Economist* (Washington, District of Columbia). "The Federal Reserve Must Choose between Inflation and Market Chaos." March 19, 2023. Accessed March 19, 2023. https://www.economist.com/finance-and-economics/2023/03/19/the-federal-reserve-must-choose-between-inflation-and-market-chaos.

reduction in the Federal Reserve's asset balance after gradually selling off billions in securities it had acquired during the initial stages of the COVID-19 Pandemic (see Figure 8.1).[163]

1. Factors Affecting Reserve Balances of Depository Institutions
Millions of dollars

Reserve Bank credit, related items, and reserve balances of depository institutions at Federal Reserve Banks	Averages of daily figures			Wednesday Apr 12, 2023
	Week ended Apr 12, 2023	Change from week ended Apr 5, 2023	Change from week ended Apr 13, 2022	
Reserve Bank credit	8,586,475	- 12,692	- 319,639	8,578,046
Securities held outright[1]	7,877,511	- 6,268	- 605,424	7,877,741
U.S. Treasury securities	5,280,684	- 6,268	- 481,002	5,280,914
Bills[2]	280,966	0	- 45,078	280,966
Notes and bonds, nominal[2]	4,517,796	- 6,977	- 446,083	4,517,796
Notes and bonds, inflation-indexed[2]	377,024	0	- 13,816	377,024
Inflation compensation[3]	104,897	+ 708	+ 23,974	105,127
Federal agency debt securities[2]	2,347	0	0	2,347
Mortgage-backed securities[4]	2,594,480	0	- 124,422	2,594,480
Unamortized premiums on securities held outright[5]	304,056	- 617	- 39,725	303,880
Unamortized discounts on securities held outright[5]	-27,402	+ 81	- 5,742	-27,314
Repurchase agreements[6]	34,286	- 10,000	+ 34,277	30,000
Foreign official	34,286	- 10,000	+ 34,286	30,000
Others	0	0	- 9	0
Loans	326,597	+ 247	+ 303,337	321,087
Primary credit	67,921	- 3,117	+ 67,478	67,633
Secondary credit	0	0	0	0
Seasonal credit	1	+ 1	+ 1	1
Paycheck Protection Program Liquidity Facility	9,068	- 198	- 13,749	9,000
Bank Term Funding Program	76,707	+ 8,551	+ 76,707	71,837
Other credit extensions[7]	172,900	- 4,989	+ 172,900	172,615
Net portfolio holdings of MS Facilities LLC (Main Street Lending Program)[8]	22,330	+ 18	- 6,547	22,351
Net portfolio holdings of Municipal Liquidity Facility LLC[8]	5,605	+ 2	- 1,049	5,607
Net portfolio holdings of TALF II LLC[8]	1,924	- 2	- 587	1,925
Float	-174	+ 208	- 41	-250
Central bank liquidity swaps[9]	484	- 71	+ 251	484
Other Federal Reserve assets[10]	41,259	+ 3,710	+ 1,613	42,535
Foreign currency denominated assets[11]	18,850	- 48	- 350	18,898

Figure 8.1: Factors Affecting Reserve Balances of Depository Institutions

Balance Sheet Functions

Overall, the Federal Reserve's balance sheet is a crucial tool in managing the nation's monetary policy and supporting the economy during times of crisis. While the long-term effects of its balance sheet expansion remain to be seen, the Federal Reserve will continue to closely monitor economic conditions and adjust its policies as needed to support growth and stability.

With regard to any formulas related to the balance sheet, it is important to recognize the capital-asset ratio, the leverage formula, and the basic accounting procedures relevant to all transactions on the balance sheet. The capital-asset ratio is simple. It is simply the ratio of capital

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[163]Ibid.

to assets. In investment banking, the ratio of capital to assets tends to be lower as they tend to take on more considerable risk for the sake of raising funds. The leverage formula can be recognized as total liabilities divided by total equity. Leverage is key to determining the risk associated with banks The debt to capitalization ratio, which measures a firm's debt, is also an indicator of leverage. The federal reserve does not necessarily have much concern over its own leverage ratio as it maintains a low risk as its income primarily is based on US government securities (Treasury Bonds, government pensions, interests receivable) which are extremely strong and consistent. It also has the power not to print money, but to add money into circulation controlling money markets both domestically and internationally by purchasing and selling securities[164]. Because of the vastness of its fiscal powers (and responsibilities), it maintains an incredibly high solvency as a bank and government institution.

Investment Banking Approaches

The Federal Reserve has a number of tools at its disposal to influence the economy. One of these tools is the ability to tighten or loosen credit conditions. Credit tightening refers to the Federal Reserve's efforts to make it more difficult or expensive for individuals and businesses to borrow money.

As of March 2023, the Federal Reserve has not implemented any significant credit tightening measures. In fact, it has taken steps to keep credit conditions relatively loose in order to support economic growth. For example, the Federal Reserve has kept interest rates near historic lows and has continued to purchase large amounts of assets such as Treasury securities and mortgage-backed securities.[165]

[164] Federal Reserve Bank, Federal Reserve Balance Sheet: Factors Affecting Reserve Balances - H.4.1, H.R. Misc. Doc. No. H.4.1 (Apr. 7, 2023). Accessed April 7, 2023. https://www.federalreserve.gov/monetarypolicy/bst_fedsbalancesheet.htm.
[165] Federal Deposit Insurance Corporation, Balance Sheet: Total Assets [QBPBSTAS], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/QBPBSTAS, April 29, 2023.

In addition to these measures, the Federal Reserve has also established lending facilities to provide support to various sectors of the economy. For example, the Main Street Lending Program provides loans to small and medium-sized businesses, while the Municipal Liquidity Facility provides short-term loans to state and local governments. These measures are intended to provide support to the economy and prevent a credit crunch that could harm growth.
Despite these efforts to keep credit conditions loose, there are concerns that inflation could become a problem if the economy overheats. Inflation occurs when the prices of goods and services rise too quickly, eroding the purchasing power of consumers and businesses. To combat this risk, the Federal Reserve has indicated that it may begin to raise interest rates in the future.[166] However, the Federal Reserve has emphasized that it will be patient in its approach to raising rates and will base its decisions on a range of economic indicators, including employment levels and inflation expectations. This cautious approach is intended to avoid triggering a recession or other negative economic outcomes.

Financial Institution Current Events

Silicon Valley Bank Failure

The Federal Reserve's statistics on credit tightening prior to the collapse of Silicon Valley Bank indicated that it was taking a relatively hands-off approach to managing credit conditions. While it had not implemented any significant credit tightening measures, it had taken steps to keep conditions relatively loose in order to support economic growth. After the bank collapse and its repercussions in the financial sector, fear of bank runs and collapses led the Federal Reserve to enact credit tightening very quickly. The Fed quickly adjusted their asset balance from $8.3T to $8.7T by purchasing assets, a reverse of the inflation-countering tactics associated

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[166] Ibid.

with recapitalization, a quantitative tightening method.[167] It makes sense for the Fed to enact credit tightening whilst increasing its asset balance as it will help minimize run-risk in banks in a highly inflated economy.[168] Essentially, by tightening the conditions for crediting by a bank, they may become slightly less leveraged and more flexible, increasing overall solvency.

Banking System Risks from Inflation

In terms of policy recommendation, it is clear that any asset recapitalization and balance sheet contraction will be temporarily slowed. It is necessary to implement credit tightening in order to decrease the potential of financial institutions suffering from the effects of inflation on their own debit balances. In the case of the semi-recent bank collapses, Silicon Valley Bank was not highly leveraged and still lost much of its liquidity and eventually failed. Because of inflation and the rate hikes by the federal reserve, deposits were much more difficult to handle. Silicon Valley Bank was not in a highly leveraged situation. It had undergone rapid expansion during the pandemic receiving the deposits of many tech firms and other high value depositors. Silicon Valley Bank's managers decided to invest much of its new cash deposits into notoriously safe, highly liquid securities including treasury bonds and a rapidly expanding asset value as it could not keep up with increasing rate hikes and its rapid influx of depositors. What many consider to

[167] *The Economist* (Washington, District of Columbia). "What does Silicon Valley Bank's Collapse Mean for the Financial System?" March 10, 2023. Accessed March 10, 2023. https://www.economist.com/finance-and-economics/2023/03/10/what-does-silicon-valley-banks-collapse-mean-for-the-financial-system.

[168] The Federal Reserve System, Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank, H.R. Rep. (Apr. 28, 2023).

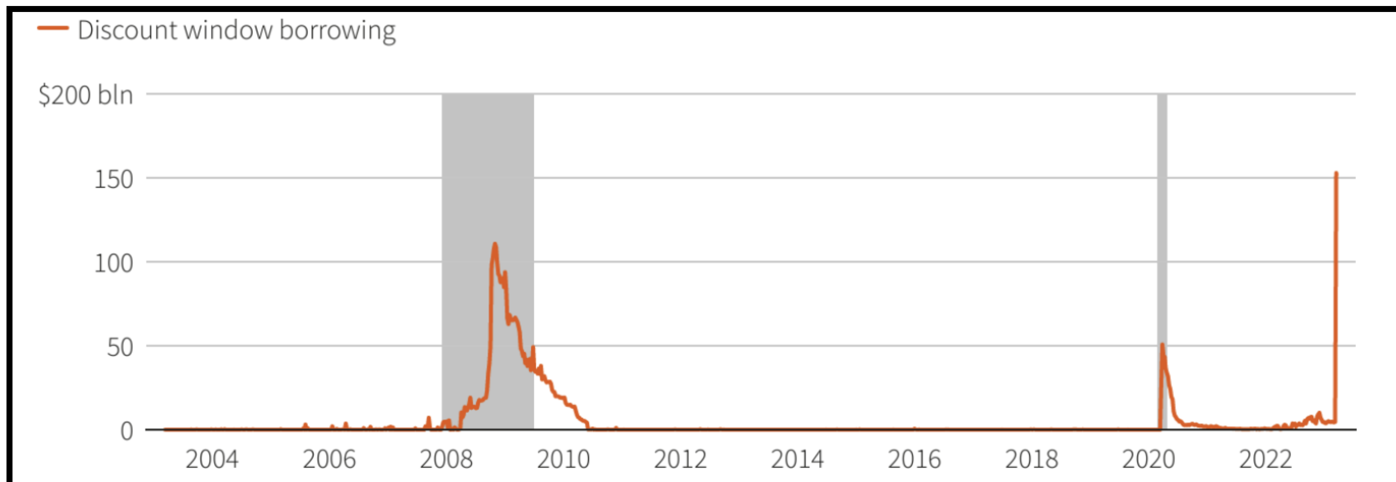

Figure 8.2: Discount Window Borrowing, 2004 to present

be an unusual blunder on SVB's risk managers' part as treasury bonds and government securities tend to lose value as interest rates rise, however the extreme spike in the Federal Reserve's discount window of approximately $150B (see Figure 8.2)[169] in demands by financial institutions reflect a worrisome possibility of a bank failure trend. Eventually, SVB's depositors initiated a bank run demanding an accumulative $42B expunging any cash reserves it had. This type of failure is a considerable issue as interest rates may continue to rise and an inflation-ridden economy. This all coincided with a gradual rate hike in the Federal Discount Lending Rate from 0.5% to approximately 5.0%.[170] Tightening credit-conditions should be a tactic effective enough to prevent extreme liquidity loss in financial institutions in a high-rate market.

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[169] Federal Reserve Bank, Periodic Report: Update on Outstanding Lending Facilities Authorized by the Board under Section 13(3) of the Federal Reserve Act April 10, 2023, H.R. Rep. (Apr. 10, 2023).
[170] Board of Governors of the Federal Reserve System (US), Discount Window Primary Credit Rate [DPCREDIT], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/DPCREDIT, April 29, 2023.

The Housing Market (MBS) and the Balance Sheet

Mortgage Backed Securities

In terms of mortgage backed securities, the Federal reserve has little intent to purchase any with a buy-commitment of a $165M value (see Figure 8.3). However, in the housing market, mortgage payments have been more challenging to complete for individuals with higher rates. The mortgage backed securities which make up a $6.3T value, are the cornerstone of most commercial and investment banks. As mortgages become more difficult to pay, a financial institution's MBS holdings become more risky. This was a major source of unconfidence in Silicon Valley Bank that other financial institutions are not immune from.

3. Supplemental Information on Mortgage-Backed Securities
Millions of dollars

Account name	Wednesday Apr 12, 2023
Mortgage-backed securities held outright[1]	2,594,480
Residential mortgage-backed securities	2,586,046
Commercial mortgage-backed securities	8,434
Commitments to buy mortgage-backed securities[2]	165
Commitments to sell mortgage-backed securities[2]	0
Cash and cash equivalents[3]	0

Figure 8.3: Mortgage Backed Securities holdings by the Federal Reserve

Credit Tightening with Housing Market

The Federal reserve should therefore continue its credit tightening procedures as a regulatory tactic to decrease risk of insolvency and reduce the leverage ratios of financial institutions. This would also decrease the amount of expansion of the Fed balance sheet necessary meaning the recapitalization effort associated with quantitative tightening could persist. Nevertheless, the housing market may be a major source of economic stress in the future

requiring more fiscal attention.[171] For now, implementing credit tightening can reduce the risk. In the case of additional inflationary concerns the Federal Reserve may purchase MBS to decrease the risk in the housing market for financial institutions who have large quantities of these securities.

Credit Tightening - Recapitalization

Once the issue with Financial institutions is stabilized, the Fed should and will continue to sell its assets to remove liquidity from the market. It had already begun a reduction in its asset balance as of February from its then value of $8.9T to an eventual pre-pandemic level of $4.2T over the course of a two-five year period.[172] This massive recapitalization strategy should be extended over a longer period until the global banking system can develop higher capital-asset ratios to deal with the effects of inflation. It may wish to increase the rate of quantitative tightening to more rapidly build liquidity in the case of fiscal strife associated with the banking system.[173] Overall, there will be a large increase in security sales from the Federal Reserve building a much higher capital-asset ratio.[174]

Cooling Inflation

As of mid-April of 2023, inflation rates seem to be cooling down to 6.0%, down from the 6.4% February prediction and down from 9.1% in June of 2022. This is further reflected in the Market Yield on U.S. treasury securities which shows a decrease from 4.26% to 3.29% between March 7th and April 7th, 2023 as reflected in the 5-year maturity quote in Figure 8.4.[175]

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[171] Federal Deposit Insurance Corporation, Balance Sheet: Total Assets [QBPBSTAS], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/QBPBSTAS, April 29, 2023.
[172] Ibid
[173] Federal Reserve Board. "Credit and Liquidity Programs and the Balance Sheet." Federalreserve.gov. Last modified March 16, 2023. Accessed April 16, 2023. https://www.federalreserve.gov/monetarypolicy/bst_fedsbalancesheet.htm.
[174] Federal Reserve Bank, Federal Reserve Balance Sheet: Factors Affecting Reserve Balances - H.4.1, H.R. Misc. Doc. No. H.4.1 (Apr. 7, 2023). Accessed April 7, 2023. https://www.federalreserve.gov/monetarypolicy/bst_fedsbalancesheet.htm.
[175] Federal Reserve Bank of St. Louis, 5-Year Breakeven Inflation Rate [T5YIE], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/T5YIE, April 30, 2023.

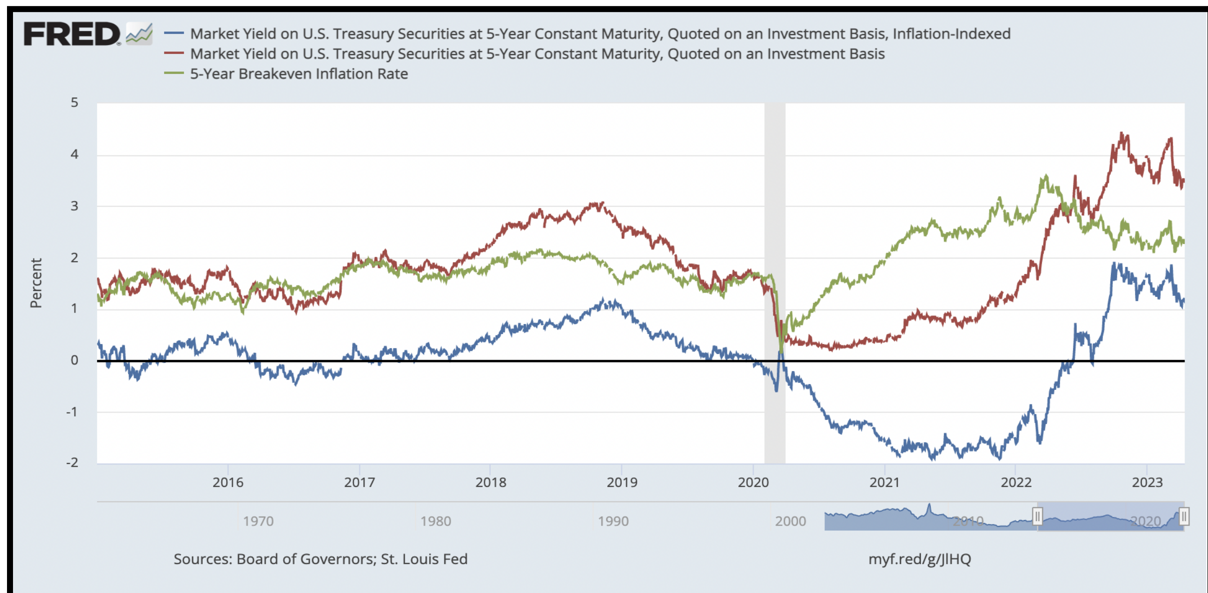

Figure 8.4: Market Yield on U.S. Treasury Securities, and 5-year Breakeven Inflation Rate

This is a sign of a cooling in the inflation crisis. The Federal Reserve should, by no means, however, decrease the total litany of its recapitalization effort. The inflation issue is still far from over and there are additional situations including international affairs which may contribute heavily to the state of the United States Economy.[176]

Current Events: International - Chinese Credit Expansion

Diplomatically, it is not unknown that China and its government have rapidly increased their foreign creditors and invest heavily in infrastructure and economic development of underdeveloped countries. A more recent example is its potential intentions to embark on a debt diplomacy campaign in a war-disheveled Ukraine, even offering a poorly designed peace plan between them and the Russian Federation. Additionally, China has increased its diplomatic

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[176] *The Economist* (Washington, District of Columbia). "The Federal Reserve Must Choose between Inflation and Market Chaos." March 19, 2023. Accessed March 19, 2023. https://www.economist.com/finance-and-economics/2023/03/19/the-federal-reserve-must-choose-between-inflation-and-market-chaos.

efforts to decrease tensions between Iran and Saudi Arabia and influence a non-USD trade standard for oil (although this will not have an extreme effect on the USD value, it may set unfavorable presidents for its velocity).[177]

United States Economic Isolation

Most striking are recent remarks from French President Emanual Macron and Chair of the European Commission, Ursula von-der-Leyen. Mr. Macron, who represented the European Union in a meeting with Chinese President Xi Jinping, called for steady cooperation between Europe and China economically and a fiscal distancing from the United States. Ms. von-der-Leyen however made suggestions more controversial.[178] Overall, a global fiscal distancing from the United States in favor of Chinese investment places the United States in a less than optimal position.[179]

H.4.1

1A. Memorandum Items
Millions of dollars

Memorandum item	Averages of daily figures			Wednesday Apr 12, 2023
	Week ended	Change from week ended		
	Apr 12, 2023	Apr 5, 2023	Apr 13, 2022	
Securities held in custody for foreign official and international accounts	3,330,948	+ 11,731	- 130,040	3,334,735
Marketable U.S. Treasury securities[1]	2,910,038	+ 11,972	- 140,218	2,913,806
Federal agency debt and mortgage-backed securities[2]	340,167	+ 70	+ 11,434	340,167
Other securities[3]	80,743	- 311	- 1,256	80,761
Securities lent to dealers	47,709	- 2,323	+ 2,966	47,334
Overnight facility[4]	47,709	- 2,323	+ 2,966	47,334
U.S. Treasury securities	47,682	- 2,341	+ 2,939	47,318
Federal agency debt securities	28	+ 19	+ 28	16

Figure 8.5: Federal Reserve Securities held in Foreign Official and International Accounts

[177] Ibid
[178] *The Economist* (London, United Kingdom). "Emmanuel Macron's Blunder over Taiwan." April 12, 2023. Accessed April 12, 2023. https://www.economist.com/leaders/2023/04/12/emmanuel-macrons-blunder-over-taiwan.
[179] Barcelona,William L., Danilo Cascaldi-Garcia, Jasper J. Hoek and Eva Van Leemput (2022). "What Happens in China Does Not Stay in China," International Finance Discussion Papers 1360. Washington: Board of Governors of the Federal Reserve System, https://doi.org/10.17016/IFDP.2022.1360.

In correlation with Chinese credit expansion, the Federal Reserve's balance on Securities held in custody for foreign official and international accounts is plateauing with a $130B decrease on the week of April 13, 2023 (see Figure 8.5)[180]. The Federal Reserve has a $3.3T balance on this account presently. Along with the current recapitalization effort it would be within the U.S. government's interest to influence an expansion in foreign depositors and foreign direct investment to increase its capital-asset ratio. In the future the Federal reserve should encourage a massive influx of capital investment resulting in the Federal Reserve needing a large capital balance to purchase securities and drastically increasing the cash flow in the money market. Preparing these fiscal maneuvers is vital for a potential transition into a great-power-competitive economy in the long run.

CONCLUSION

Due to the changing supply chain landscape in which supply chain issues associated with the COVID-19 pandemic and the Ukraine-Russia crisis are decreasing, we expect that the inflationary support the supply chain has provided in recent years will decrease throughout summer 2023. This easing of supply chain issues, and the accompanying decrease in banking crises, will likely increase consumer spending and demand. Consumption spending changed drastically throughout the pandemic, and GDP growth rates are very slowly recovering throughout 2023 as the economy faces historically high inflation rates. The Federal Reserve's goal is to achieve a "soft" landing, raising interest rates to curb inflation while attempting to have a minimal impact on GDP growth. Inflation has had a huge impact on supply chains, GDP, and consumer demand as the current trends in inflation can be attributed to a blend of demand and

[180] Federal Reserve Bank, Federal Reserve Balance Sheet: Factors Affecting Reserve Balances - H.4.1, H.R. Misc. Doc. No. H.4.1 (Apr. 7, 2023). Accessed April 7, 2023. https://www.federalreserve.gov/monetarypolicy/bst_fedsbalancesheet.htm.

supply-side factors. Consumer demand underwent shifts during and after the COVID-19 lockdowns, which has drastically contributed to inflation on the demand side.

Furthermore, given that the instability caused by the collapse of SVB has largely passed without widespread contagion, the Fed should focus almost exclusively on inflation concerns for the remainder of the year. This would mean a 25 basis point increase in the Federal Funds Rate at the May and June FOMC meetings. However, to remain accommodative of fragility in the banking sector, the Fed could simultaneously also engage in quantitative easing, similar to the Maturity Extension Program, to put downward pressure on longer term interest rates. Additionally, Powell, when compared to past Fed Chair's FOMC press conferences, impacts markets to a far greater extent. They also don't return to normal as quickly; this is due to an unconventional principle called "forward guidance" at work. Quantitative tightening is also a major unconventional tactic which is the Fed slowing economic growth by not reinvesting government securities when they come to maturity, but instead letting them roll off the balance sheet. From the perspective of the balance sheet, it is clear that there is a general plateau in the majority of credit accounts on the Fed balance sheet. Strategically, the capital balance should be steadily increased to combat solvency risks in the banking system and enforce stricter credit-tightening measures.

Examining other similarly impacted sectors, a lack of adequate housing supply has caused housing prices to rise significantly post-COVID, although the rise in the federal funds rate has caused the market to cool down, and in turn, caused MBS products to decline as well. Due to the prevalence of remote work, commercial real estate continues to be a problem, causing CMBS products and the already devalued MBS products to cause instability in the US banking sector, most visibly with the 2023 banking crisis. Given the changes in work settings, the current

rate of unemployment is very low compared to general standards, though many problems have arisen in the tech industry as a result, and many companies have been forced to limit hirings and fire en masse as a result of previous overhiring at the beginning of 2023, the Fed should aim to increase the federal funds rate. They can also use forward guidance to limit the mass unsustainable expansion of businesses.

Overall, we suggest that the Federal Reserve Board raises interest rates to support the traditional summer inflationary period. Following the May interest rate hike of 25 bpm, we suggest that during the June 2023 Federal Open Market Committee (FOMC) meetings the committees take a hawkish stance and raise the interest rates by .25 basis points at each meeting. This would be 2023's terminal rate, and we recommend that rates remain stable with a terminal rate of 5.25-5.5% through year-end 2023.

We expect that these hikes and decreases will adequately support the economy and predicted relaxing supply chain issues, to eventually quell the inflationary pressures seen throughout 2023 and thus eventually returning the federal funds interest rate back to the Fed's target rate of 2%. The economy is predicted to meet these rate levels in 2024, though this will be contingent on how quickly inflation drops back down. While the end of 2023 will likely not see a FFR of 2%, this rate will likely be met in 2024, demonstrating hope for the United States economy following the tumultuous pandemic-era influences.

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