Not the Fed Tealbook, June 2023

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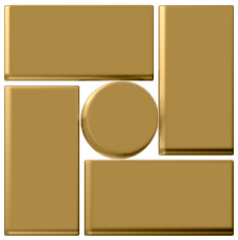
June 2023



CBA Working Paper 2023/14

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Not the Fed Tealbook

The Central Bank of the Republic of Armenia

June 2023

Abstract

“Not the Fed Tealbook” simulates a state-of-the-art macroeconomic analysis and streamlined monetary policy note with limited resources. This provides a simple and accessible application of the Forecasting and Policy Analysis (FPAS) Mark II framework that incorporates uncertainty, nonlinearities, and Alan Greenspan’s 2004 formulation of “monetary policy as a risk management exercise.” This conceptual and analytical approach is applied to the US, given its importance in the global macroeconomy and the ready accessibility of data and analysis. The analysis features the key aspects of current stage monetary policy discussions, namely important nonlinearities in economic behaviors and the significance of endogenous policy credibility. The report also highlights the importance for central banks to be transparent about how they are effectively managing the inflation-output (employment) tradeoff in calibrating monetary policy.

Authors

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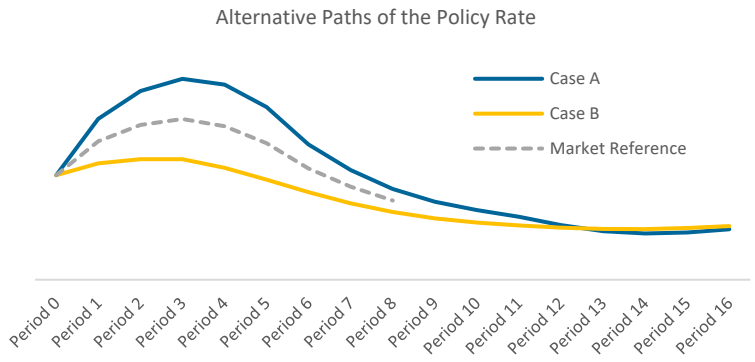
Table of Contents

Monetary Policy as Risk Management Framework

Our framework for monetary policy is through a lens of risk management to analyze and communicate the uncertainty surrounding the economic outlook more effectively. Our approach is to consider alternative scenarios for the evolution of the economy that have important implications for monetary policy. Elevated uncertainty is a reality that central banks must manage, and we do this by explicitly incorporating it into our framework and communication. We develop and analyze two or more illustrative scenarios that would imply a higher or lower path for interest rates than what is currently priced in financial markets. These scenarios should not be interpreted as pure risk scenarios but are meant to represent plausible paths for policy rate that could be in an individual's baseline scenario.

- Market Reference is the expected path of the policy rate that is currently priced in financial markets.
- Case A reflects a scenario that incorporates economic and financial developments that would require a higher interest rate path than what is currently priced in financial markets that is consistent with guiding the economy back to its long-run equilibrium.
- Case B reflects a scenario that incorporates economic and financial developments that would require a lower interest rate path than what is currently priced in financial markets that is consistent with guiding the economy back to its long-run equilibrium.



Illustrative purposes only

Why a scenario-based approach to risk management?

To conduct monetary policy in a highly uncertain environment, we believe that Board decision making, and communication are more effective when this uncertainty is recognized at the beginning of the process and incorporated throughout, rather than starting with competing baseline forecasts offered by different Board members and attempting to reconcile them to achieve a consensus decision.

Since the primary mechanism for the transmission of monetary policy is through the expected path of the policy rate, our alternative scenarios are constructed around the market reference path. We believe the approach will lead to a more constructive discussion among Board members because they will focus on whether the market interest rate path needs to be nudged in a particular direction to best achieve the objective of price stability. Case A and B scenarios will be plausible but will differ from the scenario underlying the market reference path because they will illustrate the impact of different risks and uncertainties.

These alternative illustrative scenarios will provide a consistent and useful backdrop that will allow Board members to express their views flexibly and qualitatively about the appropriate path for the policy interest rate given the uncertain outlook.

Through the presentation of multiple scenarios relative to the market expectation, the CBA will not only be able to better communicate the uncertainty they are confronting, but also more effectively nudge market rates in the direction of the scenario that better balances these risks and uncertainties.

Macroeconomic Backdrop

Ever since our understanding about the banking sector shifted from a loanable funds model to endogenous money creation, it has become clear that understanding the financial sector is critical for understanding the underlying risk in the economy. Financial shocks have become more commonplace since the 1980's and a regular source of recessions over the past forty years. As the economy matures over time under this system and debt grows, the potential impact of the next financial shock is likely larger than before.

Although we cannot be certain, the central bank must be open and transparent about its worst fears when it believes it is warranted to help financial markets position themselves in a manner where risk is priced appropriately. In similar fashion to before the GFC, it would have been beneficial had central banks joined the chorus of economists, such as Raghuram Rajan, that were warning about a potential collapse in the subprime mortgage market as early as 2005. This preamble should be viewed within a similar context which is not a call for immediate action and a sharp correction but a recognition of an underlying reality that we know little about but nevertheless, must take steps to guard against if we want to call ourselves diligent risk managers.

Since the GFC, we continue to live in an era of what Mohamed El-Erian refers to as tremendous economic and financial distortions that have yet to be resolved. El-Erian is looking at these distortions through the lens of equity and real estate prices which indeed look overvalued to this day relative to their pre-pandemic levels. These conditions typically incentivize bubbles in asset prices to form which we can see in the explosion in net worth among households that dwarfs the height of the GFC. The potential for a further asset price correction is clear.

However, in our view, these distortions are broader and run a gamut of different areas but ultimately begins with the aftermath of the GFC and the era where the non-ponzi game condition was not satisfied i.e. the real interest rate was below the real growth rate or r-g < 0.

Figure A: History of the Non-Ponzi Game Conditions

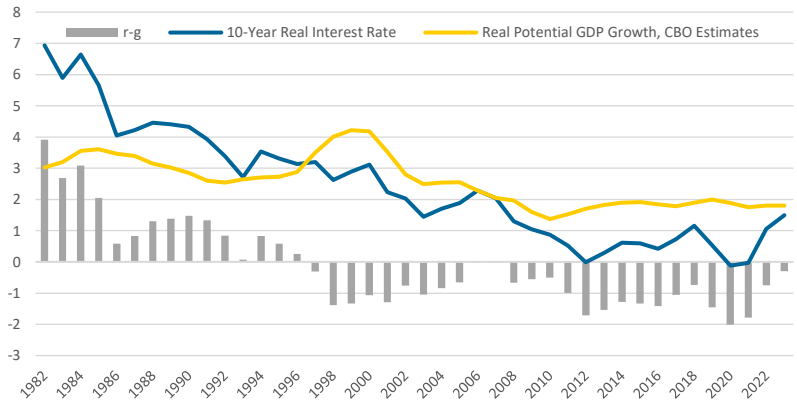


Figure B: Has Created Bubble Conditions for Asset Prices that Dwarf the Global Financial Crisis

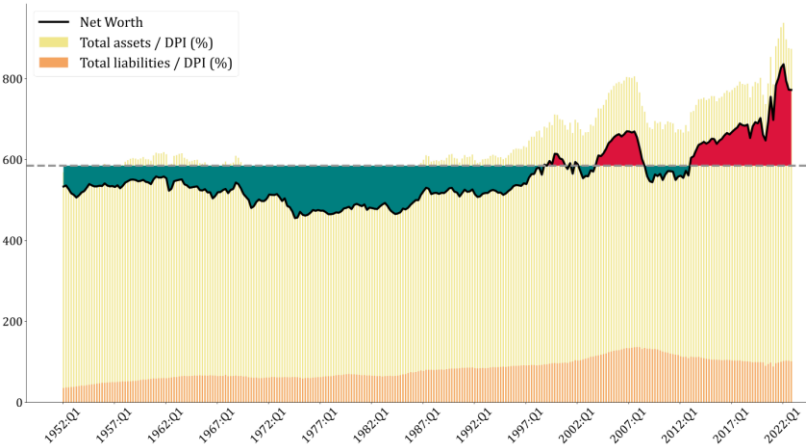
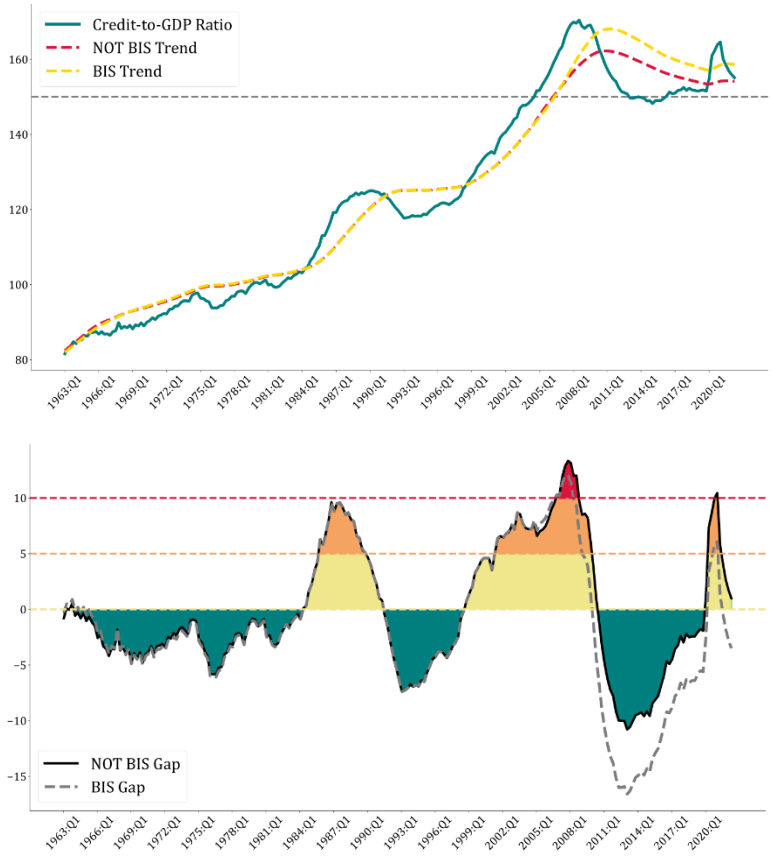


Figure C: Households De-levered post-GFC but Debt Levels Remain Elevated



A massive amount of debt was built up under this regime and since this paradigm persisted for so long, did financial markets interpret it as a structural change? If so, then that can have a major impact on the planning behavior of financial institutions and furthermore if they were wrong and interest rates were to rise to more sustainable levels then they would be exposed to substantial capital losses under such a scenario. Then COVID came along, and this was an opportunity to naturally resolve some of these distortions in the financial system, however, due to its extreme and uncertain nature, policymakers opted for a “policy of least regrets” – overstimulating the economy and risk inflation vs under-stimulating and risk deflation. This policy unfortunately has led to a further round of distortions that complicate monetary policy further.

First, fiscal policy is distorted through the same mechanism, years of low interest rates have normalized deficit spending and there have yet to be serious discussions about long-run debt sustainability. The US government continues to run large deficits in the first quarter of 2023, at a time when the central bank is trying to bring inflation down.

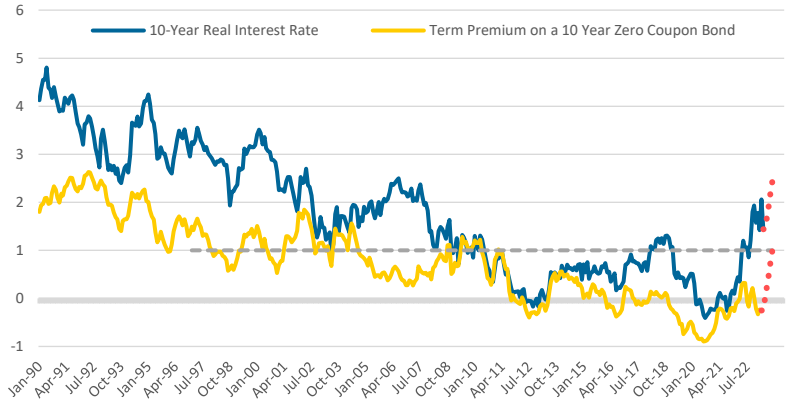
Second, households by proxy have benefited enormously from government deficits with a large cache of excess savings built over the pandemic period. It is true that those at the lower end of the income distribution have likely used up most of their excess savings but in the interim have benefitted most by the labor bottlenecks that formed during COVID and are currently experiencing extremely low levels of unemployment and high wage growth relative to their higher income counterparts.

Third, COVID itself is likely to have a lasting impact in terms of the bullwhip effect caused by the large shift from services to goods and back again. Is likely to complicate tracking a monetary policy relevant business cycle as previous “leading” indicators like manufacturing and housing are simply reverting to their pre-pandemic levels as opposed to inducing the next broad-based business cycle.

Finally, there has been a rich debate among those in the upper echelons of our field that have discussed the outlook for the long-term real interest rate. Historically, there is an unmistakable downward trend in real rates which begs the question of whether low rates are here to stay or not? From our perspective, it’s a complicated question to produce any precise solution. All we want to stress here is that there is huge uncertainty around where long-term real rates are headed, however, the implications of being wrong in one direction versus another are asymmetric.

The term premium is ground zero for thinking about this uncertainty which is perfectly plausible to have been artificially suppressed since the GFC due to unconventional monetary policies such as quantitative easing. The potential for the term premium to unwind to pre-GFC levels would entail an additional increase of about 100 bp on top of observed real rates today. The consequences of such a scenario playing out given the levels of public and private debt is self-evident, mass insolvencies.

Figure D: Potential for the Term Premium to Revert to Pre-Pandemic Levels is A Clear Risk



In our view, financial markets are being highly complacent about the inherent risk in the economy that should reflect the uncertainty around these distortions correcting or reverting to a more stable equilibrium. Our fear is that we live in a binary financial system defined by the non-ponzi condition where these distortions do not get resolved until the non-ponzi game condition is realized and all these distortions correct at once precipitating a Fisherian Debt-Deflation type depression.

We are truly threading the needle to bring back macroeconomic stability while simultaneously maintaining financial stability. The corridor to achieve this goal continues to narrow as we move forward in time and inflation remains sticky above the target which under a standard macroeconomic framework would require higher interest rates. However, this might be an environment that is impossible to de-couple monetary policy and financial stability concerns and we must consider that there might be inevitable trade-offs that includes a temporary tolerance for higher inflation in lieu of potential financial instability caused by tightening monetary policy.

The Case A and B framework is especially relevant for today's economy where Case A-type essentially reflects an economic scenario where the core macroeconomic forces dominate the policymaking decision i.e., strong economic growth, tight labor market and elevated inflation that requires higher interest rates vs a Case B-type scenario where a credit crunch is underway that will feed into the real economy imminently. Furthermore, there is uncertainty about the magnitude of these fundamentally different alternative scenarios that can lead to explosive situations in either direction where the Fed could be overly concerned about financial stability and find themselves behind the curve and requires another round of substantive tightening. Meanwhile, on the flip side, whenever one discusses a scenario that involves bank stress or risk materializing, historically has never been a smooth process and therefore the potential of a large recession already in the books is also plausible at this point. When the endogenous money destruction process gets underway it usually cascades.

Both cases attempt to capture the wide array of views that have been discussed by various members of the Fed as well as presented in staff scenarios. The cases provide members with these opposing views a strategy moving forward in this delicate situation to move seamlessly from one scenario to another as the recent volatility in the pricing of the Fed Funds rate in the aftermath of the SVB collapse has illustrated.

Statement of the Mock Monetary Policy Committee

The Mock Monetary Policy Committee (MMPC) has decided to raise the target range of the federal funds rate by 25 basis points to 5.25-5.50%.

This decision comes at a time of elevated inflationary pressure and heightened financial instability in the form of multiple bank failures. This mix of issues really gets at the heart of where monetary policy meets financial stability. In the view of the MMPC, we believe given the strength of the real economy that it must take primacy when thinking about monetary policy setting and achieving long-run macroeconomic stability. In the meantime, there are other tools to deal with backstopping the financial system to prevent contagion from forming. Giving up on our macroeconomic objectives too soon may present an even greater threat to the financial system if not dealt with in a timely manner. That said, we are cognizant of tighter credit standards that may simply take more time to feed through the system given distortions around household balance sheets, namely excess savings, and real wealth accumulation during COVID.

When the committee began raising interest rates in March 2022, we were hopeful that by this time we would start to see a material slowdown in broad economic activity that is consistent with bringing inflation back to 2% i.e. below potential growth. Even though interest rates have clearly impacted sectors such as housing, the broader domestic economy continues to grow at or above potential. In order to feel confident that we are on the path towards achieving our objectives of sustainable full employment and inflation target, we need to see a material slowdown in economic activity.

The labor market remains secularly tight with an unemployment rate of 3.7% in an environment where there are more than 1.5 job vacancies for every unemployed person. Wage inflation continues to be stubbornly high and poses the main challenge for bringing down underlying inflation in the economy that is consistent with the target. We find it hard to believe that wages can fall without a substantial cooling of the labor market.

The disinflationary forces in goods and commodity markets in the second half of 2022 was a strong motivating factor for being optimistic about lower underlying inflation and the belief that the Fed Funds rate was positioned sufficiently tight, however, different measures for core inflation have had a more difficult time to disinflate and remain uncomfortably elevated and therefore likely require a higher policy rate than what is priced in financial markets barring any systemic risk to the banking sector that goes beyond the recent troubles at Silicon Valley Bank. Long-term inflation expectations remain anchored; however, the longer inflation remains elevated the greater the risk of de-anchoring becomes.

The MMPC considers a host of different scenarios and that are guided in part by a policy strategy of least regrets that avoids more punitive interest rate increases in the future that would jeopardize our ability to engineer a smooth return of output and inflation back to their long-run objectives. Weighing the risks between inflation becoming entrenched or wide-scale banking sector failures, the MMPC has voted to move policy in a tighter direction to reach the terminal rate that we believe is necessary to achieve our objectives sooner rather than later and will re-evaluate policy based on the scenarios presented in this report or coming in the future whether rates need to continue to rise or not.

Monetary Policy Outlook in a Nutshell

Preface: Looking at the data today, one can derive plausible scenarios for the economy that move in very different directions, in other words, uncertainty around the future path of policy interest rates required to achieve our objectives is especially high. Therefore, the choices and magnitudes behind the different case scenarios are meant to reflect the range of plausible scenarios that different policymakers would consider as their “most likely” path of the economy. These scenarios are meant to play a role for managing these different risks in real time depending on which mix of risks materialize. Furthermore, by taking these alternative viewpoints seriously and developing them in a structured way, we hope it will help policymakers and analysts have more productive discussions and help financial markets manage uncertainty more accurately. A final consideration is that this period of uncertainty is special in the sense that there appear visible risks on both ends of the spectrum that could push the economy to high inflation on one end where the real economy is resilient to interest rate increases and deflation on the other hand where the financial sector is much more sensitive to higher interest rates than ever before (financial dominance). The Case A and B scenarios are meant to capture this corridor of plausible scenarios before the economy tips into these potentially explosive or non-linear scenarios that would require more dramatic action by policymakers in either direction (Case X and Y scenarios).

Global Economy: The GDP growth outlook is expected to slow as growth prospects in advanced countries remains poor as energy and productivity shocks stemming from the conflict in Ukraine continues to weigh on growth in 2023, especially in the Euro Area. On the other hand, China ending its zero-COVID policy was expected to apply some upward support to global growth and consequently global commodity prices such as oil. However, that scenario has not exactly manifested quite yet as demand for oil is expected to remain subdued and for supply to outstrip demand. Of course, given that the oil market is relatively balanced, modest changes to demand or supply could easily begin outstripping the other and apply pressure on oil prices in either direction.

Domestic Economy: GDP growth measured 1.1% in 2023Q1 but largely driven by volatile inventories while consumption was strong (3.7%). Residential fixed investment has been the major drag on the economy since tightening policy, but the magnitude of such declines is unlikely to continue without further increases in mortgage rates. Meanwhile, consumer spending remains the engine of the economy and has not shown signs of slowing down, which we attribute to strong household balance sheets and high wage growth. Recent volatility in inventories make estimates of the output gap highly uncertain. The underlying growth connected to strong consumption if prevails would suggest that the economy is operating above capacity.

Labor Market: Wage growth that is around 6% YoY over the past several months which if sustained would present a problem for monetary policy to bring inflation back to target as underlying inflation would substantially higher. Furthermore, the high number of job vacancies to each unemployed person makes it reasonable to expect wage inflation could remain elevated until the labor market cools much more than it has either through announced layoffs materializing or tighter credit conditions.

Inflation: Food and energy prices are expected to level off meaning large disinflation on the horizon where the effect of the disruptions due to the conflict in Ukraine peters out. Furthermore, China’s reopening does not initially appear to be that inflationary and could be disinflationary while still providing a modest boost to growth from improving supply chains further. The major concern at this point is whether the response to higher wages will feed back into inflation, namely the service sector? Meanwhile, we have a good idea that rent prices will continue to rise as new people adjust to the new price level on the market. This leaves goods inflation which was a shining light in the second half of 2022 and reason for optimism that policy was positioned appropriately. However, these forces may have begun to recover suggesting core inflation could remain elevated in the near-term. How fast core inflation disinflates is of the utmost importance to monetary policy so that inflation expectations do not begin to ratchet upwards despite a slowing economy, making the pain of disinflation worse.

Financial Markets: In the wake of the Silicon Valley Bank collapse, rumors of a larger banking contagion began to foment within financial markets reflected in a rapid decline of the expected path of the Fed Funds rate. However, steps taken by authorities to backstop the banking system have certainly helped allay these fears and the expected path has rebounded somewhat. That said we are not out of the woods yet, with persistent regional bank failure concerns. Issues connected to whether the economy is prepared for higher interest rates now populate policymaker's worst fears.

Monetary Policy: Given our macroeconomic framework, many signs point to the need for tighter monetary policy (Case A) especially considering important non-linearities within a high inflation, high output environment. Although, we recognize that these are unprecedented times and a lot of these shocks that we have observed could revert/unwind quite quickly (larger disinflation, faster slowdown in growth than the Case A scenario) but to endorse such a case we would have to observe a combination of corroborating factors to be confident that we are in a Case B world. However, due to the recent turmoil on financial markets on account of the Silicon Valley Bank collapse, monetary policy must be prudent to achieve its macroeconomic objectives while maintaining financial stability.

Global Economy

Case A-type Considerations

Expansionary Demand: Stronger economic recovery in China and Europe in 2023 relative to the headwinds (zero-COVID and Ukraine conflict) that impacted growth in 2022 could revert faster than expected.

Contractionary Supply: OPEC's decision to reduce production is putting a floor and upward pressure on oil prices.

Case B-type Considerations

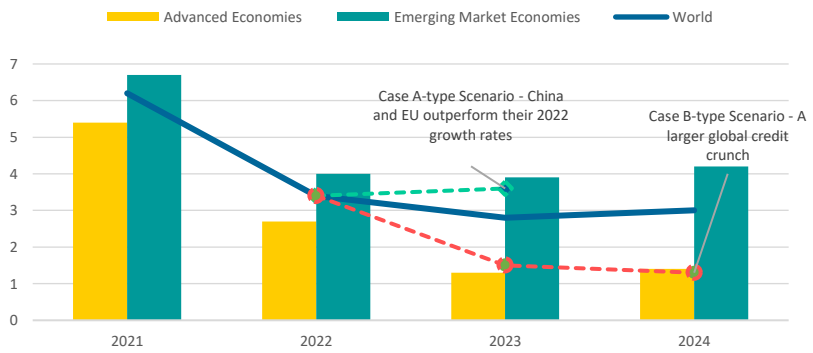
Contractionary Demand: Persistent financial stability concerns stemming from more bank failures in Europe and continuing concerns about China's financial system.

Expansionary Supply: Global commodity prices such as food have declined since the Ukraine conflict began and China's reopening could help ease supply-chain issues further.

Global Growth

2022 was marred by the conflict in Ukraine and zero COVID policy in China. Recent forecasts by the IMF and the European Commission expect energy and productivity shocks to continue to weigh on global growth and inflation in 2023. However, the removal of these shocks sooner than expected could bring forward upside potential for both growth and inflation.

Figure 1: A More Resilient Global Growth Environment Could Complicate the Speed of Disinflation While Still Mindful of Potential Financial Instability

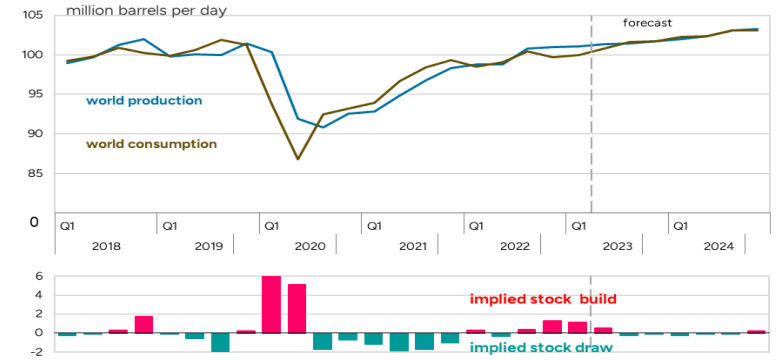


Source: IMF, April WEO

China Resurgence (Lack Thereof?)

The impact of the China resurgence story is starting to take hold as the rebound in growth has not been inflationary, especially in commodity markets. In fact, China reopening could pose further disinflation risk depending on the view on improving supply chains.

Figure 2: China's Reopening is Taking Hold but May Have Hit a Snag. Potential Near-term Tailwind for Global Growth While Still Disinflationary



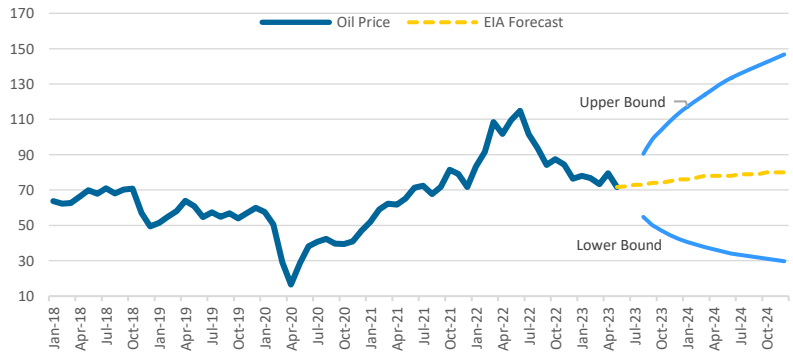
Data source: EIA, STEO, June 2023

Commodity Prices

Oil prices are expected to moderate around current levels which would help the disinflation process back to the target. The oil market is currently balanced (supply=demand), however one of these forces could easily overtake the other and push oil prices in either direction. In particular, the expansion of supply from non-OPEC countries on the one hand and global demand problems on the other hand might shatter the current balance in the market towards disinflation.

However, the decision and strategy by OPEC to reduce output in the face of lower demand puts an upward bias on prices as a more realistic risk for the near-term future.

Figure 3: Oil Prices Expected to Moderate but Risks to the Upside are More Pronounced Given Risks to Growth and OPEC Supply Constraints



Source: EIA STEO June 2023

Domestic Output

Case A-type Considerations

Expansionary Demand: Consumer demand remains strong and net exports move back towards pre-pandemic levels as global trade normalizes with the reopening of China.

Contractionary Supply: The semiconductor shortage continues to impact the production of new vehicles that could revert the recent disinflation in used and new vehicle prices.

Case B-type Considerations

Contractionary Demand: The rise in the net percentage of banks tightening credit standards may lead to a sizable credit crunch that would have recessionary effects.

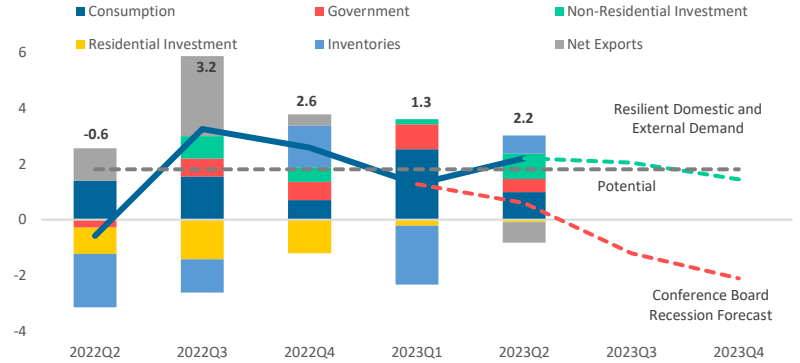
Expansionary Supply: Manufacturing production ramping up again after a year of decline as the goods sector normalizes port-COVID.

Real GDP

Growth came in at 1.1% in 2023Q1. However, the primary contributor came from a highly volatile change in inventories while consumption was very strong at 3.7%. The Case A-type world reflects consumption remaining strong and the inventory drag reverts as manufacturers scramble to respond to the recession that has yet to materialize.

Case B will broadly revolve around tight bank lending conditions taking hold once important distortions such as excess savings or revenge spending gets absorbed and household balance sheets return to a more normal state.

Figure 4: 2023Q2 GDP is Expected to Rebound to 2.2%, Unexpected Drawdown in Inventories Reverts, while Consumption Remains Strong



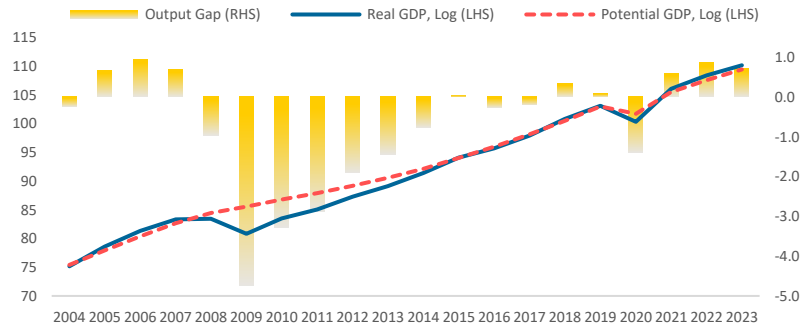
Source: FRED, Atlanta Fed GDPNow, Illustrative staff projections

Output Gap

A major concern for monetary policy at this juncture is the initial position of the economy remaining in a relatively hot position with aggregate demand continuing to outstrip aggregate supply so far in 2023 and applying upward pressure on prices.

Until the risks from recent banking fragilities are realized it is difficult to anticipate bank lending tightness compared to previous credit crunch induced cycles given the unique position of the economy today that is still rebalancing post-COVID.

Figure 5: The Output Gap is Estimated to be Positive as Long as Growth Remains at or Above 1.8%

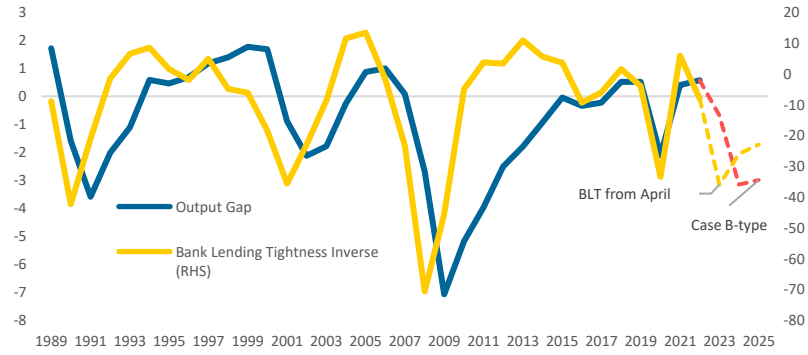


Source: Staff projections, MPMOD Case A, June 2023

Bank Lending Tightness

The primary motivating factor behind our Case B scenario is the treatment of our bank lending tightness variable which takes the average of the net percentage of banks tightening credit standards across multiple dimensions. Historically, it has been a reliable leading indicator of economic downturns, however again the uniqueness of the current situation could be confounding the usefulness of this variable. For instance, it may simply be reflecting the rapid rise of nominal interest rates despite real rates remaining subdued.

Figure 6: The Bank Lending Tightness Indicator Could be a Harbinger for What is to Come and Undergirds Our Case B-type Scenarios.



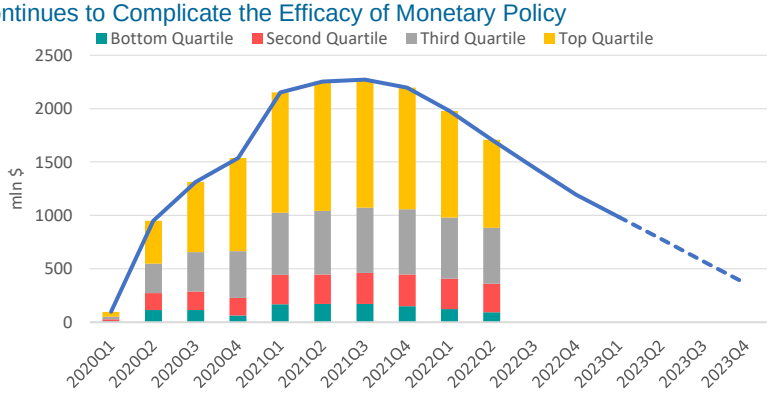
Source: Staff projections, MPMOD Case B, June 2023

Box 1: Consumption Outlook

Excess Savings

Analysis around excess savings remains relevant today so long as excess savings continue to persist. A recent update by Abdelrahman and Oliveira of the San Francisco Fed agree that based on past savings rate that aggregate excess savings is likely to remain positive into the fourth quarter of 2023 as we illustrate in Figure 1b.

Figure 1b: Excess Savings Are Expected to Remain Positive and Therefore, Continues to Complicate the Efficacy of Monetary Policy

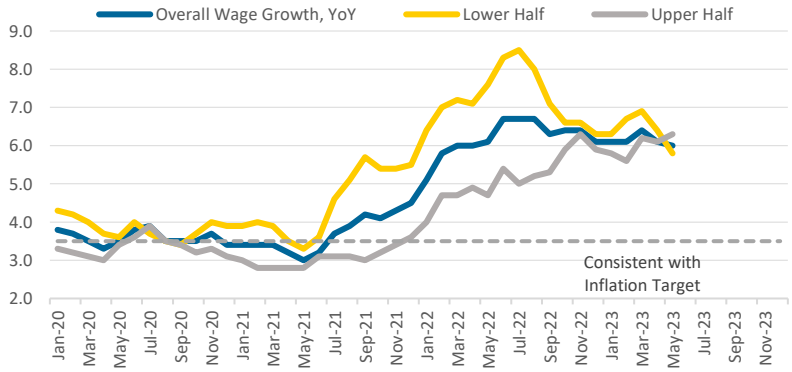


Source: Staff estimates, Fed

Wage Distribution

At the same time, despite the bottom quartile of the income distribution having drawn down a sizeable portion of their excess savings during the pandemic period, it has been the lower income levels that have benefited most from the pandemic labor market. Whereby the lower income levels have seen their wages rise substantially more than those in the upper half of the income distribution. However, that gap has since closed but the benefits should remain. Given that during the pandemic, it was the lower paying jobs most associated with labor shortages and bottlenecks makes this recent deceleration of wage growth especially interesting for those that believe we could see a material decline in inflation via lower wage growth without a large increase in the unemployment rate.

Figure 2b: Are COVID-related Labor Bottlenecks Subsiding Without A Rise in Unemployment?

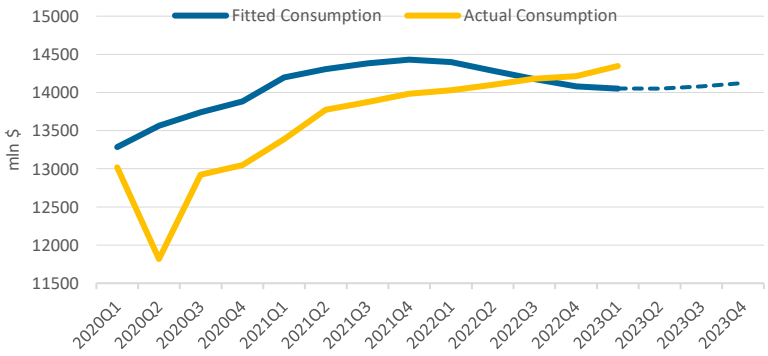


Source: Atlanta Wage Tracker

Consumption Function

Using optimistic assumptions for real disposable income and wealth, we are likely in a period where actual consumption will outstrip fitted consumption. Under typical circumstances, this would lead us to believe that consumption would begin to slow to close the gap between actual and fitted consumption. However, after a period of forgone consumption during COVID, consumers may begin to enter an extended period of “revenge spending” before fitted consumption starts reflecting actual consumption once again.

Figure 3b: Will Consumption Slow or Are We in a Period of Revenge Spending?



Source: Staff estimates

Labor Market

Case A-type Considerations

Expansionary Demand: A tight labor market persists, and wage inflation remains elevated especially among the lower income quartile whose excess savings have become depleted.

Contractionary Supply: Bottlenecks persist especially among the lower income half of the wage distribution keeping upward pressure on wage growth.

Case B-type Considerations

Contractionary Demand: Unemployment rises rapidly. The WARN act layoff announcements are realized.

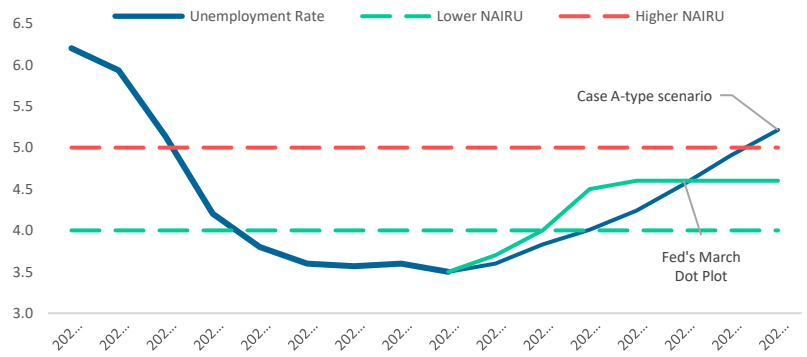
Expansionary Supply: Beveridge curve shifts back to its pre-pandemic position suggesting a lower estimate for NAIRU than what is currently assumed.

Unemployment Rate

Regardless of one's estimate of the NAIRU, the current unemployment rate of 3.7% is well below most estimates. This presents a key risk for policymakers if the NAIRU is indeed much higher than is currently judged.

However, signs of the labor market cooling have become evident with the steady rise of continuing jobless claims and this momentum would need to continue to relieve pressure on wages.

Figure 7: The Future Unemployment Rate is Dependent on Where the NAIRU is Which is Highly Uncertain

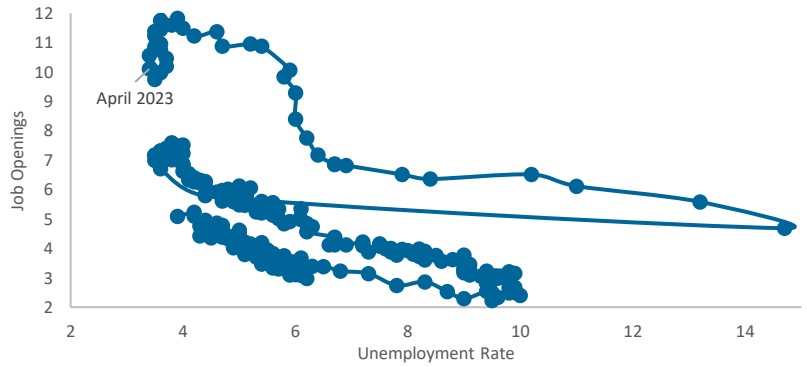


Source: FRED, Staff projections

Beveridge Curve

The case for a higher NAIRU in part reflects developments in the labor market associated with the ratio of job openings and unemployed. A noticeable outward shift occurred during the COVID-pandemic. Although it is known that Beveridge Curve's tend to shift out during recovery phases, we also know that they can become stuck which under a Case A-type scenario would be associated with a higher NAIRU and unemployment to bring the economy to equilibrium. April data which saw a rise in the number of job openings suggest that this indeed may be the case.

Figure 8: The Beveridge Curve Inching Closer to Its Pre-pandemic Position but in April Reverted Somewhat, is it Stuck?



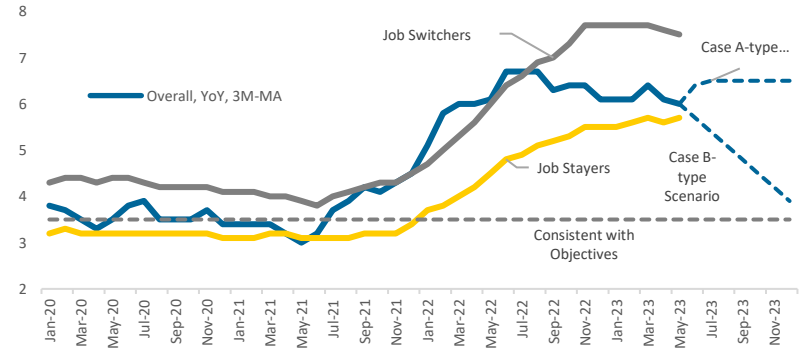
Source: FRED

Wages

During COVID, the demand for workers among the lower half of the income distribution increased substantially, this pulled up overall wages and those in the upper half of the income distribution ended up benefiting as well. There are these types of dynamics throughout the labor market i.e. job switchers vs job stayers are another good example from Figure 9.

We have had elevated wage inflation for several months now and the question is will wage inflation begin to moderate where we can be confident that the labor market is consistent with the inflation target?

Figure 9: Several Months of Elevated Wage Growth. Critical for Wages to Moderate to More Sustainable Levels



Source: Atlanta Fed Wage Tracker

Inflation

Case A-type Considerations

Wage-price spiral: past wage inflation feeds back into consumer prices, especially for services and we have an old-fashioned wage-price spiral.

Higher underlying inflation: underlying inflation without further tightening in credit conditions will converge to ATL Feds measures for sticky price or wage inflation.

Case B-type Considerations

Disinflation process is smooth: concerns about higher underlying inflation are misplaced. Inflation is well anchored to the 2% target. Disinflation to target is relatively painless not requiring major output loss.

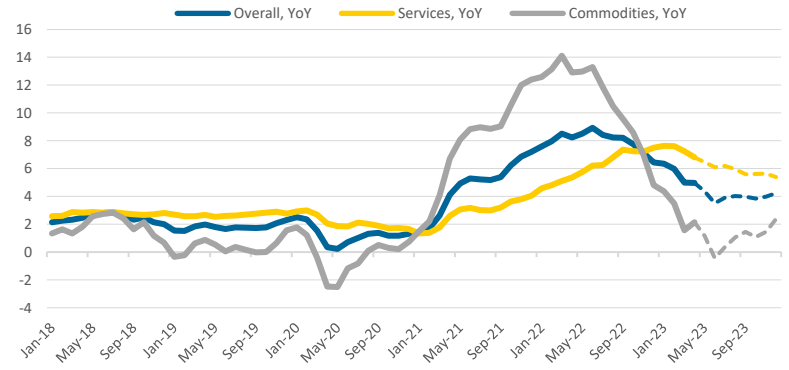
Deflationary spillover from goods to services: significant deceleration of commodities' inflation will affect inflation expectations and overall costs in many industries and services, pushing the prices in those sectors down.

Overall Inflation

Food and energy shocks from the Ukraine conflict are likely to continue to disinflate while as long as wage growth persists then service sector inflation would also be expected to remain elevated.

Goods inflation was expected to contribute to the disinflation process in 2023 but an earlier than expected rebound on demand for durables could be problematic for policy getting ahead of underlying inflation.

Figure 10: YoY Inflation Decomposition with Short-term Outlook that Assumes Elevated Service Inflation Due to Elevated Wage Inflation

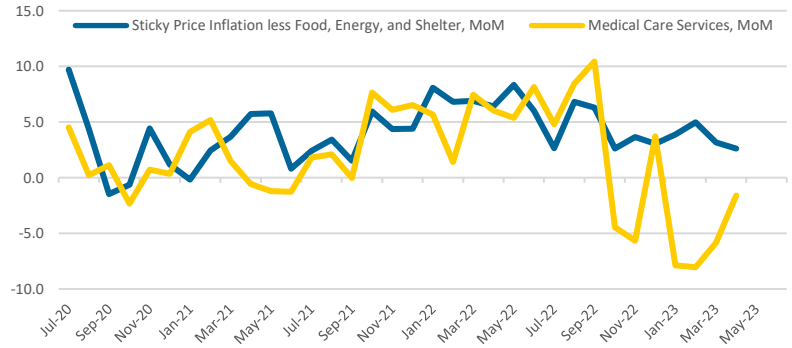


Source: FRED, Illustrative staff projections

Sticky Price Inflation

Sticky prices are changed infrequently and therefore must consider some expectation about where prices may be headed when those prices are changed. These types of prices help us better understand in real-time the inflation mentality pervasive in the economy that contributes to a wage and price spiral forming and inflation becoming entrenched. These prices have decelerated recently but remain elevated. A deflationary drag has been observed in medical services which could mean sticky prices are understated moving forward.

Figure 11: Core Sticky Price Inflation Less Shelter Ticking Up and Might Be Understated by Continued Deflation in Medical Services



Source: FRED

Underlying Inflation

Really no consensus around what underlying inflation is and how to measure it. This uncertainty needs to be incorporated into how we view our different scenarios for what "restrictive" policy means to achieve the central bank's objectives.

The estimates range from 2.7 to 6.1%. Conceptually, we prefer both the Atlanta Fed's measures for sticky prices and wage tracker that deals with important compositional and seasonal issues with wages. Both happen to be on the upper end of the distribution and feature prominently in our risk assessment for inflation.

Figure 12: Where is Underlying Inflation?

Price Data	Wage Data	Survey Data
Core PCE	Average Hourly Earnings	Cleveland Fed, 1Y
4.3-4.7%	3.1-3.4%	2.7%
Core CPI	Employment Cost Index	Krugman Embedded Inf
5.0-5.1%	4.2-4.4%	3.4-4.8%
Sticky Price	Atlanta Wage Tracker	Michigan Survey 1Y
4.5-6.1%	4.6-5.0%	3.6-4.6%

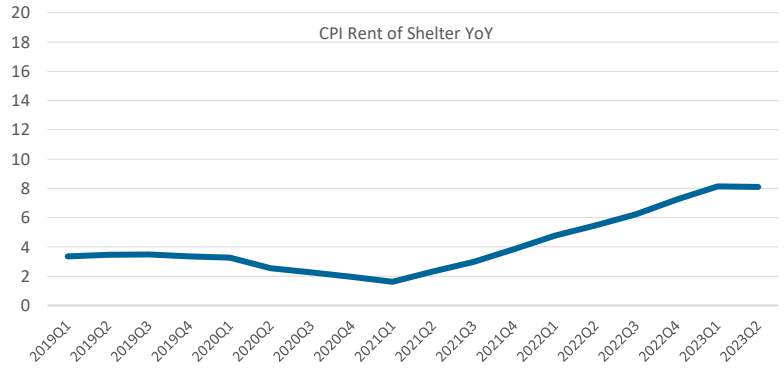
Box 2: Rent Inflation Outlook

Rent of Shelter (BLS)

Given its importance in the CPI and PCE basket, having an idea about rent inflation will be a critical determinant for how quickly core measures of inflation will fall. The BLS measure of rent prices is meant to capture the entire market of rents which means new price increases tend to take time (about 12 months) to be incorporated into all contracts.

So far, rent of shelter as calculated by the BLS has not slowed down much since it started reflecting the rise in new rent prices during the pandemic. However, many observers looking at other measures of rent (Zillow) noted that Rent of Shelter in the CPI was poised to peak.

Figure 2b: CPI Rent of Shelter Peaking. Will it Stay Elevated or Begin Disinflating?



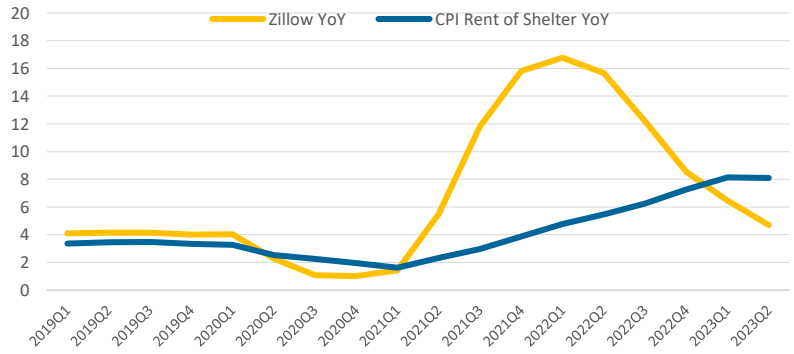
Source: FRED

Private Measures of Spot Rent Prices (Zillow)

Private measures of rent prices such as Zillow try to capture where rent prices are today and therefore it has some leading quality (about 12 months) before they are fully reflected in the BLS measure.

These private measures have been consistently showing steep disinflation in the past several months which have led many to believe that we are about to see a similar pattern in the BLS data.

Figure 2b: CPI Rent of Shelter Peaking. Will it Stay Elevated or Begin Disinflating?

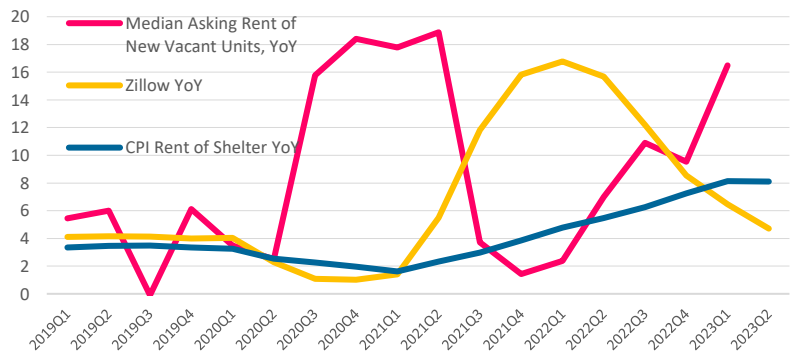


Source: FRED, Zillow

Rent of New Vacant Units (Census)

However, recent data published by the Census Bureau saw a large uptick in the median asking rent of new vacant units in 2023Q1 suggesting a sustained disinflation outlook for new rent prices might be premature at this point and if this uptick holds then another wage of new rent inflation could be on the horizon that keeps rent of shelter inflation elevated for too long that would threaten inflation expectations becoming de-anchored from 2%.

Figure 3b: Is There Another Rent Inflation Wave on the Horizon?



Source: FRED, Zillow, Census

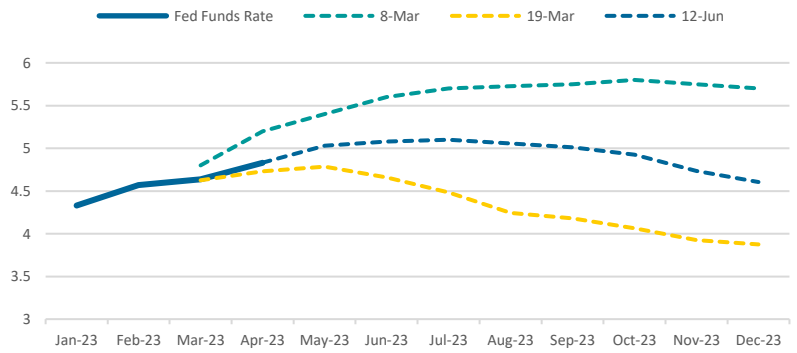
Financial Markets

Fed Funds Path

The market pricing of the Fed Funds rate has experienced substantial volatility as markets grapple with the potential of a stronger than expected economy on the one hand and a credit crunch on the other.

Our scenarios must reflect these different regimes depending on how the data evolve to develop a comprehensive strategy for dealing with extreme uncertainty presented by these competing underlying forces.

Figure 13: The Market Pricing of the Fed Funds Rate. Strong Real Economy or Looming Banking Crisis?

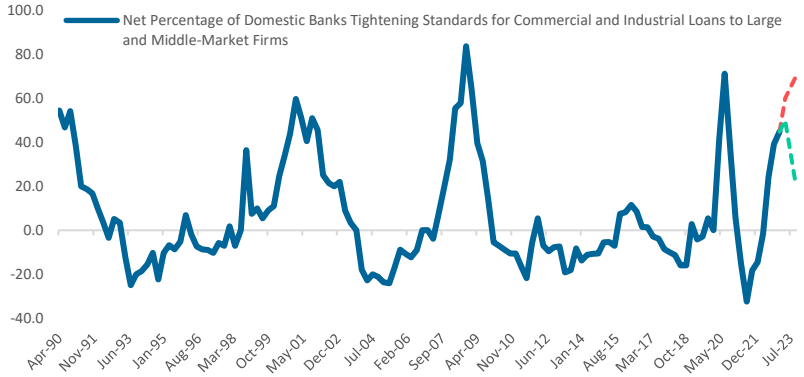


Source: FRED, CME Futures

Recession Watch

The banking fragilities that have surfaced could exacerbate a financial system that was already tightening lending conditions at a rapid pace. It is still unclear whether the current tightening in lending standards will have the same impact as in previous cycles.

Figure 14: Banks are Tightening Lending Standards, Could the Recent Banking Turmoil Exacerbate the Current Situation?



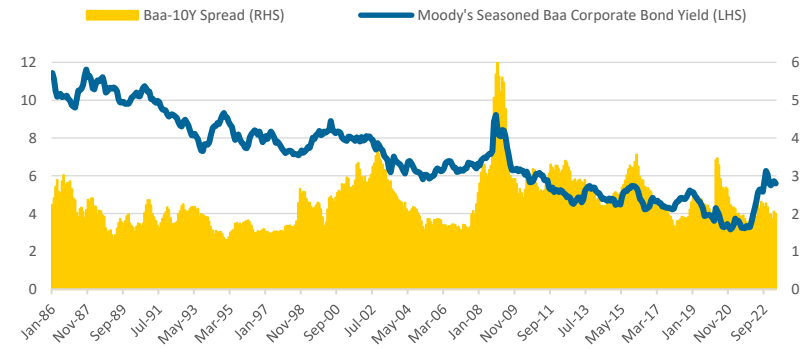
Source: FRED

Corporate Bond Market

Risky corporate bond spreads will be an important real-time indicator that will corroborate whether the credit crunch is upon us or not. At this point in time, high yield corporate bond rates are contained, and risky spreads remain historically low relative to prior recessionary episodes.

We will be paying close attention to these market movements and sensitive to its changes from here on out as it will serve as an early warning signal that will likely require swift action to prevent serious deterioration and financial contagion.

Figure 15: Are Financial Markets Pricing in a Recession? High Yield Corporate Bond Rate Still Relatively Low by Historical Standards



Source: FRED

Monetary Policy

Monetary Policy Outlook

Case A-type scenarios depend on real growth staying at or above potential in the near-term, mainly driven by strong consumer demand in part fueled by excess savings and revenge spending. As a result, inflation remains stubbornly high and labor market conditions do not materially cool and remain inconsistent with the inflation objective. This mix would likely require a higher path for interest rates to ensure policy gets ahead of inflation once and for all. In many respects this type of scenario reflects the market pricing for the Fed Funds path prior to the collapse of Silicon Valley Bank. If the recent turmoil blows over and a strong real economy reasserts itself, then perhaps an even higher terminal rate will be required to compensate for a less aggressive policy stance in the interim.

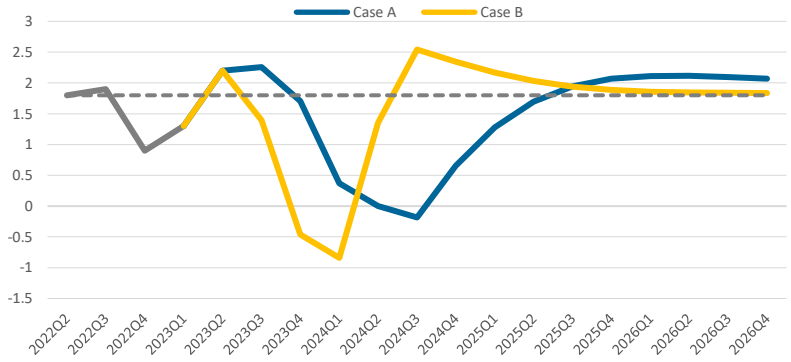
Key Assumptions: NAIRU is 5%, underlying inflation is about 5%, real growth remains above potential in the near term.

Case B-type scenarios reflect recent fragilities in the banking sector begin to feed through into the real economy generating a slowdown in activity that helps accelerate the disinflation process back to the 2% target. If those risks were to materialize, then they would likely require an abrupt switch in the policy stance as monetary policy has done enough to tighten bank lending conditions.

Key Assumptions: NAIRU is 4.5%, underlying inflation is about 4%, real growth falls below potential in the near-term.

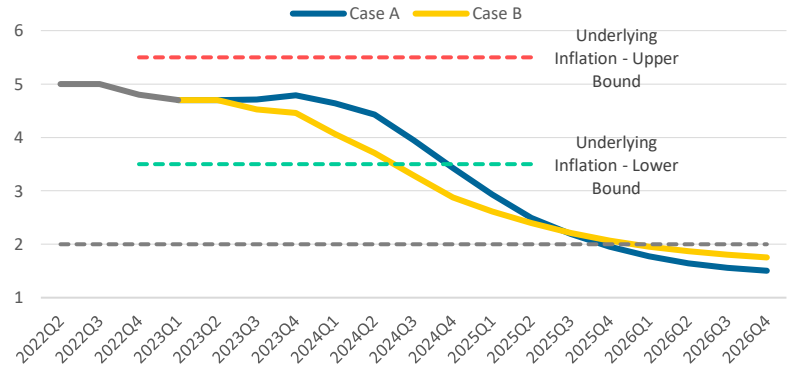
Due to the uniqueness of the economy today and the juxtaposition of a potentially strong underlying economy and financial instability, uncertainty is undoubtedly heightened, and we must consider paths for the economy that reflect one of these underlying forces dominating so that the policy outlook is prepared to deal with these risks in quasi real-time.

Figure 16: Real Growth, QoQ, Resilient Consumer or Crisis in Confidence?



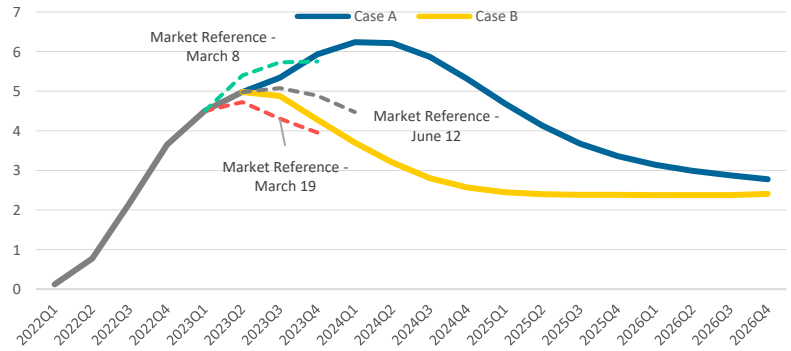
Source: Staff projections, ENDOCRED US June 2023

Figure 17: Core PCE Inflation, YoY. Inflation Gets Stuck at 5% or Disinflation Continues as Real Economy Drag Takes Hold



Source: Staff projections, ENDOCRED US June 2023

Figure 18: The Endogenous Interest Rate Path for Both Case A and Case B Scenarios Relative to Market Pricing



Source: Staff projections, ENDOCRED US June 2023

Appendix

Summary of Risk Issues

Case A-type Scenarios	Case B-type Scenarios
Global economy	
China and European economies grow faster than expected in 2023 from zero-COVID policy and Ukraine-related energy shortfall headwinds being removed.	We are underestimating the effects that monetary policy tightening will have on major advanced economies in 2023 leading to a more abrupt slowdown in growth.
Domestic Output	
Consumers prove to be more resilient on account of a large stock of excess savings where consumption continues to grow at elevated levels.	A regional banking crisis and tighter financial conditions transmits quickly into slower economic growth.
Labor Market	
Labor bottlenecks persisting well into 2023 with no material softening of the labor market and putting upward pressure on wage inflation.	The spike in layoff announcements is at a magnitude where if they materialize could be sufficient to cool the labor market and put wage inflation on a path that is more consistent with the inflation target.
Inflation	
Underlying inflation reflects higher bound estimates based on the Atlanta Fed measures for sticky price and wage inflation.	Underlying inflation reflects lower bound estimates based on Average Hourly Earnings or the Employment Cost Index etc.
Financial Markets	
The Silicon Valley Bank collapse has been addressed through financial stability policies, but the experience may make policymakers balk at their price stability objectives by opting to choose a more gradual approach for policy interest rate increases.	The Silicon Valley Bank collapse is a sign of larger vulnerabilities to the banking sector that could prove more systemic and a series of bank runs starting with other regional banks begin to foment i.e. First Republic.

Appendix

Table 1: US Core Economic Projections

- Case A | Case B -

	2022	2023		2024		2025	
Real GDP Growth	2.1	2.0	1.7	1.0	0.7	1.1	2.1
Output Gap	0.5	0.5	0.3	-0.3	-0.8	-1.0	-0.5
Unemployment Rate	3.6	3.7	3.8	4.7	4.8	5.6	5.0
Core PCE Inflation	5.0	4.8	4.6	4.2	3.5	2.4	2.3
Fed Funds Rate	1.7	5.2	4.7	5.9	3.1	4.0	2.4

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