

Macroeconomic Forecasts, 2Q2024
Domestic Metrics



Prepared by: Capitalytics, LLC
P. O. Box 381162
Birmingham, AL 35242

Table of Contents

Summary.....	4
Macroeconomic Indicators	5
Inflation & Cost of Living	5
Inflation: Fuel.....	6
Inflation: Food.....	7
Housing Prices and Housing Inflation.....	10
Inflation: Summary	12
Macroeconomic Indicators: Other	15
Inflation & Real Wages.....	16
Unemployment and Labor Force Participation.....	17
Disruptive (“Black Swan”) Events.....	20
Data Analysis	23
Correlations.....	24
Real & Nominal GDP Growth, Real & Nominal Disposable Income Growth, and CPI Inflation Rate..	25
Employment.....	30
Federal Funds (Primary Credit) Rate.....	34
Treasury Yields (1, 3, & 6-month; 1, 3, 5, 7, 10, 20, & 30-year series)	38
30-year Mortgage Rate.....	44
Moody’s AAA & BAA Rates; and the BofA BBB Corporate Yield	46
Prime Rate.....	49
US Average Retail Gasoline Price.....	50
House and Commercial Real Estate Price Indexes.....	53
Dow Jones Total Stock Market Index (end-of-quarter); S&P 500 (quarterly average); and the Market Volatility Index (VIX).....	58
Regression Analyses.....	60
Appendix A: Data Sources.....	102
Appendix B: Methodologies.....	108
Section I: General Forecasting Methodology	108

Section II: Exponentially Smoothed State Space Representations & Generic “ETS” Methodology .	110
Section III: Regression Construction	111
Appendix C: Variable Correlations.....	113
References	116

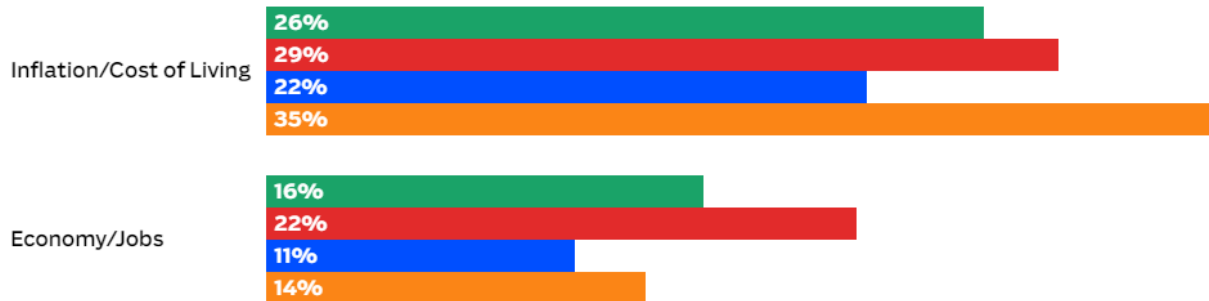
Summary

According to data collected by the Atlanta Journal Constitution, the top-two concerns of consumers are the cost of living/inflation and jobs.

AJC Poll: Economy top of mind

What issue will have the biggest influence on your vote for president in November?

■ All Voters ■ Republicans ■ Democrats ■ Independents



Source: June 11-20, 2024 AJC poll of 1,000 likely Georgia voters with a margin of error of +/- 3.1%.

The Atlanta Journal-Constitution

Source: <https://www.ajc.com/news/business/cost-of-living-economy-rank-as-top-issues-for-georgia-voters-ajc-poll-finds/5PIF5TNGK5DGRI4PMU2AX6KMYM/>

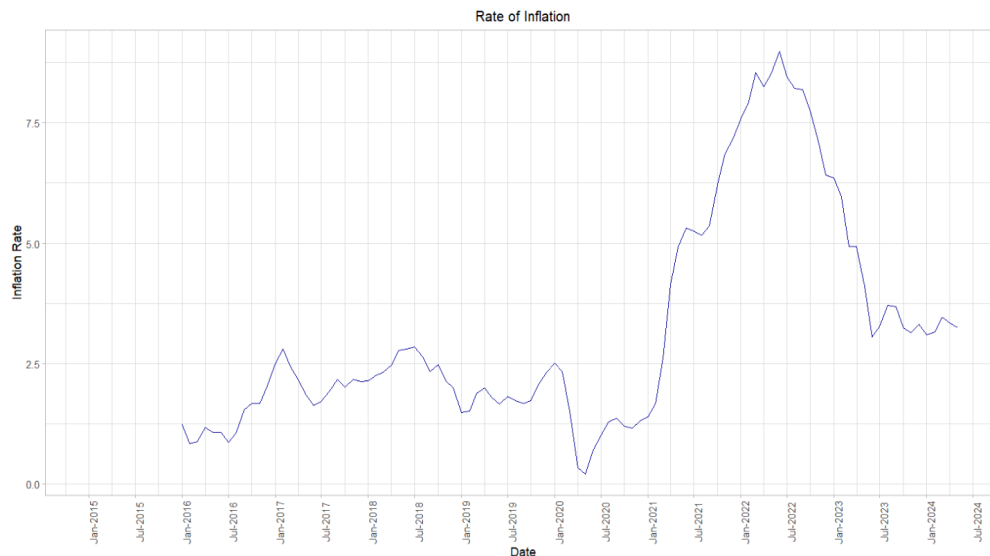
These two elements are easy for consumers to track – they see the cost of groceries and gas and are acutely aware of whether they do (or don't) have a job (or if their friends/family have jobs). The economy is in remarkable shape, but consumers are clinging to old prices for food and housing, and perhaps, are concerned about the relationship between wages and inflation.

Macroeconomic Indicators

Inflation & Cost of Living

The primary concerns of the economy (dating back to 1Q2022) are related to inflation and the policy responses to inflation. Consumers are acutely aware of the prices changes in three areas: energy¹, food², and housing³. We have entered a period of dis-inflation (where price increases are becoming smaller). The rate of inflation fell to 3.4% (3.3% with food and energy) annually. The Federal Reserve Bank has indicated that it is halting interest-rate hikes and is halting and additional talks (for now) of interest rate decreases. The market doesn't appear to be *"hating"* the Fed's policy decisions – the Dow is growing at an annual rate of approximately 8.6%, but the market also certainly doesn't appear to be *"liking"* it as much as last year (during which Dow growth of nearly 13.6% annually), when the Fed signaled potential interest rate cuts in 2Q2024.

Figure 1: National Overall Rate of Inflation



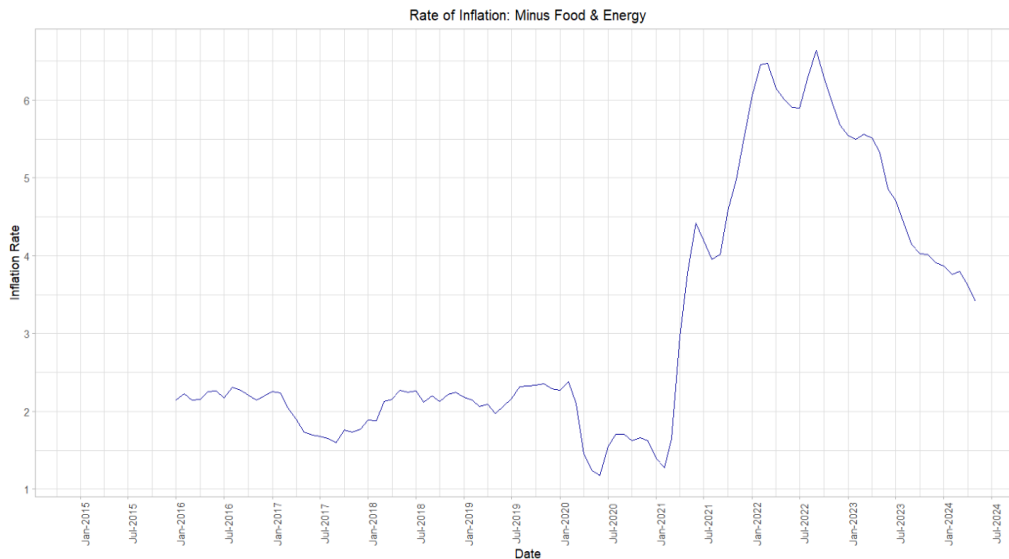
¹ <https://www.bloomberg.com/news/articles/2022-06-09/gasoline-food-and-power-inflation-slam-us-households-and-it-could-get-worse>

² *ibid*

³ <https://money.com/housing-market-cooldown-signs-predictions/?ref=/housing-market-correction-federal-reserve/>

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Figure 2 Rate of Inflation Minus Food & Energy



Inflation: Fuel

You will notice that the current rate of inflation without food and energy (3.4%) is a little higher than the rate of energy with food and energy (3.25%). Prices for food and energy prices have been falling.

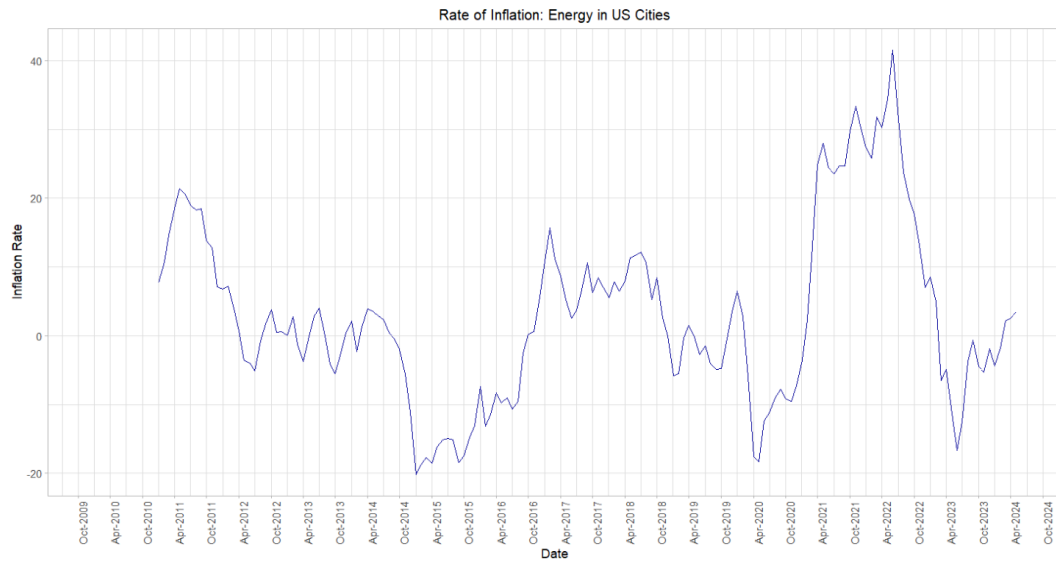
Table 1 (and Figure 2) highlight current fuel prices and the movement of fuel prices. Fuel prices as of June 28, 2024 are 1.4% lower than the prices from June 2023. We're seeing price decreases in the last month and the last week. These changes are consistent with downward trend in over-all energy prices across the economy.

Table 1: Average Gas Prices (per Gallon) in US, as of June 28, 2024

	Regular	Mid-Grade	Premium	Diesel	E85
Current Avg.	\$3.496	\$3.956	\$4.299	\$3.815	\$2.928
Yesterday Avg.	\$3.503	\$3.960	\$4.304	\$3.814	\$2.931
Week Ago Avg.	\$3.451	\$3.911	\$4.256	\$3.806	\$2.871
Month Ago Avg.	\$3.575	\$4.033	\$4.374	\$3.876	\$2.952
Year Ago Avg.	\$3.549	\$3.979	\$4.305	\$3.871	\$2.950

Source: <https://gasprices.aaa.com>

Figure 3: US National Energy Price Inflation, 2010-Present

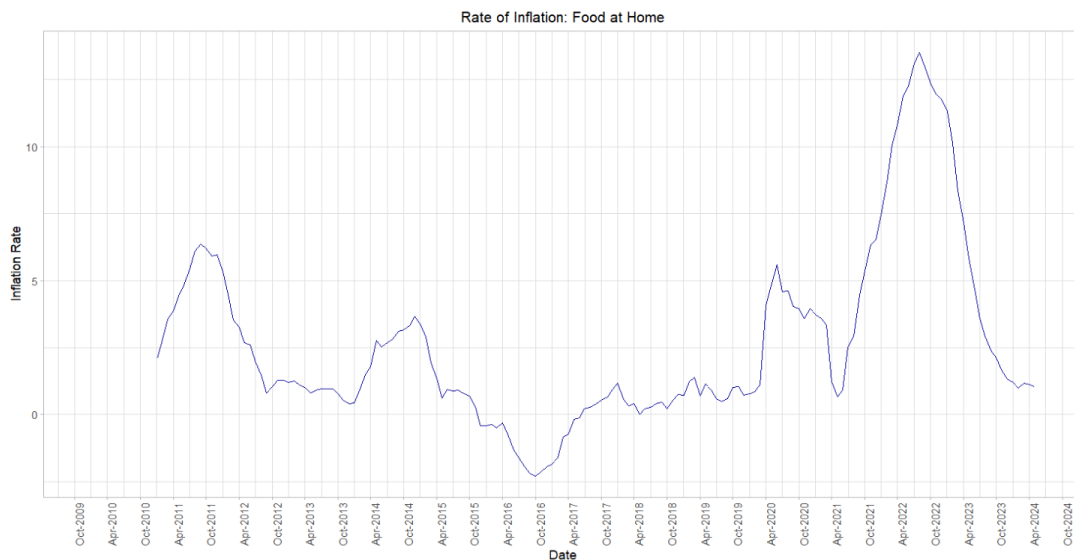


Source: Author's calculation

Inflation: Food

We are seeing the overall price of food decreasing for food at home as well as restaurant meals. This trend has been fairly consistent for the last 4 quarters. The take-home price of food is more reasonable than the cost of restaurant food.

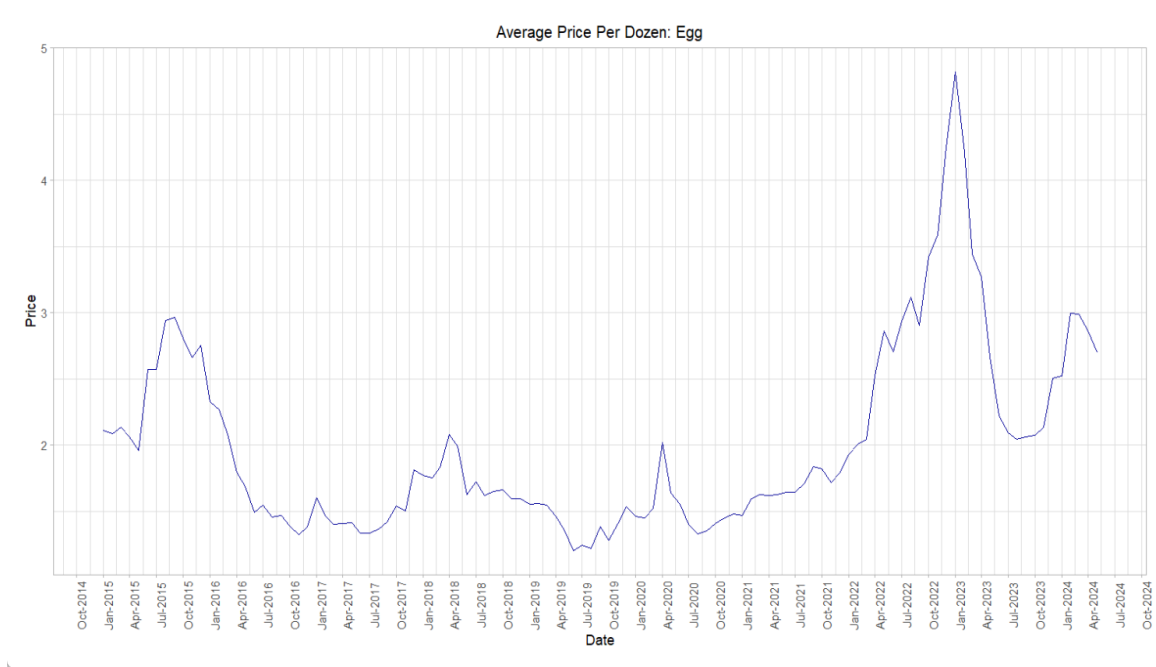
Figure 4: US National Food Price Inflation (at Home), 2010-Present



Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org/>)

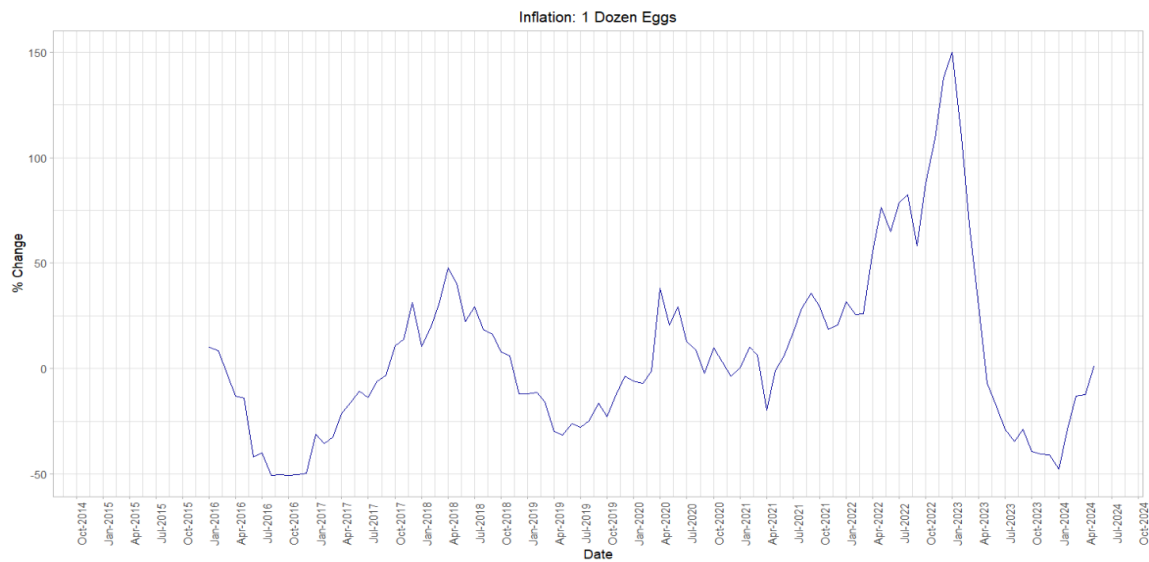
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Figure 5: US National Food Price: Average Price Per 1 Dozen Eggs (US Cities 2015 – Present)



Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org/>)

Figure 6: US National Food Price Inflation: Year-over-Year Change in Price of 1 Dozen Eggs



Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org/>)

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Figure 7: US National Food Price: 1 Gallon of Milk (US Cities 2015 – Present)

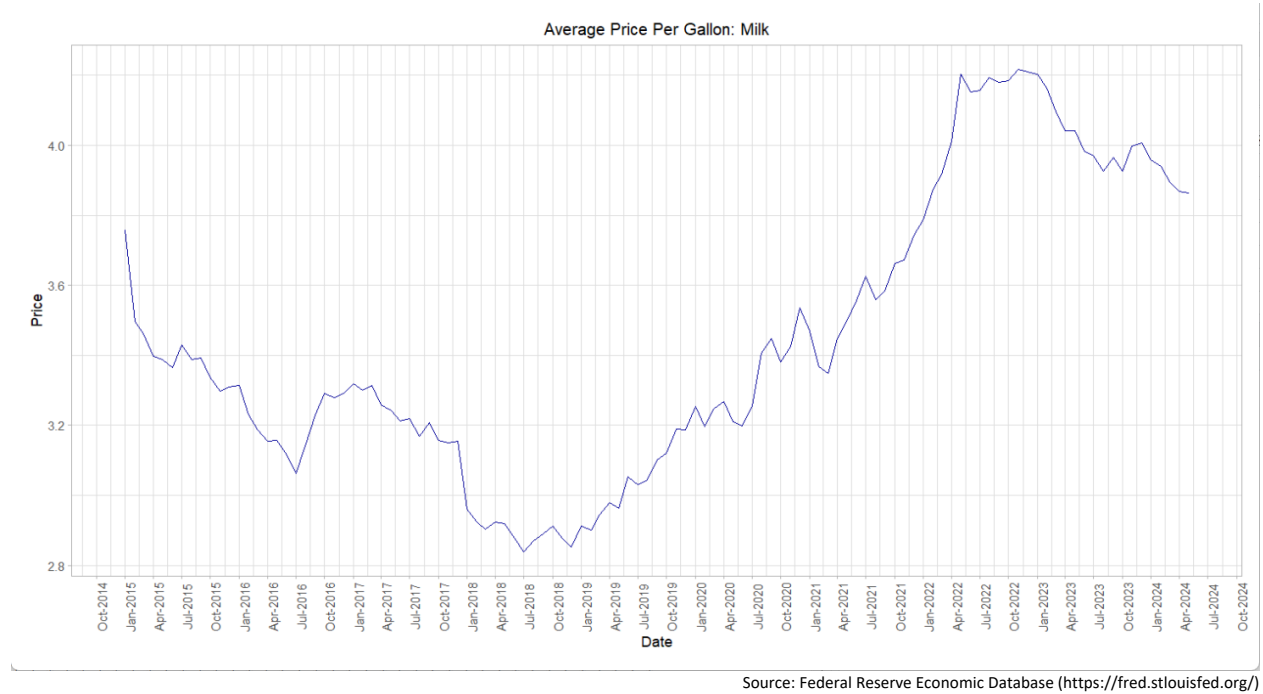


Figure 8: US National Price Inflation: Year-over-Year Change in Price of 1 Gallon Milk

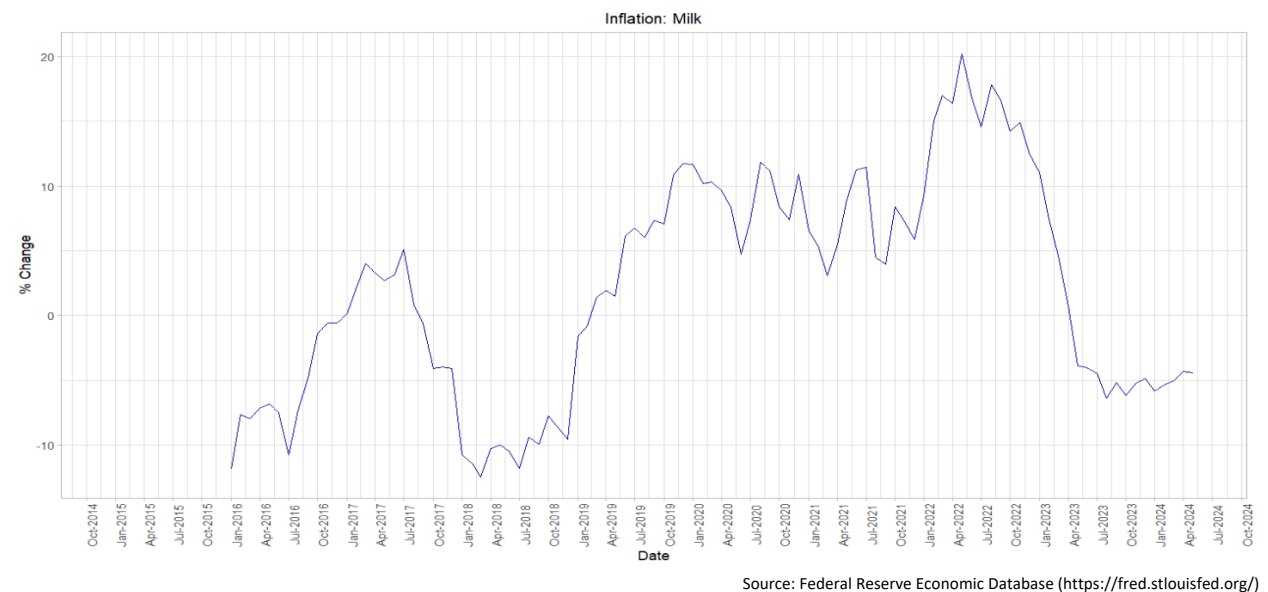
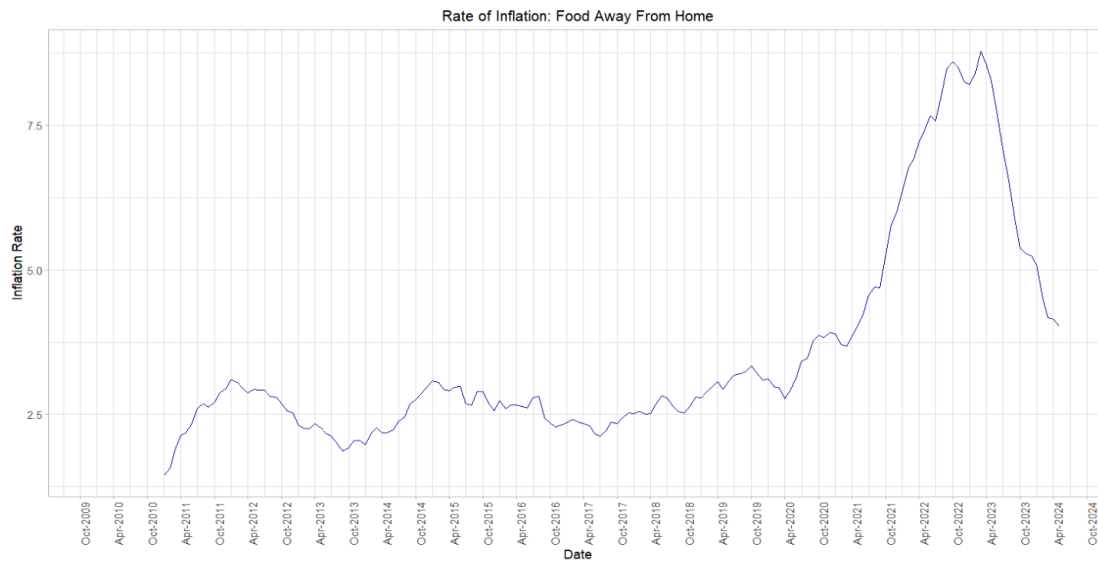


Figure 9: US National Prepared Food Price Inflation (Away from Home), 2010-Present



Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org/>)

The decrease in food inflation does not mean that food has become cheaper. In fact, the prices of eggs and milk have increased from pre-pandemic levels. We believe that the higher costs of these staples are adding to the overall “inflationary” concerns.

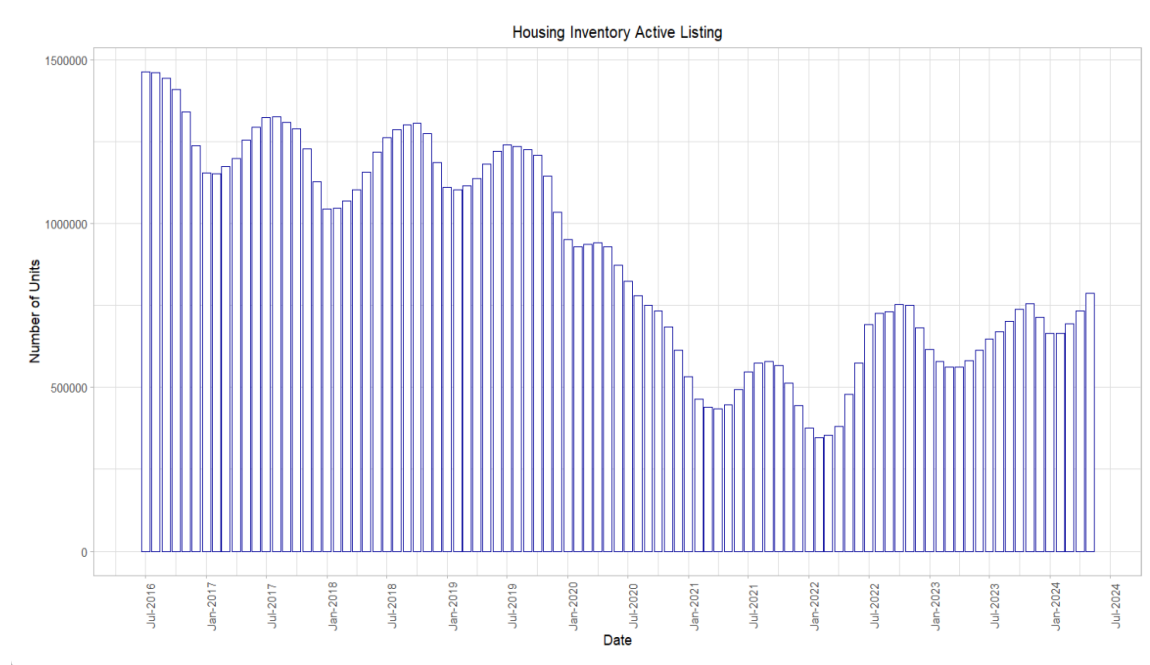
Housing Prices and Housing Inflation

Since early in the pandemic, the U.S. has seen an upward spike in the price of single-family housing units. The median price of houses spiked in early Summer 2022 and then fell through early Summer 2023. This relief was short lived; the median price of housing is increasing again. We believe that this is primarily driven by relatively low supply – the inventory of housing has decreased quite a bit since the pandemic and new home starts have not reached pre-pandemic levels. The Case-Shiller index revealed a decrease in the year-over-year movement in housing prices and, very briefly, showed a small negative movement in housing price movement (indicating deflation in housing prices). The negative trend was short lived and housing prices are starting to increase again.

Overall, an increase in mortgage rates and an increase in the median price per square foot of residential housing is making it much more difficult for families to own a home. The trend towards rental properties is likely contributing to the overall inflationary pressure for rental prices. Median prices of homes have recently started to trend downward (consistent with the decrease in the 30-year fixed mortgage rate).

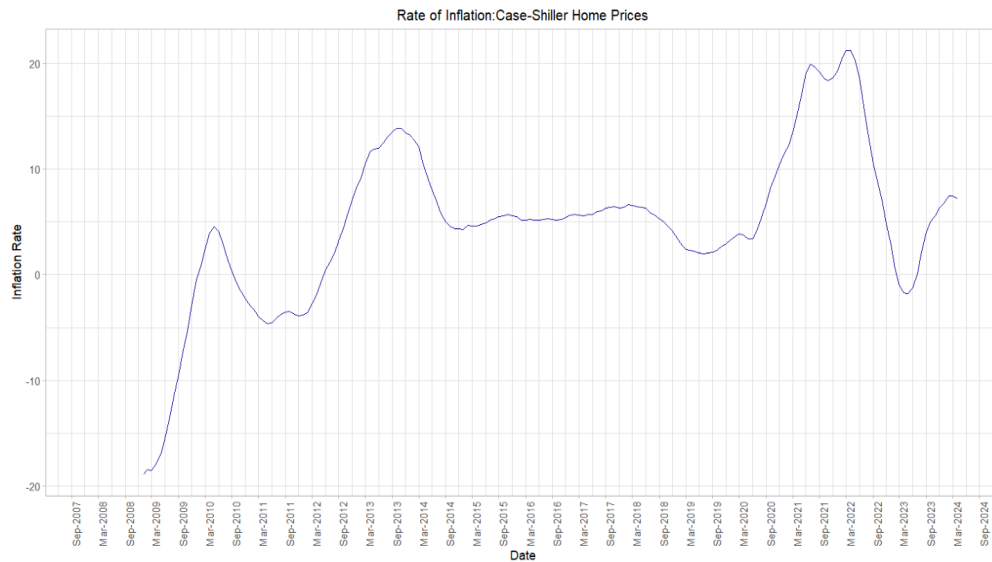
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Figure 10: US National Residential Housing Inventory (Active Listings), 2015 - Present



Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org/>)

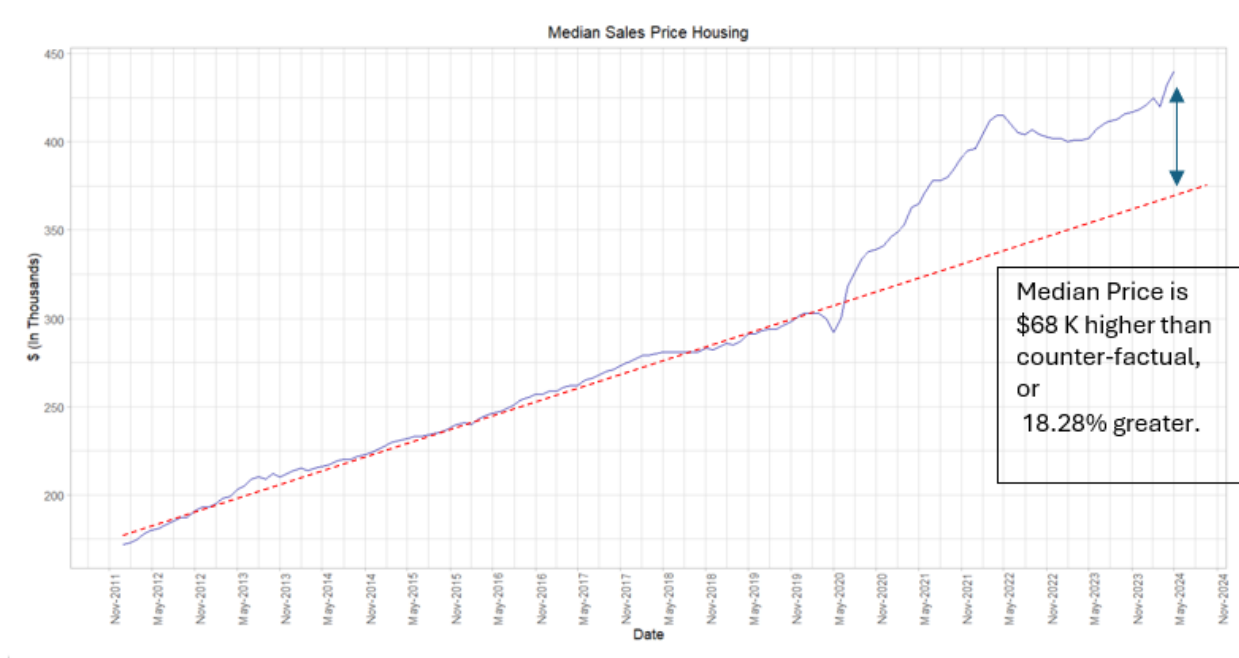
Figure 11: US National Home Price Inflation Case-Shiller, 2009-Present



Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org/>)

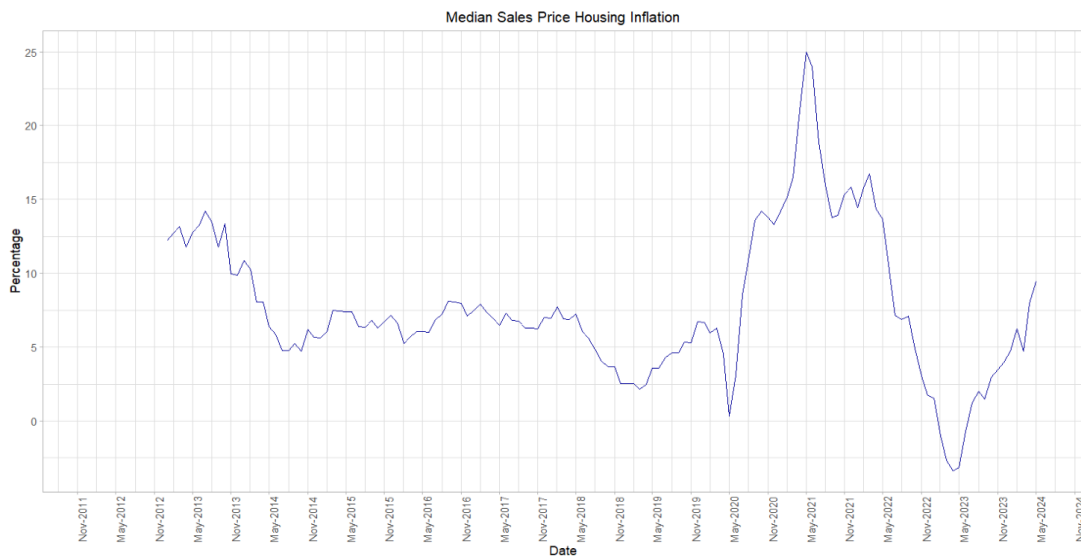
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Figure 12: Median Sales Price



Source: Redfin (<https://www.redfin.com/news/data-center/>)

Figure 13: US National Home Price Inflation (Redfin), Feb 2018-Nov 2022



Source: Redfin (<https://www.redfin.com/news/data-center/>)

Inflation: Summary

We believe that consumers are still worried about inflation because the out-of-pocket costs of some goods and services (food and housing, in particular) are higher than pre-pandemic levels. The average consumer is likely to confuse the cost of goods and the change in the cost of goods. Even though

“inflation” is now quite low, consumers still see high prices and attach an “inflation” label to the current state of the economy. The average price of homes is not returning to pre-pandemic levels and it is also unlikely that some groceries prices will see pre-pandemic levels. The Fed is not likely to change the perception of consumers that the economy is in an inflationary state.

Figure 14: US Consumer Inflation Expectations

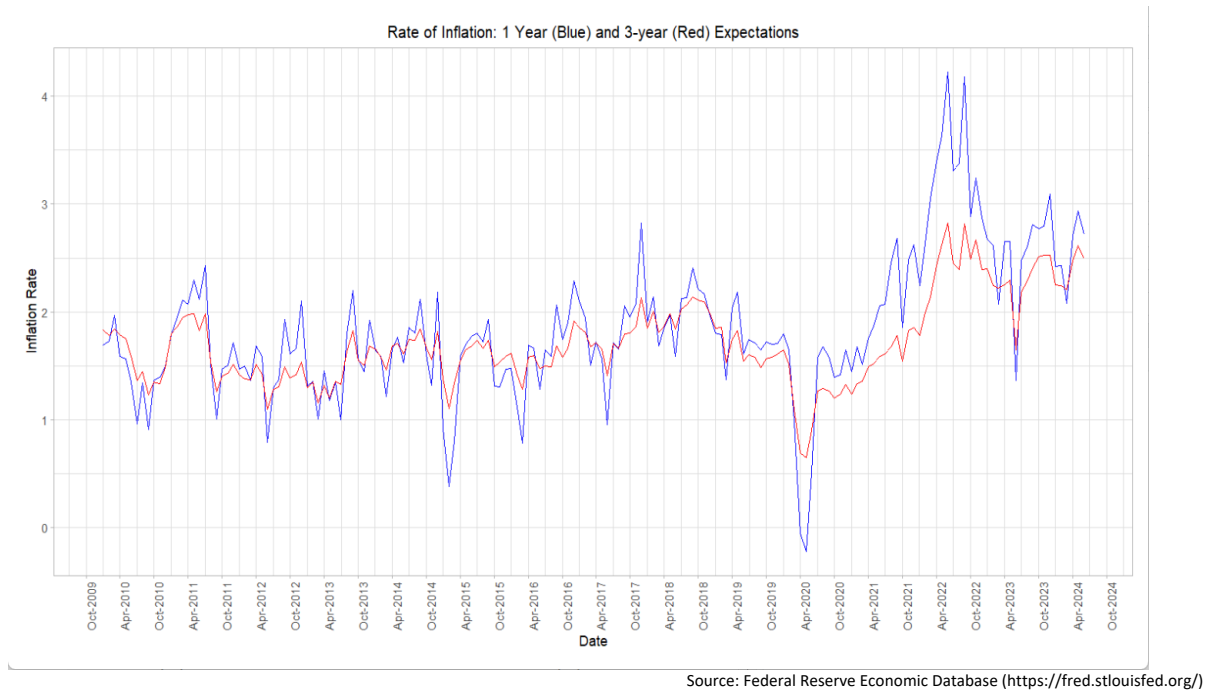


Figure 15: US National Consumer Confidence

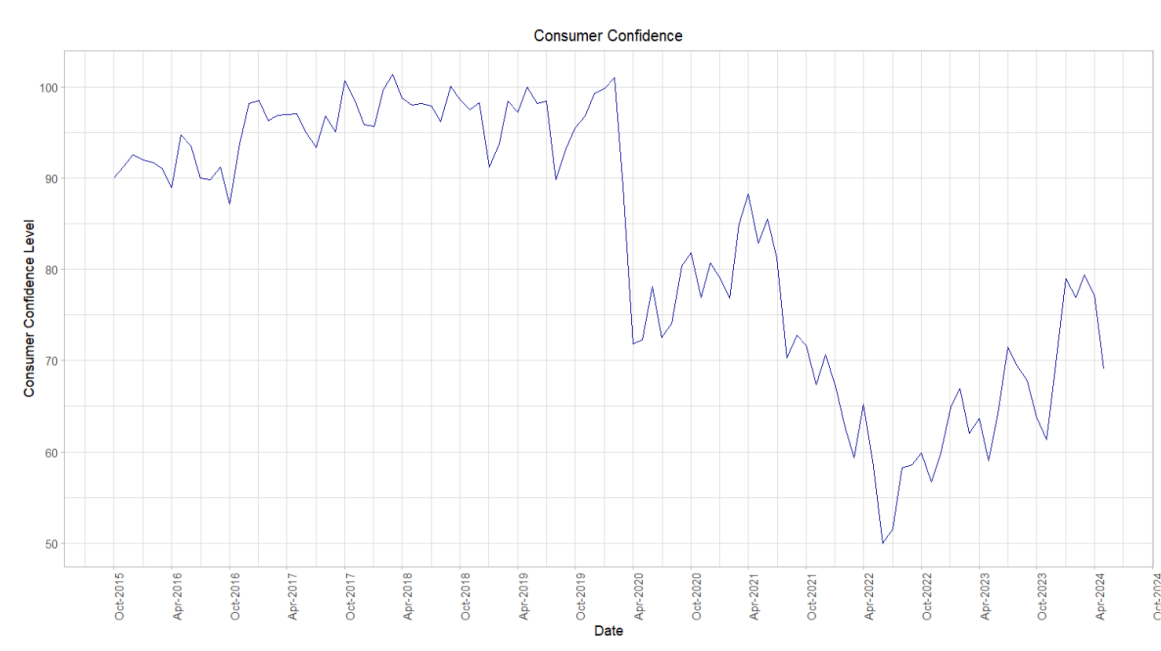
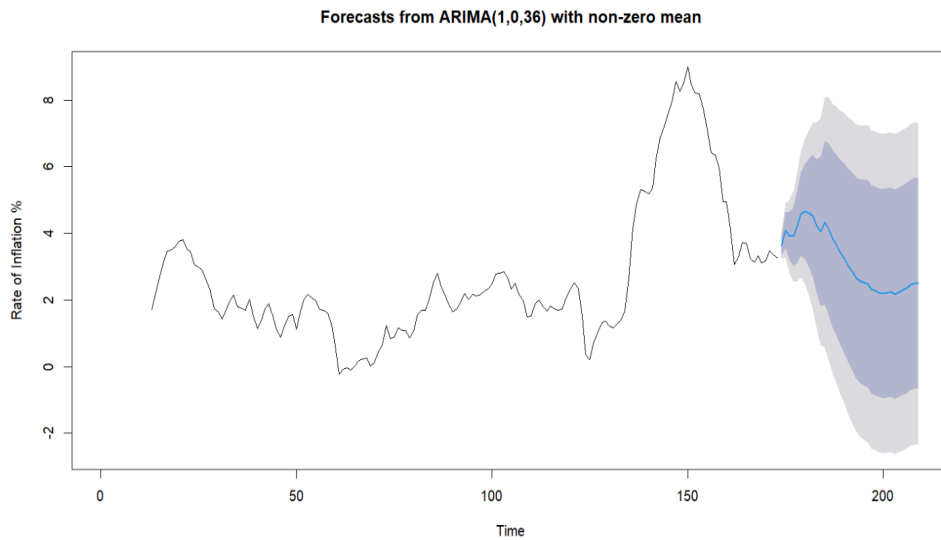


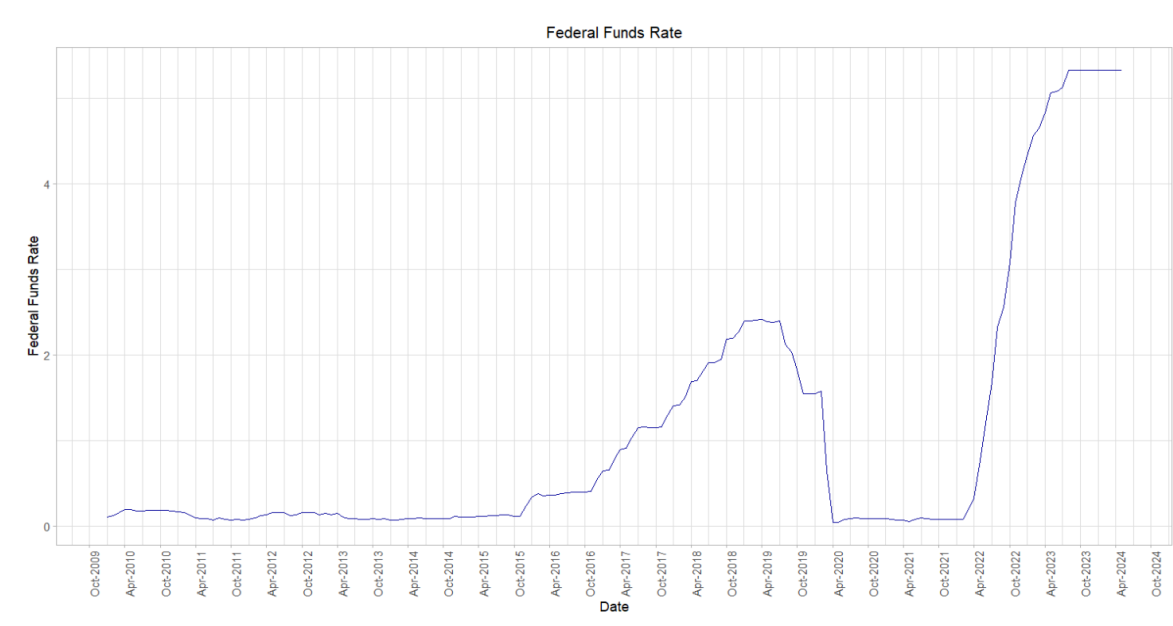
Figure 16: 36-month ARIMA Model for US Inflation



Source: Authors' calculations based on CPI

Our forecast inflation levels have continued to prove quite accurate. The current forecast suggests that inflation will hover at or around 3.5% for the near term and then start increasing back towards 4%. Given the upward pressure in housing prices and the reluctance that the Fed is showing in moving the Federal Funds target rate above the current 5.25-5.50% target band, we are not likely to move much closer towards 2% overall inflation. In fact, we believe that inflation at or around 3% is much more likely in the next year; **we are predicting 3.25 – 3.50% inflation by YE2024.**

Figure 17: Effective Federal Funds Rate, 2010-Present

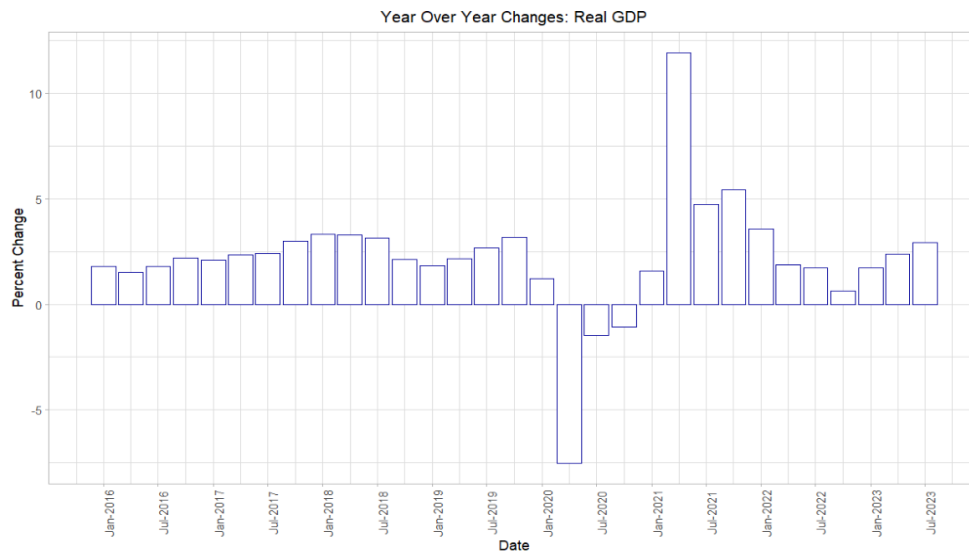


Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org/>)

Macroeconomic Indicators: Other

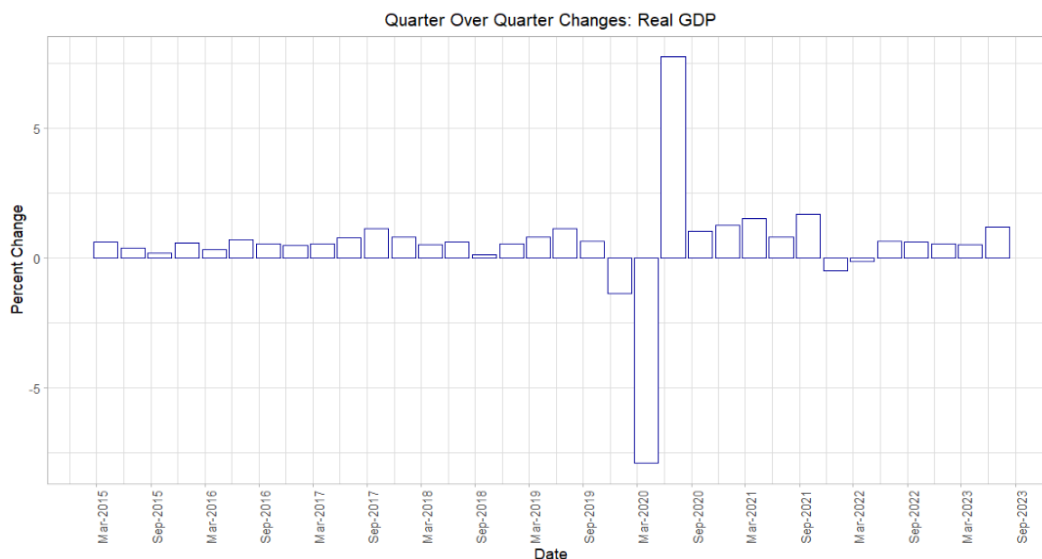
Real GDP of the United States is still quite strong and the jobs report continues to show strength throughout most sectors. We are suggesting that the annual rate of real GDP growth will be 2.75 – 3.00% for 2024. With sub-4% unemployment and real wages starting to increase, the economy is very healthy.

Figure 18: Y/Y Change in Real GDP



Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org/>)

Figure 19: Q/Q % Change in Real GDP

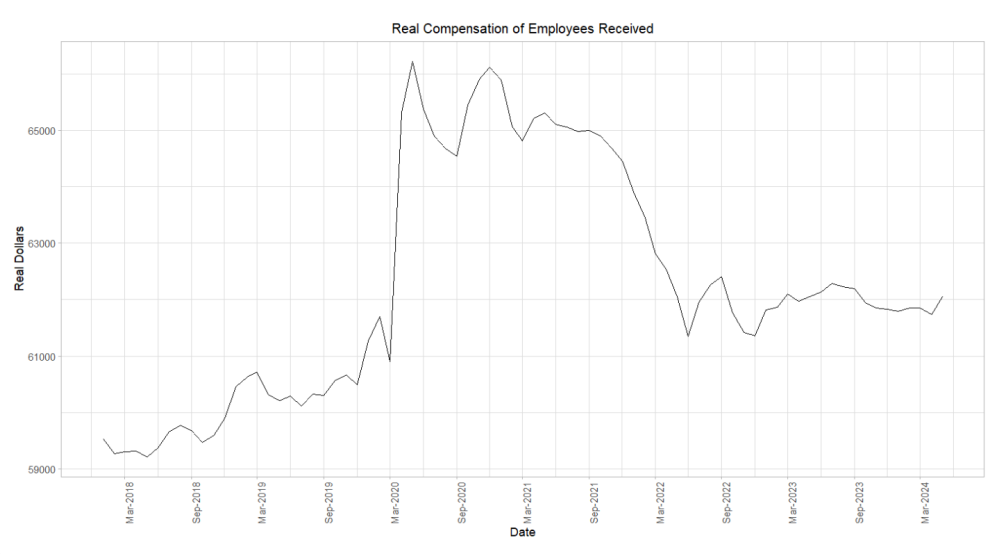


Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org/>)

Inflation & Real Wages

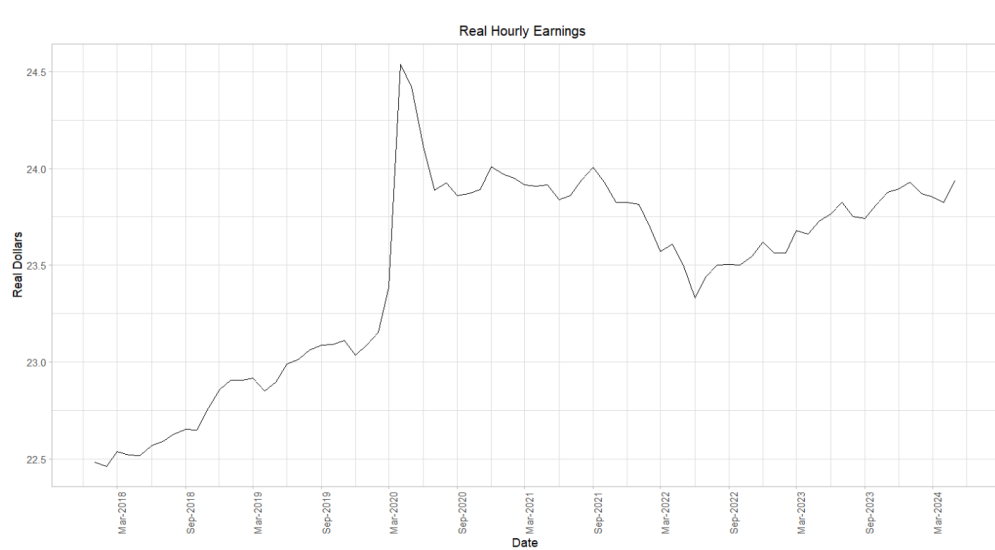
Figure 20 and Figure 21 show national overall average real wages (for both annual compensation and hourly wages). We suspect that one of the underlying reasons consumers are expressing an increase in pessimism regarding the economy is that real wages have trended down since mid-2022. Although real wages are slightly higher than they were prior to the pandemic, the myopic nature of most consumers' consideration of their wages and wealth suggest that they aren't happy with the small gains that have occurred.

Figure 20: Real Compensation of Employees



Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org>)

Figure 21: Real Hourly Wages (Nationwide)



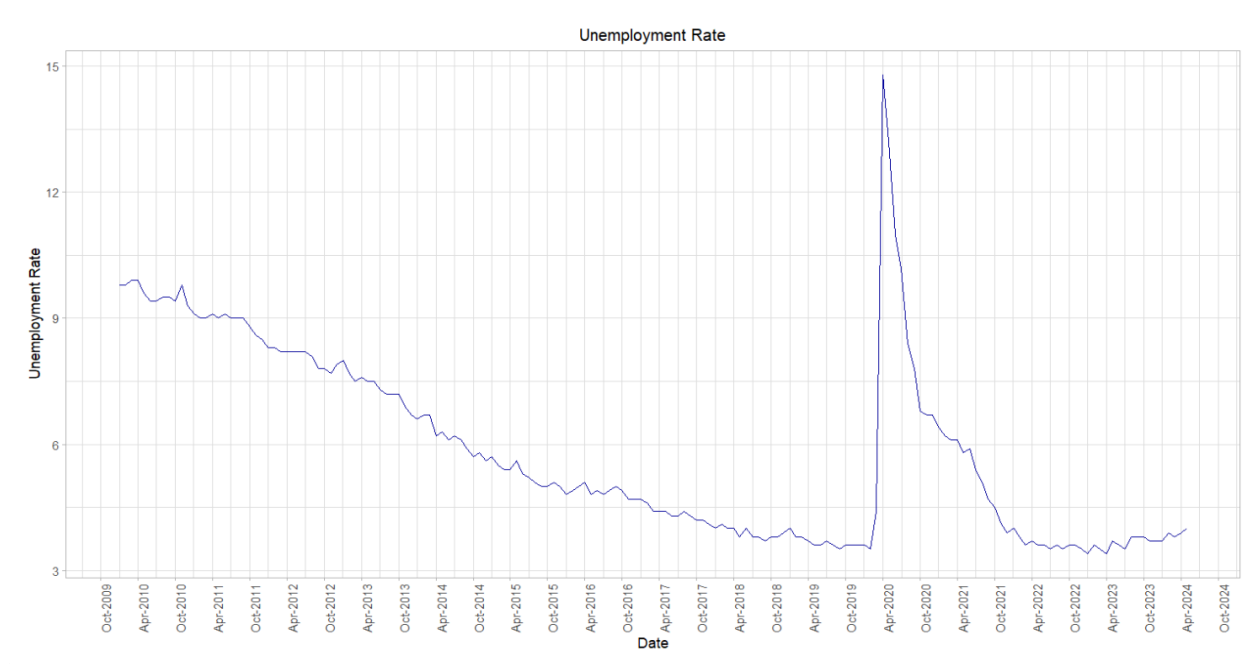
Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org>)

Unemployment and Labor Force Participation

The unemployment rate for June 2024, was 4.0%. The economy saw 27 consecutive months of sub-4% unemployment, matching the record set between November 1967 and January 1970. This current stretch of unemployment is impressive, as the economy continues to add record number of jobs.

We do not believe that the small up-tick in unemployment a signal that the economy is starting to “fall apart”. However, the Federal reserve is keeping a keen eye on this trend and is weighing the costs of benefits of interest rate cuts. If the unemployment rate starts to increase again (to 4.1 or 4.2%) and inflation starts to tick up towards 4%, the Fed will have a very difficult decision on its hands. As it stands, the Fed is going to stand pat on interest rates and actively DO NOTHING while it waits for either inflation to improve or the unemployment rate to worsen.

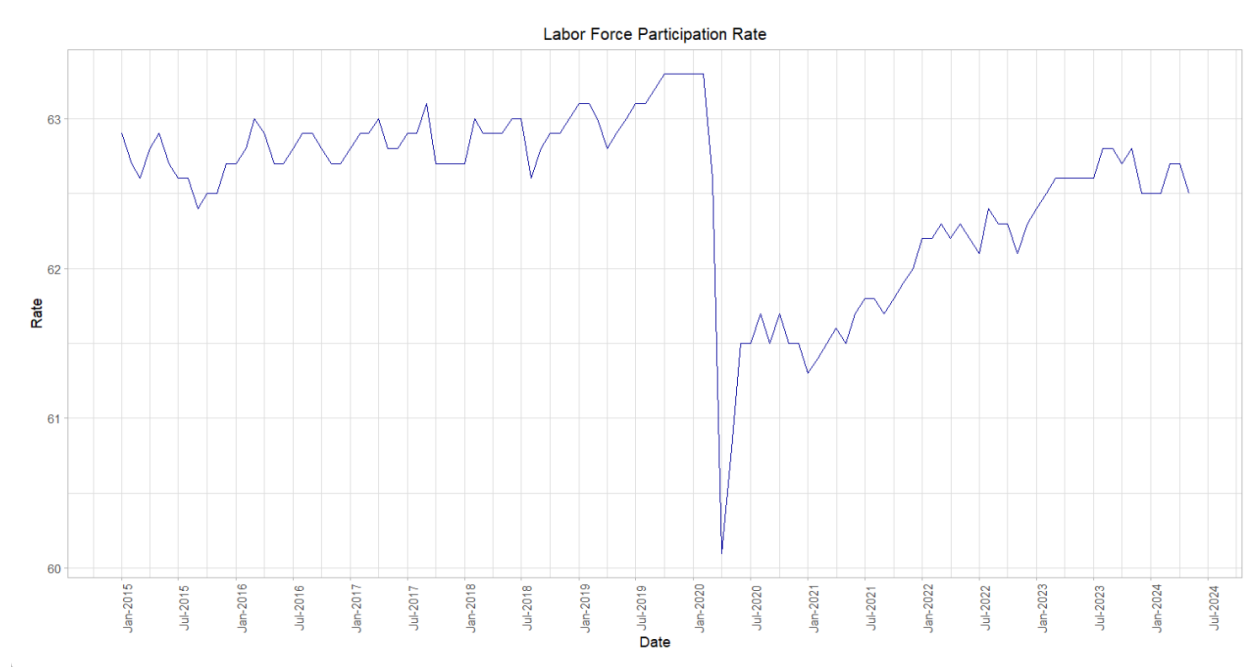
Figure 22: US National Unemployment Rate



Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org>)

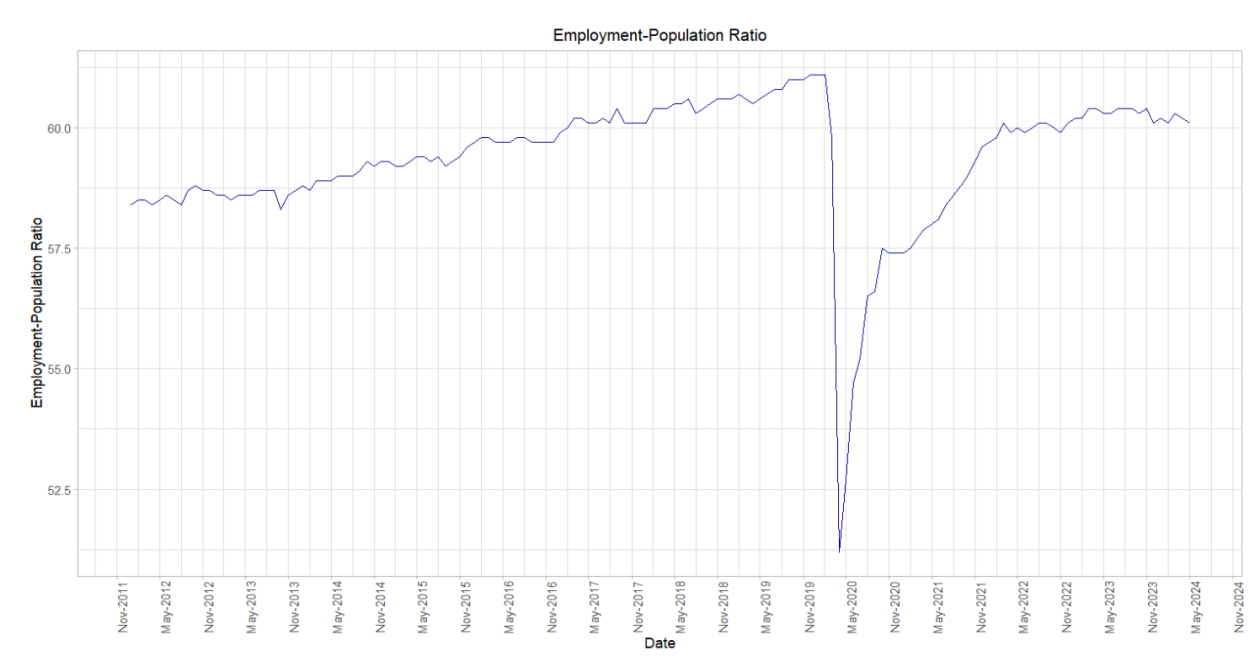
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Figure 23: US National Labor Force Participation Rate



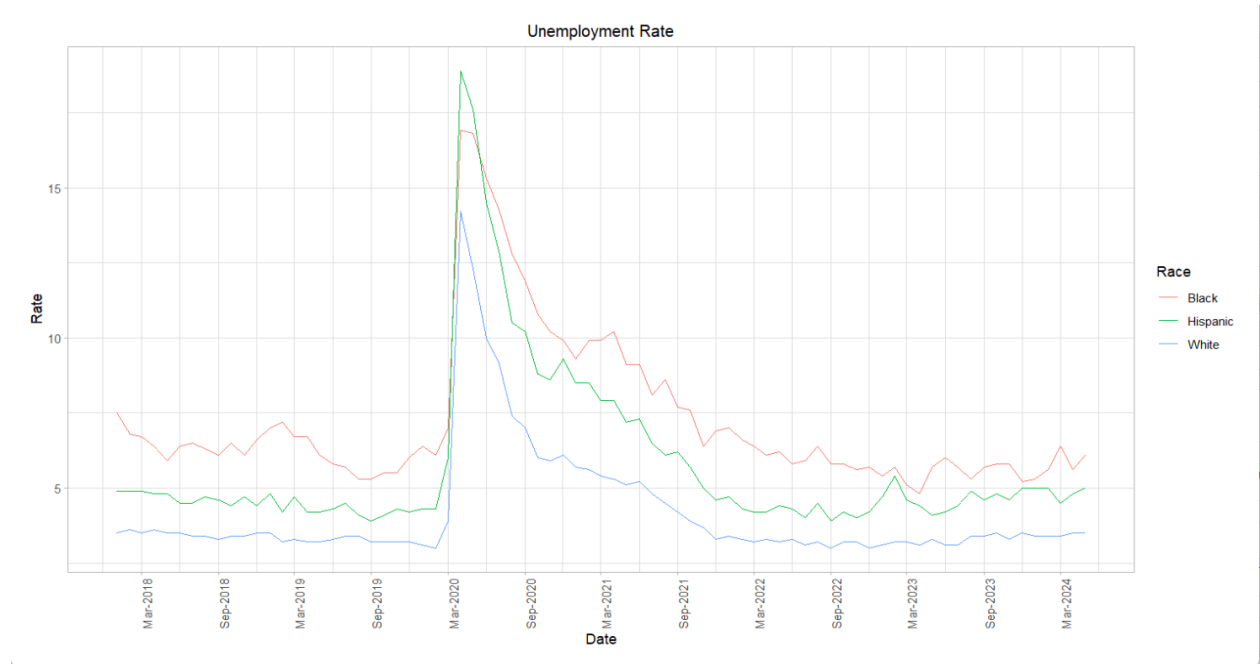
Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org>)

Figure 24: US Employment to Population Ratio (%)



Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org>)

Figure 25: Unemployment Rate by Race



Source: Federal Reserve Economic Database (<https://fred.stlouisfed.org>)

Disruptive (“Black Swan”) Events

The past five years have seen several unusual events that had a substantial impact on the national and/or global events that warrant mentioning. We mention them from the perspective of considering whether any of these types of events could occur again in the near future, and planning for their potential impact on the economy and or business operations would seem prudent.

1. Biological Events: The world has seen a number of new “Influenza-Like Illnesses” (ILI), with the latest now directly affecting virtually every country on the global in a crippling fashion.

- A. SARS (2002 & 2004)
- B. “Swine flu” (H1N1, 2009)
- C. “Avian flu” (H5N1 in 1997; H7N9 in 2013; H5N6 in 2014; H5N8 in 2016)
- D. COVID-19 (2019-2022), with several different strains (most recently, “JN.1”)

While questions during the handling of the COVID-19 emergency have shone a light on the globe’s ability to address a new pathogen under pressure, any answer is still a function of the contagiousness of the pathogen. Depending on how quickly a new pathogen spreads, along with its incubation period and symptoms, could mean the difference between survival and massive devastation.

2. Disinformation Campaigns: A staple of international conflicts (both military and otherwise), organized campaigns based on disinformation or propaganda have been around for hundreds of years. In the recent past, the U.S. has made allegations against foreign governments that there has been interference in federal elections (and caused social unrest) by using freely available social networks. Further, we are expecting to see interference from domestic and foreign forces using artificial intelligence during the upcoming U.S. Presidential election⁴. It is expected that the same types of propaganda that was made noteworthy in 2016 will continue to be seen in future elections at all levels of government, and as part of other key events.
3. Disruptive Malware and Ransomware: Over the past five years, sophisticated attacks on businesses have (literally) become a business for some entities, foreign and domestic. “Ransomware” is the latest version of malware that “... [locks and encrypts] a victim’s computer or device data, then demand a ransom to restore access.”⁵ In 2023, it is believed that 10% of all entities were attacked with ransomware⁶, with an average cost of about \$5.1M per breach globally⁷.
4. Societal Unrest, including Domestic Social Changes and Terrorism: Since 2020, we saw many social protests turn violent on both ends of the political spectrum. Without warning, these movements have caused rapid and unexpected upheavals in social climates, and upended assumptions on which financial decisions were made. As these questions have been explored socially and officially, the discussions have led to questions of how deep the disdain in the

⁴ See <https://apnews.com/article/artificial-intelligence-elections-disinformation-chatgpt-bc283e7426402f0b4baa7df280a4c3fd>

⁵ See <https://us.norton.com/internetsecurity-malware-ransomware-5-dos-and-donts.html>

⁶ <https://blog.checkpoint.com/research/check-point-research-2023-the-year-of-mega-ransomware-attacks-with-unprecedented-impact-on-global-organizations/>

⁷ <https://www.fisherphillips.com/en/news-insights/ransomware-costs-businesses-record-high-1-billion-in-2023.html#:~:text=Not%20including%20the%20payouts%2C%20the,a%2013%25%20increase%20from%202022.>

country remains on both sides of the political fence, and what societal and legislative impacts these investigations may carry.⁸

5. **Unanticipated Changes in Leadership:** President Biden is currently 81 years old (the oldest seated President of the United States), and is the expected Democratic candidate for U.S. President in November 2024.⁹ As we approach the 2024 election, his age, and the age of Donald Trump (the likely Republican candidate), is a recurring topic of conversation¹⁰. While the change of leadership in the U.S. Presidency is never perfectly smooth between two distinct administrations, the additional concerns about the potential of a sitting President not being able to completely fulfill their entire term is an additional concern. For instance, in the event that Mr. Biden is not able to complete his term, it is not clear what differences in policy may come to light between Mr. Biden and Ms. Harris if such a transition were to occur, or how effective Ms. Harris may be at leading domestically or internationally. It has been reported that Ms. Harris is a strong advocate of diversity¹¹ and wage protection¹², but we are most concerned about how she will be perceived on the international stage in negotiations with, e.g., Saudi Arabia, and countries in the Far East. Similar issues could also occur if Mr. Trump was to be elected to the U.S. Presidency.
6. **Supply Chain Disruptions:** The blockage of the Suez Canal by the tanker Ever Given in March 2021 highlighted the fragility of certain key bottlenecks in distribution of many goods, including paper products, oil, and food. The Suez itself accounts for 10-15% of all goods¹³. Notice that the Suez, the Panama Canal, the Strait of Hormuz, and the Malacca Strait are the four most noteworthy trade chokepoints. If closed, the Panama Canal would impact 5% of global trade (and 60% of U.S. imports and exports); closing the Strait of Hormuz would affect 25% of seaborne oil and a third of global liquified natural gas; and the Malacca Strait carries 40% of all global trade (including 16M barrels of oil per day globally).¹⁴ More recently, attacks launched by Yemen's Houthi group on cargo ships in the Bab al Mandeb Strait at the southern end of the Red Sea (near the Suez Canal) have caused several major global shipping and oil companies to adjust or halt their operations in the area.¹⁵ The Israel-Hamas war and the damage to Baltimore's Francis Scott Key Bridge also pose serious impacts to global and local supply chains, though not as significant¹⁶.
7. **Cryptocurrencies:** With the increasing visibility of distributed cryptocurrencies, several countries are currently investigating the benefits of implementing their own cryptocurrencies based on their own hard currencies. Over the past few years, several Caribbean countries have launched successful cryptocurrencies, including the Bahamas, Grenada, and St. Kitt's & Nevis¹⁷. Ecuador, Senegal, and China have canceled or withdrawn their currencies¹⁸. Along these lines, on January

⁸ See <https://www.insurancebusinessmag.com/us/risk-management/news/global-civil-unrest-on-the-rise-as-costofliving-crisis-intensifies-449683.aspx>

⁹ <https://joebiden.com/>

¹⁰ <https://theconversation.com/biden-and-trump-though-old-are-both-likely-to-survive-to-the-end-of-the-next-presidents-term-demographers-explain-225153>

¹¹ See, e.g., https://www.huffpost.com/entry/kamala-harris-vice-president-nominee-dnc_n_5f36f56bc5b69fa9e2fb7862

¹² See, e.g., <https://www.shrm.org/resourcesandtools/hr-topics/benefits/pages/where-kamala-harris-stands-on-workers-pay-and-benefits.aspx>

¹³ See <https://www.businessinsider.com/toilet-paper-coffee-products-delayed-suez-canal-blockage-impact-2021-3>

¹⁴ See <https://www.dw.com/en/suez-canal-blockage-4-of-the-biggest-trade-chokepoints/a-57020755>

¹⁵ <https://www.resilinc.com/blog/geopolitical-supply-chain-risks-2024/>

¹⁶ <https://chainstoreage.com/expert-viewpoints-impact-middle-east-turmoil-procurement-strategies>

¹⁷ <https://www.atlanticcouncil.org/cbdctracker/>

¹⁸ Ibid.

10, 2024, the SEC approved the listing and trading of a number of spot bitcoin exchange-traded product (ETP) shares¹⁹.

- Global unrest: As we have now seen, Russia’s invasion of the Ukraine has led to a dramatic impact on the energy and grain sectors globally. The impact of the Israel-Palestine conflict has also been speculated as impacting global economies²⁰, and fresh sanctions have been levied by the U.S. against Iran in response to Tehran further expanding its nuclear program. Speculation regarding Iran’s motives entails that Iran is interested in furthering its nuclear weapons program in order to supply arms to Russia to help with their aforementioned conflict in Ukraine²¹. Regardless, Iran’s unwillingness to work with the International Atomic Energy Agency (as called for by a United Nations resolution)²² is causing concerns that could lead to actions that would significantly alter the U.S. consumer’s economic balance, directly and indirectly.

¹⁹ See <https://www.reuters.com/technology/spot-bitcoin-etfs-start-trading-big-boost-crypto-industry-2024-01-11/> and <https://www.sec.gov/news/statement/gensler-statement-spot-bitcoin-011023>

²⁰ <https://www.bloomberg.com/news/features/2023-10-12/israel-hamas-war-impact-could-tip-global-economy-into-recession>

²¹ <https://oilprice.com/Energy/Crude-Oil/US-Targets-Iranian-Oil-Exports-with-Latest-Sanctions.html>

²² Per <https://www.iaea.org/sites/default/files/24/06/gov2024-39.pdf> and https://www.iaea.org/sites/default/files/unsc_resolution2231-2015.pdf

Data Analysis

As part of the Dodd-Frank Act, larger banking institutions in the United States are required to use government specified variables, and approved proprietary processes, to determine if they are adequately prepared for unexpected “systemic failures”. Some banking institutions are also incorporating portions or components of their forecasting processes to estimate future profitability; in order to do so, however, realistic forecasts (as opposed to extremes) are required. While arguments could be made about the variables included in this study, as stated in Jiang, et al., “... a conclusion that can be made for ... U.S. data is that there is little to no improvement in forecast accuracy when the number of predictors is expanded beyond 20-40 variables.”

Capitalytics provides the results of a rigorous analysis of every variable that is included in our quarterly macroeconomic study. These variables include the following²³:

1. Real GDP growth
2. Nominal GDP growth
3. Real disposable income growth
4. Nominal disposable income growth
5. Unemployment rate
6. CPI inflation rate
7. 1-month Treasury yield
8. 3-month Treasury yield
9. 6-month Treasury yield
10. 1-year Treasury yield
11. 3-year Treasury yield
12. 5-year Treasury yield
13. 7-year Treasury yield
14. 10-year Treasury yield
15. 20-year Treasury yield
16. 30-year Treasury yield
17. BBB corporate yield
18. Mortgage rate
19. Prime rate
20. US Average Retail Gasoline Price (\$/gal; all grades, all formulations)
21. S&P 500 Stock Price Index
22. Cost of Federal Funds (Primary Credit Rate)
23. Moody’s AAA Rate
24. Moody’s BAA Rate
25. Dow Jones Total Stock Market Index
26. House Price Index
27. Commercial Real Estate Price Index
28. Market Volatility Index (VIX)

²³ This study is motivated by the Federal Reserve Board’s Dodd-Frank Act, which includes requirements to consider various international factors; however, those factors will not be discussed extensively in this particular report based on the target use and audience of this report.

Our procedure is as follows:

1. Data is collected per the information in Appendix A, “Data sources”.
2. Correlations between variables are identified to determine which variables are may be considered as “dependent” (upon other variables, i.e., highly correlated with other variables as part of their nature).
3. Multiple forecast analyses are performed per the procedure in Section I of Appendix B for all variables, with the results of corresponding forecasts aggregated.
4. Regressions are performed per the procedure in Section III of Appendix B for all variables.
5. The rationale for these analyses, modifications, and the conclusions thereto are documented in the following section of this report, “Data Series Conclusions”.

Correlations

Part of Capitalytics’ analysis of macro-economic variables entails computing the correlation between variables, to establish the existence and level of interdependence of variables. In Appendix C of this document, we document the 162 pairs of variables that showed absolute correlation values greater than or equal to 0.6. As part of this portion of the study, Capitalytics identified the following sets of strong dependencies (correlations with magnitudes greater than 0.95) between variables that were subsequently validated as significant, long-term, recurring correlations as part of the nature of the variables; these pairings of variables are viewed as extremely significant based on the respective definitions of the variables and will be leveraged as discussed in Section I of Appendix B.

Table 14: Variable Dependencies

Regression (Dependent) Variable		Independent Variable ²⁴
1-month, and 3-year Treasury yield	... depends on ...	1-year Treasury yield
3-month, 6-month, 5-year and 7-year Treasury yield		3-year Treasury yield*
10-year Treasury yield		5-year Treasury yield*
20-year and 30-year Treasury yield, and Moody’s AAA yield		7-year Treasury yield*
30-year Mortgage rate		3-year Treasury yield*
Prime Rate		1-year Treasury yield

Due to the unexpected impact of the COVID pandemic, and the requirements to address the pandemic, the results of many of our quantitative algorithms will not match our reported expectations for what will occur over the next several months and/or years. We will note these deviations where they occur.

²⁴ It should be immediately apparent that some of the variables that are listed as “independent” are, in fact, dependent on other variables; these “independent” variables that actually have dependencies are noted by a trailing “*.”

Real & Nominal GDP Growth, Real & Nominal Disposable Income Growth, and CPI Inflation Rate

Analysis

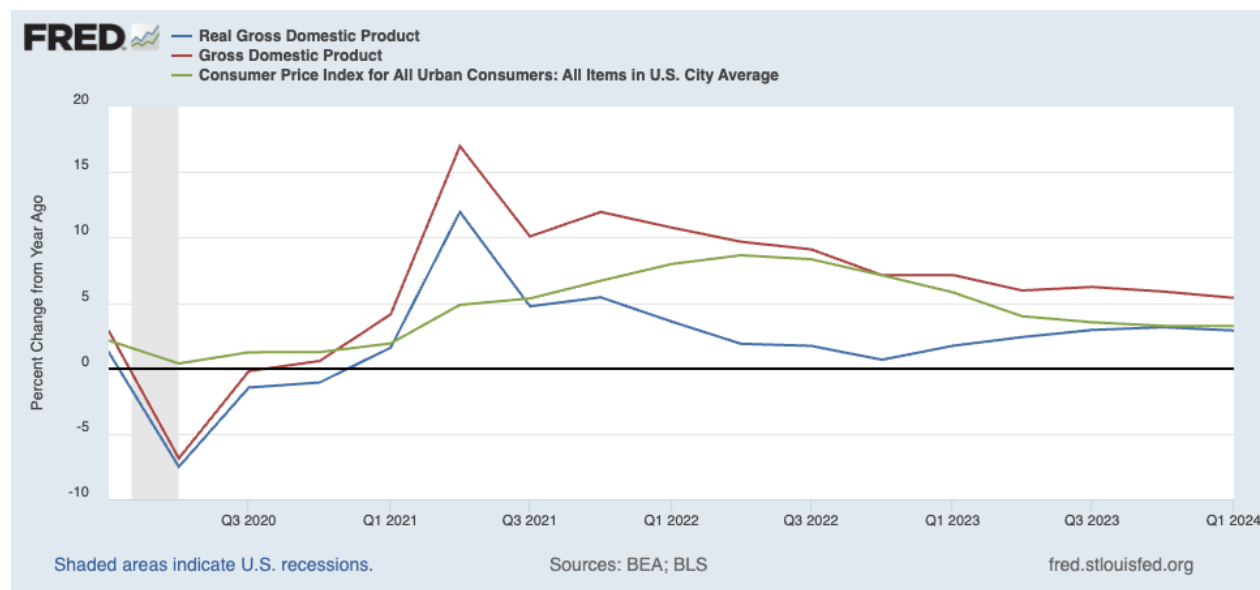
Real GDP is affected by personal consumption, retail sales, government spending, international trade, and interest rates.

Real Gross Domestic Product was up by 1.6% (+\$70.6B in 2017 US\$) during 1Q2024, with nominal GDP up by 4.3% (+\$298.9B), predominantly due to increased consumer spending, and residential *and* commercial real estate investments²⁵. Consumer spending has been most significantly affected due to inflation since the COVID-pandemic, posting at 4.24% Q/Q (annualized) during 1Q2024²⁶.

Real GDP has been increasing at extremely low rates for the past two years, with nominal decreases in the preceding two quarters (during 1H2022), after recovery from the initial impact to GDP through 3Q2020) due to COVID. Recent real GDP peaked in 3Q2023 by almost 4.9% (annualized).

Looking at Figure 26, we see a gradual and consistent decline in annualized Q/Q real GDP and nominal GDP since YE2020.

Figure 26: Real Q/Q GDP, Nominal Q/Q GDP, and Inflation (annualized)



Consider now the drivers of real GDP:

1. Y/Y percent change in real disposable personal income dropped noticeably during 1Q2024 to 1.65% (annualized); during 2023, the same metric fluctuated from 3.71% to 4.92%²⁷. Nominal

²⁵ <https://www.bea.gov/index.php/news/2024/gross-domestic-product-first-quarter-2024-second-estimate-and-corporate-profits> and <https://fred.stlouisfed.org/series/GDPC1>

²⁶ <https://fred.stlouisfed.org/series/CPIAUCNS>

²⁷ <https://fred.stlouisfed.org/series/DSPIC96>

disposable personal income growth was 4.23% in 1Q2024, but has been gradually declining (on an annualized basis) since essentially 1Q2023 (at which point it was 9%)²⁸. To put perspective on these numbers, Y/Y nominal personal income growth was 4.45%, and Y/Y real personal income growth hit only 1.86% (annualized) during 1Q2024, per Figure 27 and Figure 28.

Figure 27: Real Personal Income, Nominal Personal Income, and Inflation (annualized)

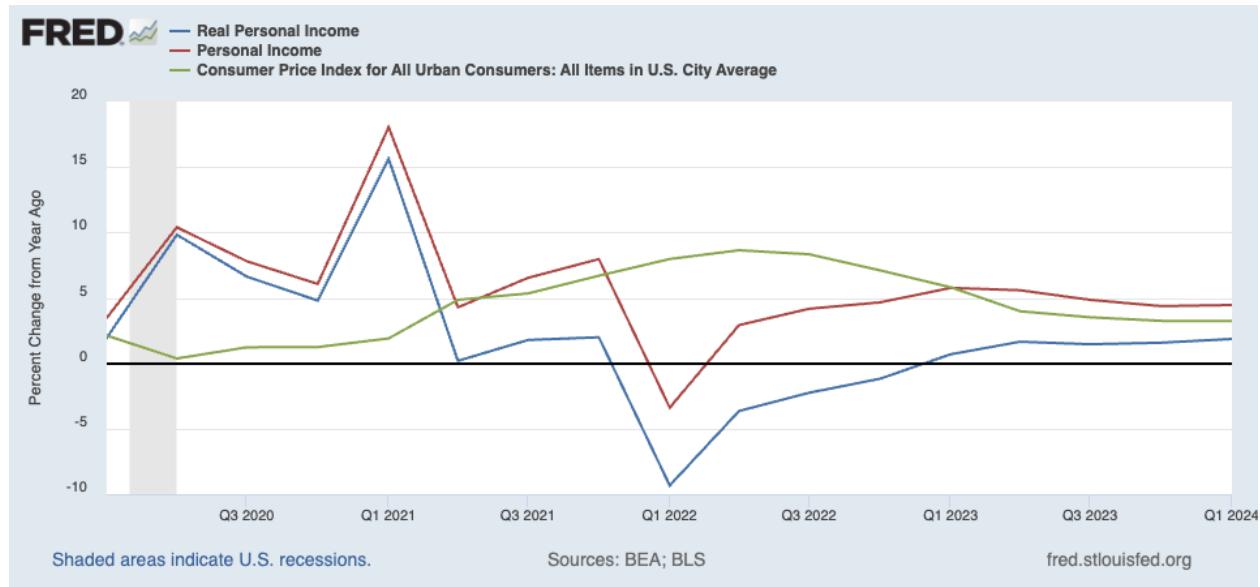
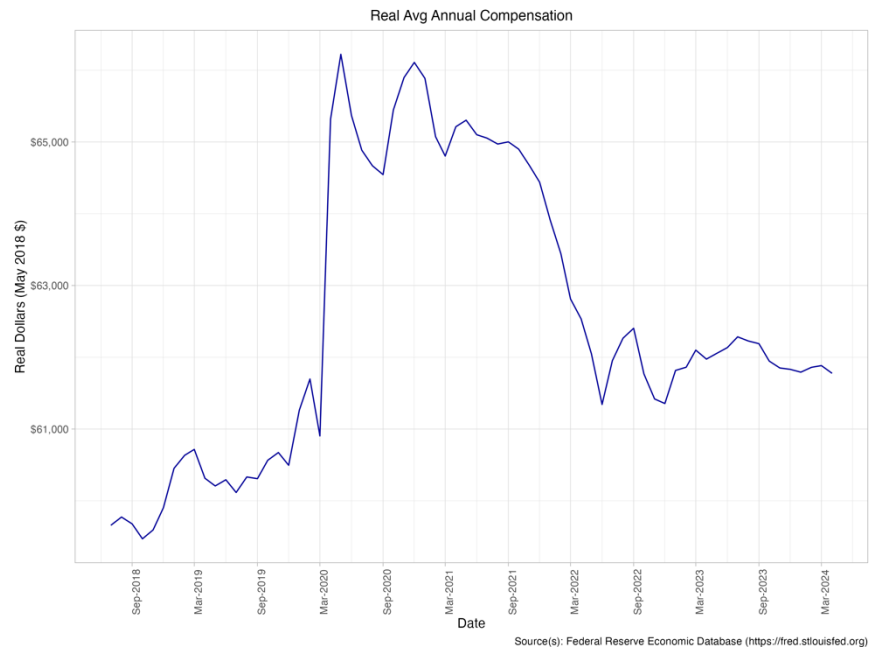


Figure 28: Real Average Annual Compensation

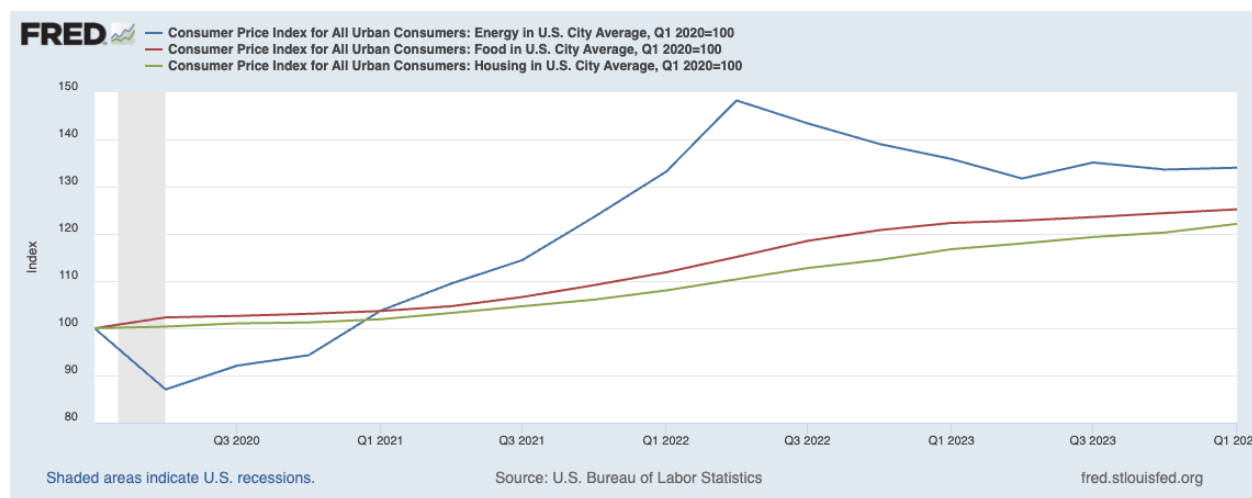


²⁸ <https://fred.stlouisfed.org/series/DSPI>

Y/Y inflation was almost 4% in 2Q2023, dropping to 3.5% in 3Q2023, and 3.25% in each of 4Q2023 and 1Q2024²⁹. (Annualized core inflation, i.e., excluding food and energy prices) went from approximately 4% in 4Q2023 to 3.81% in 1Q2024³⁰.) Generally speaking, inflation does appear to be slowing, albeit slightly and slowly; this point is inkeeping with the FOMC's publicized approach of [keeping the target Federal Funds rate] "higher for longer"³¹. Chairman Powell, along with other members of the FOMC, has reiterated their determination for returning inflation to a 2% annual rate.

Several factors have played into the FOMC's concerns during 2023 and 2024: stubbornly low unemployment rates; higher than expected consumer spending and commercial investment, leading to strong lending, spending, and investment; and continued hiring confidence.³² While spending remains high, declining consumer confidence³³ indicates that ***the American public has come to grips with the messaging of the FOMC³⁴, and is expecting prices to continue to rise³⁵, but consumers are also still expected to continue spending.***

Figure 29: Energy, Food, and Housing Inflation since 1Q2020



Given its significance in most household budgets and calculations of overall inflation, housing is a significant sticking point for the observed inflation rate³⁶. Housing inflation increased from an annualized rate of 1.91% during 1Q2021 to 7.74% during 3Q2022 -- an average increase in the inflation rate of 0.97% per quarter that occurred in a near perfectly linear trend. Housing inflation then peaked at 8.08% during 4Q2022, and fell to 4.60% during 1Q2024 – a decline in

²⁹ <https://fred.stlouisfed.org/series/CPIAUCSL>

³⁰ <https://fred.stlouisfed.org/series/CPILFESL>

³¹ <https://www.bnnbloomberg.ca/powell-reiterates-fed-likely-to-keep-rates-higher-for-longer-1.2072774>

³² <https://www.businessinsider.com/interest-rates-staying-higher-for-longer-no-cuts-powell-inflation-2024-5>

³³ <http://www.sca.isr.umich.edu/>

³⁴ <https://www.businessinsider.com/americans-losing-faith-economy-inflation-university-michigan-consumer-sentiment-2024-5>

³⁵ <https://www.reuters.com/markets/us/ny-fed-survey-finds-mixed-views-future-path-inflation-may-2024-06-10/>

³⁶ See <https://www.fastcompany.com/91142910/housing-market-home-price-forecast-2025-moodys-zillow> and <https://www.redfin.com/news/housing-market-update-mortgage-payments-record-high-inflation-report/>

the inflation rate of 0.70% per quarter³⁷. **While housing increases are now declining³⁸, what was once a \$100 expense for housing in 1Q2020 is \$122 after 1Q2024.** Add to that increase in cost similar increases in property taxes, utility costs, home maintenance, home insurance, and other costs of home ownership³⁹.

As we discussed earlier, food inflation has also been a point of concern for several quarters recently due to its unavoidability; what was a food bill of \$100 at the end of 1Q2020 is now over \$125 after 1Q2024⁴⁰ (with almost 10% growth during 2022 alone⁴¹). (Inflation rates of “food-at-home” and “food-away-from-home” are almost identical in the aggregate between 1Q2020 and 1Q2024⁴².) Given its recent trend, food prices are rising at an average of 1.5% quarterly. Food prices are generally driven by “supply and demand”, and were expected to increase by 2.2% +/- 1.0% during all of 2024; however, “food-at-home” is up by 1.0% from May 2023 to April 2024, and “food-away-from-home” is 4.0% higher across the same timespan. **Food prices are expected to continue to decelerate during 2024⁴³.**

Finally, energy inflation is a less significant component of most budgets, though it has increased overall by 34% as of 1Q2024⁴⁴. **Since 1Q2020, automotive gasoline prices rose by 34.7% as of 1Q2024, and by 48.7% as of 2Q2024⁴⁵;** gasoline prices dropped substantially due to “work-from-home” policies during the COVID pandemic, then spiked during 2Q2022 as production contracted, and now appears to be stabilizing. Heating oil has risen by 73.4%⁴⁶, but its prices are extremely volatile that are a function of global supply & demand, and weather conditions. As a counterpoint, **electricity has risen by over 30% since 1Q2020, and electricity prices currently appear to be on an upswing⁴⁷.**

We still believe that national broad-based inflation will average between 3.0% and 3.25% (annualized) by YE2024.

2. Nominal advance retail sales increased by 1.47% (Y/Y) during 1Q2024 -- a change of \$8.78B since 1Q2023, and a decline of \$887M since 4Q2023 during 1Q2024⁴⁸. First quarter has historically been one of the strongest quarters of a year, but the **peaks of retail sales have been declining post-pandemic** as consumers grapple with inflation and tepid nominal wage increases.
3. Federal government spending has grown consistently from 1Q2022 through 1Q2024, growing from \$5.93T to \$6.6T (11.3%). This equates to an increase of \$83.6B in spending per quarter over the most recent eight quarters⁴⁹. Overall government spending during 2022 was more volatile, as spending levels have dropped since peaking in 3Q2023 to \$9.92T during 1Q2024, an

³⁷ <https://fred.stlouisfed.org/series/CPIHOSNS>

³⁸ <https://www.realtor.com/research/may-2024-rent/>

³⁹ <https://www.wsj.com/economy/housing/housing-affordability-taxes-insurance-costs-rise-bca64df1>

⁴⁰ <https://fred.stlouisfed.org/series/CPIUFDSL>

⁴¹ <https://www.ers.usda.gov/data-products/food-price-outlook/summary-findings/>

⁴² <https://fred.stlouisfed.org/series/CPIUFDSL>

⁴³ <https://www.ers.usda.gov/data-products/food-price-outlook/summary-findings/>

⁴⁴ <https://fred.stlouisfed.org/series/CPIENGSL>

⁴⁵ <https://fred.stlouisfed.org/series/GASREGW>

⁴⁶ <https://fred.stlouisfed.org/series/DHOILNYH>

⁴⁷ <https://fred.stlouisfed.org/series/CUSR0000SEHF01>

⁴⁸ <https://fred.stlouisfed.org/series/RXSF5>

⁴⁹ <https://fred.stlouisfed.org/series/FGEXPND>

increase since \$8.33T seen during 1Q2022⁵⁰. ***Real government expenditures have grown by almost 10% since 2022, and are not expected to decrease in the near future.***

4. The trade deficit is the difference between what the U.S. purchases from foreign nations and what it sells overseas. The quarterly trade deficit has continued to climb to \$204.5B during 1Q2024, up almost 2% Y/Y.⁵¹ While there was a slight decline during 2023 (i.e., the U.S. sold slightly more than previously, compared to its purchases), the trade deficit has been relatively level since mid-2022 as the Federal Funds rate started to increase post-COVID. During April 2024, imports of automotive vehicles & parts, computer & telecommunication equipment, crude oil have increased, whereas exports of industrial & electrical machinery, semiconductors, and pharmaceuticals have increased. Imports and exports of services have slightly declined during April 2024.⁵² Trends of the sectors dominating increases and decreases are transient, but ***it appears likely that many of the described sectors will continue to dominate the landscape for the very near term*** (i.e., show continued spending trends when compared to other sectors).

Given these changes, as mentioned earlier, we continue to believe that U.S. & global GDP strength will improve with ***annualized real U.S. GDP to rise to 2.75% to 3.0% by YE2024.***

Other Commentary

- “Overall, markets will likely remain optimistic and stable, supported by significant job gains and low unemployment. Although inflation appears to have eased, elevated levels will likely prompt the Federal Reserve to remain cautious and keep rates steady. Meanwhile, stable interest rates, declining inflation, and sustained consumer spending should support continued investment. On the other hand, global conflict and uncertainties could create headwinds and volatility across financial markets.” (<https://oilprice.com/Finance/the-Markets/Whats-Ahead-for-Markets-in-the-Second-Half-of-2024.html>; June 28, 2024)
- “The Consumer Price Index for All Urban Consumers (CPI-U) was unchanged in May on a seasonally adjusted basis, after rising 0.3 percent in April, the U.S. Bureau of Labor Statistics reported today. Over the last 12 months, the [“]all items[“] index increased 3.3 percent before seasonal adjustment. ... More than offsetting a decline in gasoline, the index for shelter rose in May, up 0.4 percent for the fourth consecutive month. The index for food increased 0.1 percent in May. The food away from home index rose 0.4 percent over the month, while the food at home index was unchanged. The energy index fell 2.0 percent over the month, led by a 3.6-percent decrease in the gasoline index. ... The index for all items less food and energy rose 0.2 percent in May, after rising 0.3 percent the preceding month.” (<https://www.bls.gov/news.release/cpi.nr0.htm>; June 12, 2024)
- “Second-quarter GDP growth (which will be released on July 25) will likely run about 2.0%, a pickup from 1.3% in the first quarter. Consumer spending is still likely to be decent, though it is probably rising slower than last year. Exports should start growing again after a drop in the first quarter, and businesses are likely to stop cutting inventories as prospects for future sales brighten. ... The yearly average GDP growth for 2024 will be 2.5%, the same as in 2023, but will then slow down to 1.9% in 2025.” (<https://www.kiplinger.com/economic-forecasts/gdp>; June 6, 2024)

⁵⁰ <https://fred.stlouisfed.org/series/W068RCQ027SBEA>

⁵¹ <https://fred.stlouisfed.org/series/BOPGSTB>

⁵² <https://www.bea.gov/news/2024/us-international-trade-goods-and-services-april-2024>

- “Outpacing all other regions is the Southwest, fueled by rapid population growth and booming oil production across the state of Texas, one of the fastest growing state economies in 2023. ... The combination of lower land, labor, and electricity costs are driving corporate investment in the region. ... With the second-highest real GDP growth rate, the Southeast also surpasses the national average. ... Georgia and Tennessee are emerging as automotive hubs. In fact, Georgia leads the country in electric vehicle assembly and battery plant investment, at a staggering \$14.5 billion.” (<https://www.visualcapitalist.com/real-gdp-growth-of-u-s-regions-in-2023/>; June 4, 2024)
- “JPMorgan Chase CEO Jamie Dimon has concerns that history could repeat itself. ... The US economy ‘looks more like the 1970s than we’ve seen before,’ he said earlier this week at a discussion hosted by the Economic Club of New York. He repeated that message in a Wall Street Journal interview published Thursday before the GDP report was released. “Things looked pretty rosy in 1972 — they were not rosy in 1973,” Dimon said.” (<https://www.cnn.com/2024/04/25/economy/stagflation-us-economy-gdp/index.html>; April 25, 2024)

Employment

Analysis

The national unemployment rate was 3.8% during 1Q2024 (161.1M working people), after standing at 3.7% during 4Q2023 (161.4M working people); as of this writing, the rate appears to be increasing slightly since the end of 1Q2024 as well⁵³. Per Figure 30, unemployment appears to be increasing most substantially in northern Michigan, Nevada, inland California, and Alaska. (See also Figure 31.)

Per Figure 32 and Figure 33, the quarterly average for the U.S. civilian labor force declined slightly over 1Q2024 (by roughly 200,000 people), but has increased to the same level as 4Q2023 since the end of 1Q2024⁵⁴; this type of volatility in this metric is to be expected. The labor force participation rate is fluctuating just above 62.5%, and the employment-population ratio is similar waffling just north of 60% (Figure 34). ADP’s National Employment Report reported lessened hiring in manufacturing, leisure & hospitality, “white collar” and IT during May 2024⁵⁵.

As we mentioned earlier, ***we believe that it is likely that the Fed’s efforts are starting to take hold, and that it is very likely that unemployment will end 2024 at 4.0%.***

⁵³ <https://data.bls.gov/timeseries/LNS14000000> and <https://fred.stlouisfed.org/series/CE16OV>

⁵⁴ <https://fred.stlouisfed.org/series/CLF16OV>

⁵⁵ <https://adpemploymentreport.com/>

Figure 30: US Unemployment Rate per County (June 2024)

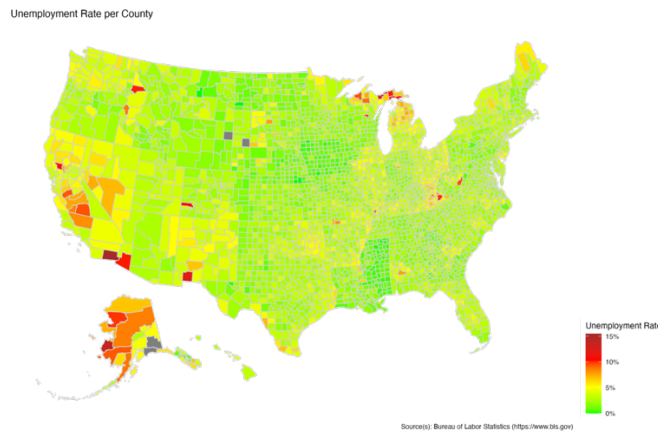


Figure 31: US Unemployment Rate



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Figure 32: Level of US Civilian Labor Force

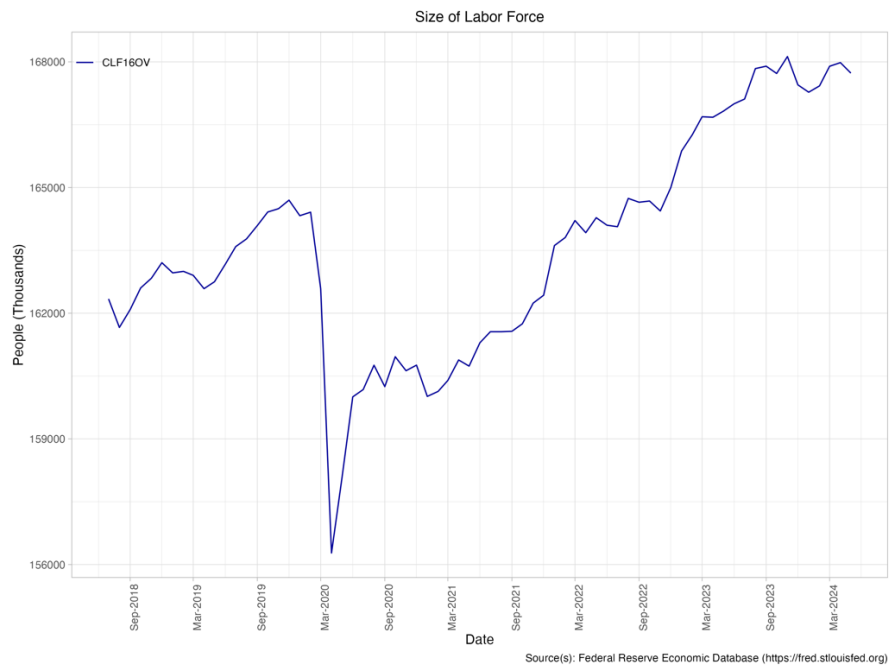
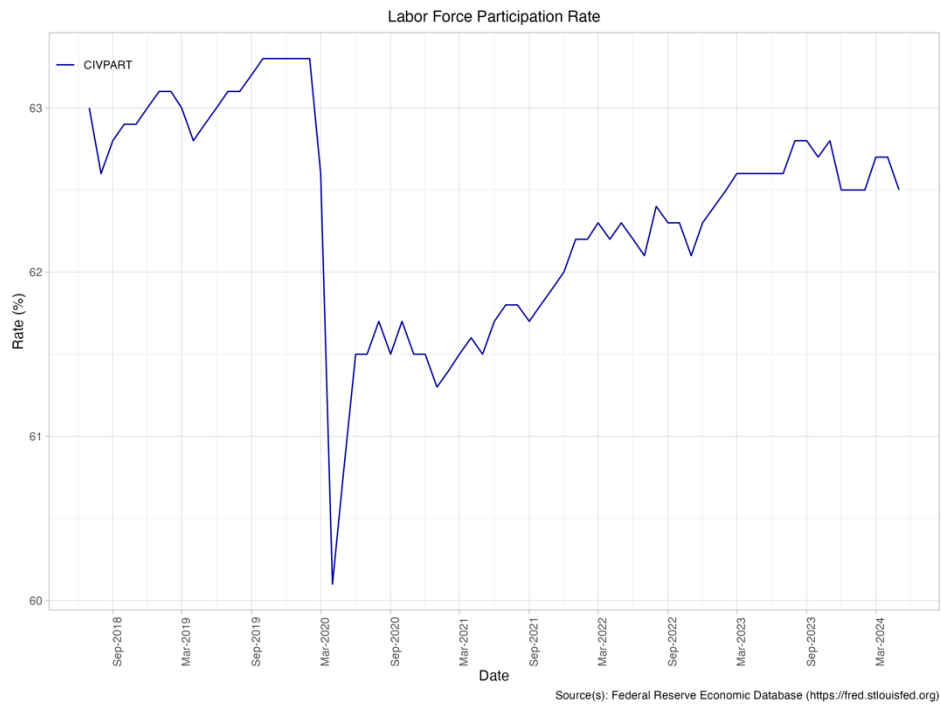


Figure 33: US Labor Force Participation Rate



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Figure 34: US Employment to Population Ratio (%)

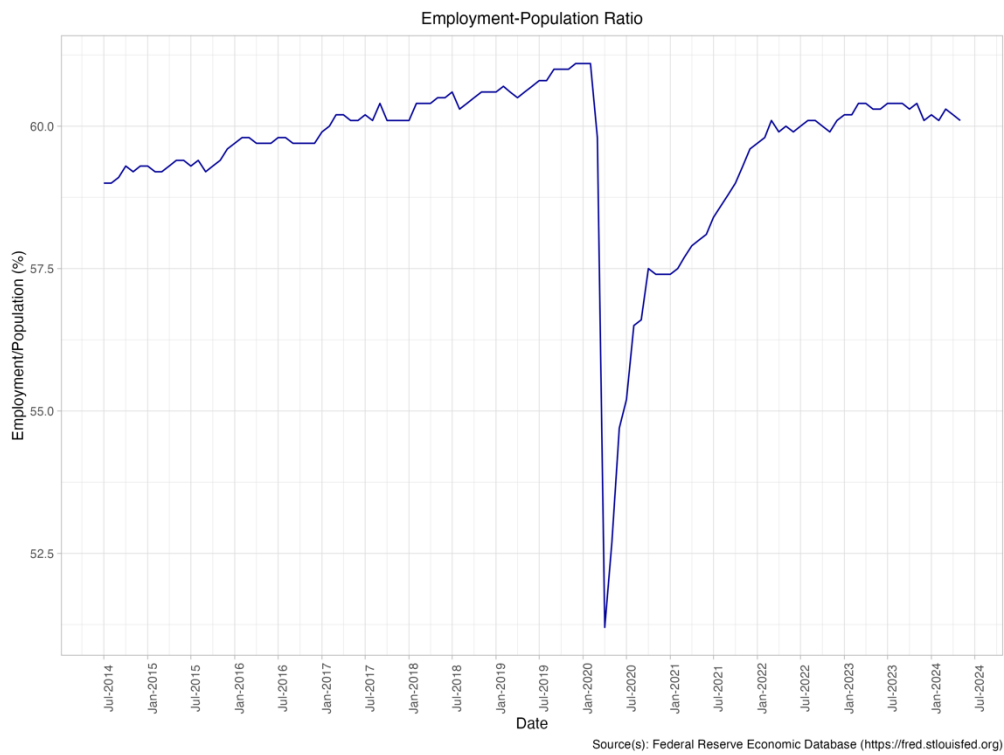
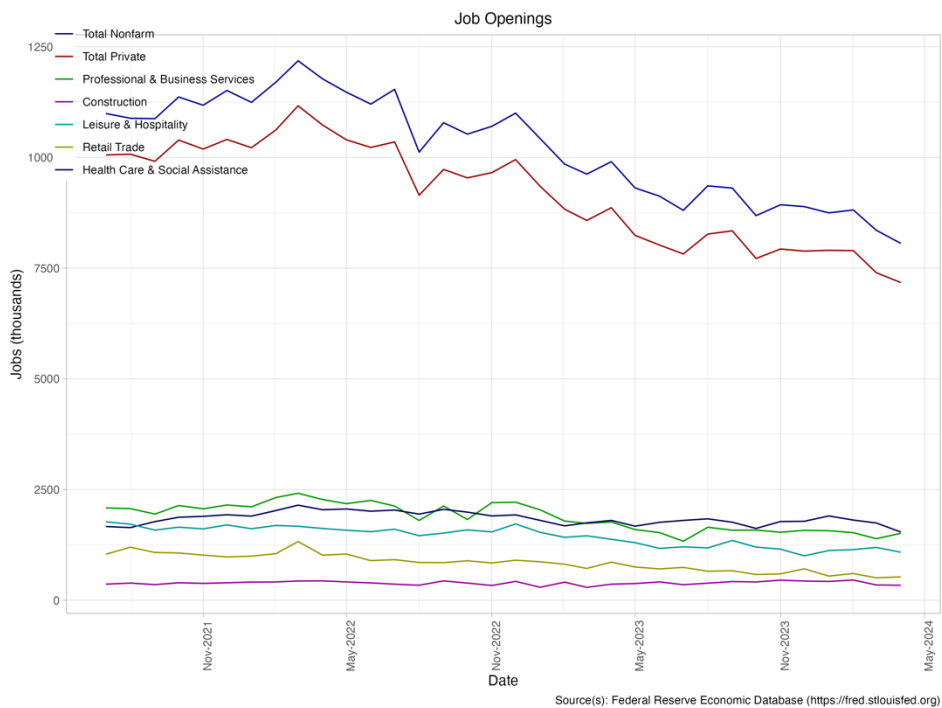


Figure 35: Job Openings



Other Commentary

- “There are reasons to expect that May’s strong [employment] gain is still part of a broader moderating trend. First, there were five weeks instead of four between April and May’s survey week. That could have boosted the May report a bit, and may also result in a lower-than-normal report for June. ... Second, the May report is well below the 310,000 gain of the March report. Third, it is unlikely that the state and local government sector will continue their robust hiring spree for long. Finally, April’s low report was likely an anomaly in a more gradual moderating trend. Job gains for the rest of the year are likely going to be between 200,000 and 250,000 per month.” (<https://www.kiplinger.com/economic-forecasts/jobs>; June 7, 2024)
- “Employers added 272,000 new jobs in May, ... Overall, analysts said that the hiring boost highlighted the continued resilience of the U.S. economy, which has defied expectations as businesses keep hiring, wages keep rising and consumers keep spending in the face of steeply higher borrowing costs and persistent inflation.” (<https://www.wsj.com/economy/jobs-report-may-unemployment-economy-2aee1a4f>; June 7, 2024)
- “For those who care about inequality and fairness, wage trends of the last several years have been strong for lower-wage workers. The Economic Policy Institute (EPI) has documented that ‘real wages’ (adjusted for inflation) ‘of low-wage workers grew 12.1% between 2019 and 2023.’ If Republicans in Congress would support increasing the federal minimum wage, which has been stuck at \$7.25 per hour since 2009, we’d see even stronger gains for low-wage workers ...” (<https://www.forbes.com/sites/richardmccahey/2024/06/07/record-breaking-accomplishments-on-jobs-and-unemployment-under-biden/>; June 7, 2024)
- “‘On the surface, [the May 2024 jobs report] was hot, but you’ve also got a bigger drop in household employment,’ said Liz Ann Sonders, chief investment strategist at Charles Schwab. ‘For what it’s worth, that tends to be a more accurate signal when you’re at an inflection point in the economy. You can find weakness in the underlying numbers.’ ... A more encompassing unemployment figure that includes discouraged workers and those holding part-time jobs for economic reasons held steady at 7.4%.” (<https://www.cnbc.com/2024/06/07/jobs-report-may-2024-us-job-gains-totaled-272000-in-may.html>; June 7, 2024)

Federal Funds (Primary Credit) Rate

Analysis

When a depository institution has a shortfall and need for liquidity, it may borrow funds on a short-term basis from the Federal Reserve. The “discount rate” is the interest rate charged to commercial banks and other depository institutions on loans they receive from their regional Federal Reserve Bank’s “discount window”. The Federal Reserve Banks offer three discount window programs to depository institutions: Primary Credit, Secondary Credit, and Seasonal Credit, each with its own interest rate. Under the Primary Credit program, loans are extended for a very short term (usually overnight) to depository institutions in generally sound financial condition. (Secondary Credit & Seasonal Credit may be available to institutions that do not meet the “sound financial condition” criteria.) The discount rate charged for primary credit (the primary credit rate) is set above the usual level of short-term market interest rates.

Inter-bank loan rates will also track with the primary credit rate for overnight lending. The rate for inter-bank loans is generally driven by the target federal funds rate; the target federal funds rate is the

target interest rate set by the Federal Open Market Committee (FOMC), and is intended as a guide for the rate at which commercial banks borrow and lend their excess reserves to each other on an overnight basis. The FOMC sets the target federal funds rate periodically based on key economic indicators that may show signs of inflation, recession, or other issues that can affect sustainable economic growth. The actual interest rate that a lending bank will charge is determined through negotiations between the two banks. The weighted average of interest rates across all transactions of this type is known as the effective federal funds rate.

Based on the most recent two “dot plots” from the FOMC Board of Governors’ meetings (Figure 36 and Figure 37), the Governors have slightly shifted their opinions (between their March 2024 and June 2024 meetings) as shown in Table 2.

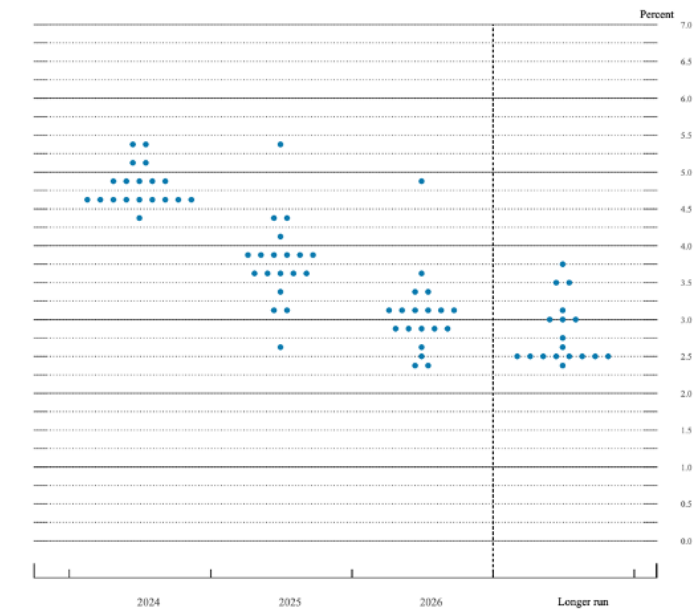
Table 2: Changes in FOMC Board of Governors' "Dot Plots" (March 2024 vs June 2024)

Year	March 2024 median	March 2024 range	June 2024 median	June 2024 range
2024	4.5%-4.75%	4.25%-5.5%	5.0 %-5.25% (↑ 50bp from Mar.)	4.75%-5.5% (↑ +/-50bp from Mar.)
2025	3.75%-4.0%	2.25%-5.5%	4.0%-4.25% (↑ 25bp from Mar.)	2.75%-5.5% (↑ +/-50bp from Mar.)
2026	3.0%-3.25%	2.25%-5.0%	3.0%-3.25% (level from Mar.)	2.25%-5.0% (level from Mar.)

Since our last report, the Federal Reserve has altered their (unofficial) stance from expecting as many as three 25 bp rate cuts to now expecting to drop federal funds rates by no more than 50 bp by YE2024 (and most likely only 25bp) from the current 5.25-5.5%. This change in expectations is due to the resilience of the economy; in other words, as has been mentioned prior, consumers are continuing to spend money in spite of the continuing (relatively) high federal funds rate. Further connecting the dots in that concept, consumers still do not feel that jobs are becoming hard to secure, and companies are still putting forth the listings to provide that impression. With the continued listings provided by companies, and the funding to support those listings, the sense is that there is still a strong market for goods and services (and, hence, the profitable need for employees to provide those goods and services), which supports the beliefs of consumers that spending does not need to be curtailed.

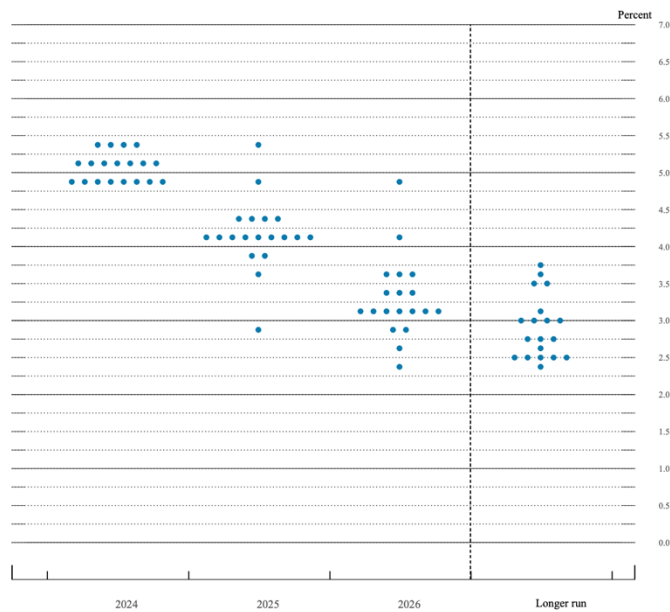
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Figure 36: FOMC "Dot Plot" from March 2024 Board of Governors' Meeting



Source: <https://www.federalreserve.gov/monetarypolicy/files/fomcprojtbl20240320.pdf>

Figure 37: FOMC "Dot Plot" from June 2024 Board of Governors' Meeting

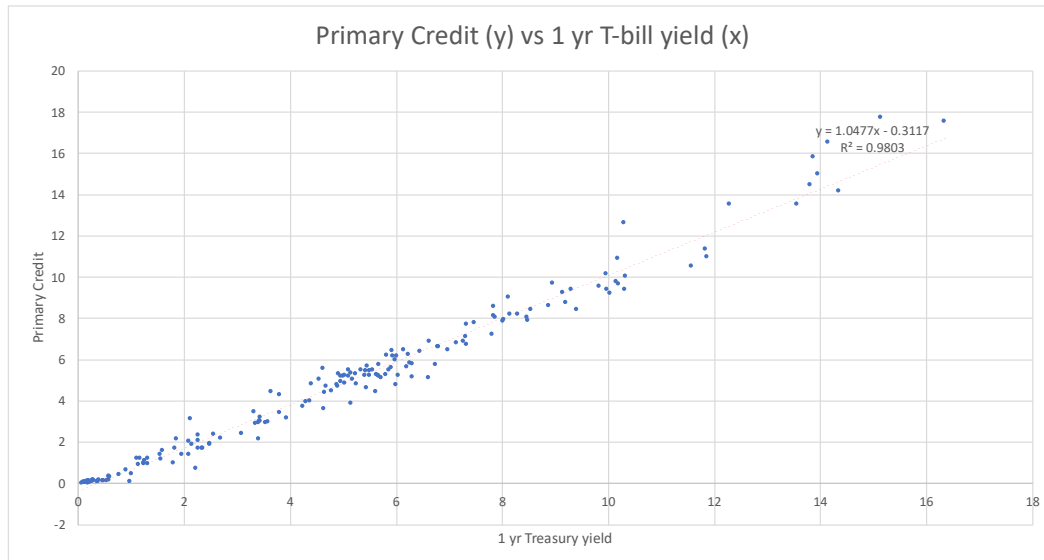


Source: <https://www.federalreserve.gov/monetarypolicy/files/fomcprojtbl20240612.pdf>

We feel that interest rates will end 2024 within 25 bp of their current level. The most likely case is a 25bp drop in 2024 (likely soon after the election, to avoid any appearance of impropriety), with as many as three 25 bp drops during 2025.

In Figure 38, we see the historical and projected relationship between the effective overnight lending rate and the 1-year T-bill yield.

Figure 38: Primary Credit, as a function of 1-year Treasury yield



Source: Authors' calculation

Other Commentary

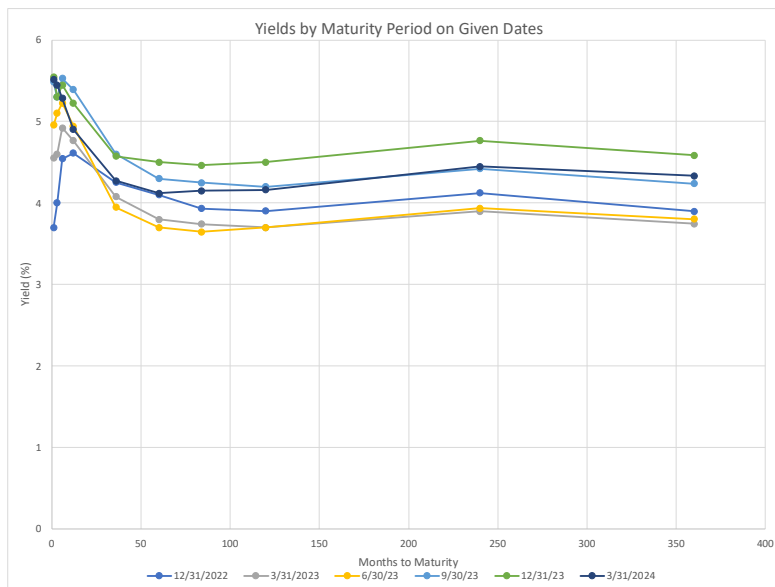
- “We believe that the Fed will wait until its policy meeting right after the Nov. 5 election to cut rates. If not for the presidential election, the Fed might cut rates at their September meeting, but we believe that the central bank will likely want to avoid making its first move during the middle of a presidential campaign, to avoid the appearance of favoring the current administration. ... Once the Fed does start cutting interest rates, it will likely continue doing so into 2026, but will not return short-term rates to zero.” (<https://www.kiplinger.com/economic-forecasts/interest-rates>; June 12, 2024)
- “Inflation remains stubbornly high. That’s why the Federal Reserve, as a part of its monetary tightening, has been reducing the size of its balance sheet, which still has more than \$7 trillion in assets left over from its last round of quantitative easing. So why has the Fed now decided to slow the pace of quantitative tightening by \$35 billion a month when inflation is still too high? ... The Federal Open Market Committee’s decision to slow QT comes from a desire to be sure that banks have ‘ample’ reserve balances (deposits held by banks at the Fed) to meet daily cash needs. Every dollar of these deposits at the Fed must be backed by Fed assets. If the size of the Fed’s balance sheet is brought down too much and too quickly, that creates a risk of cash hoarding by banks—which could cause overnight interest rates to soar, wreaking havoc on wholesale funding markets. This happened in September 2019, during a previous round of QT. This time around, the Fed is dropping the size of its balance sheet more cautiously.” (<https://www.wsj.com/articles/the-fed-is-too-cautious-on-qt-quantitative-tightening-policy-afcf9e17>; June 3, 2024)

Treasury Yields (1, 3, & 6-month; 1, 3, 5, 7, 10, 20, & 30-year series)

Analysis

The U.S. Treasury yield curve (see Figure 39) is still notably inverted as it has been for more than the past two years. At this point, the market is generating the greatest yields for 1-month maturities (5.51% annualized yield), with declining yields until yields reach five years (4.12% yield); from that point, as maturities increase, yields increase and peak at twenty-year maturities (4.45% yield), with thirty-year maturities showing a slightly lower yield (4.33% yield). This yield curve shape reinforces the overall belief by investors that either a recession may be imminent, or the economy may be in a recession currently; this situation reflected in the yield curve showing that a shorter duration investment will garner higher returns than a longer duration investment.

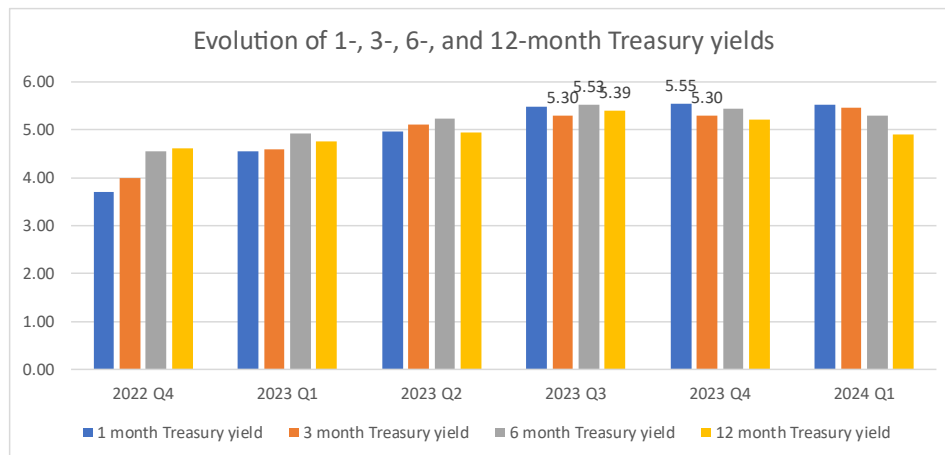
Figure 39: Treasury Yield Curves as a function of time-to-maturity



Sources(s): Federal Reserve Economic Database (<https://fred.stlouisfed.org>)

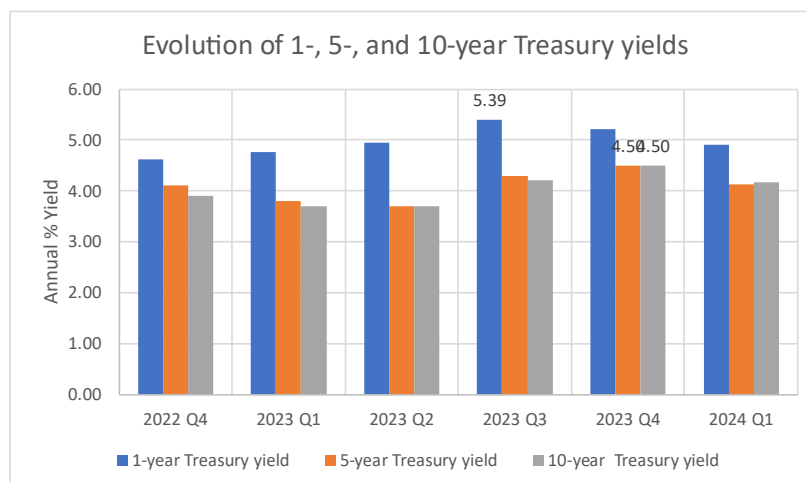
In Figure 40 and Figure 41, we note that many Treasury instruments of varying maturities appear to have recently peaked in yields in 3Q2023 and 4Q2023. (Peak recorded yields are noted on each chart.) 6-month and 1-year peaked at the end of 3Q2023; 3-month yields were identical at the end of both 3Q2023 & 4Q2023; and 1-month, 5-year and 10-year instruments appear to have crested around YE2023. The lack of an obvious relationship between the maturities and their peaks is slightly disconcerting, though it's expected that these "snapshots" of the yields are not perfect. The key point to take from the two charts is that it appears that yields are now slowly dropping and will do so for the near future.

Figure 40: Evolution of 1-, 3-, 6-, and 12-month Treasury yields



Source: Authors' calculation

Figure 41: Evolution of 1-, 5-, and 10-year Treasury yields



Source: Authors' calculation

Returning to Figure 39, **we do not expect the yield curve's shape to change substantially until at least YE2025**. Returns at the short end will remain relatively high. This position has been echoed by other analysts and economists⁵⁶. The next milestone in the evolution of yields will be a nearly flat yield curve across all maturities.

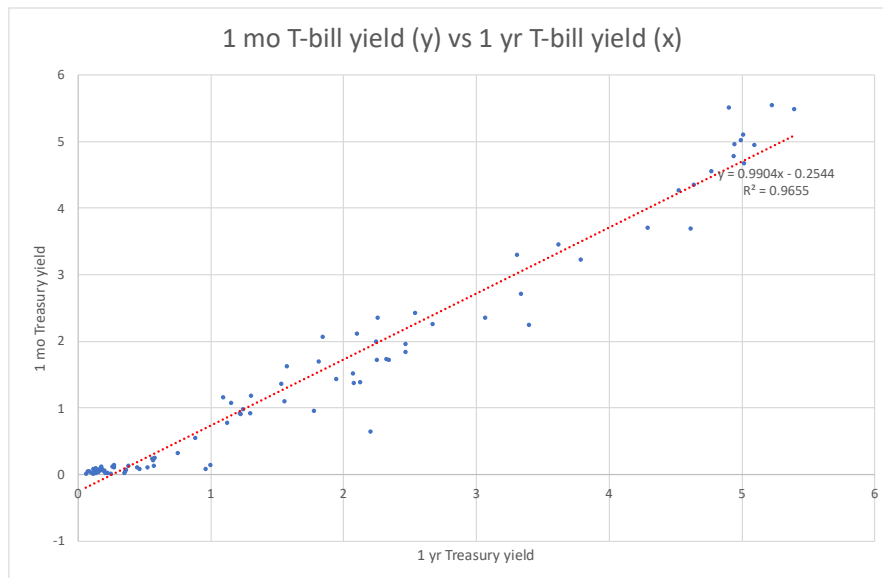
As much as we would like to view the yield curve and the forces acting on the yield curve to be apolitical, it would be naïve to assume such. It is expected that the economic recovery that is currently being traversed will continue as long as President Biden remains in office. If President Trump is re-elected, even though he does have an extremely “pro-business” legacy, and the effects of his new policies will not be felt immediately upon being sworn in, it is not clear how treasury yields will react in response to other investment opportunities; it would seem reasonable to assume (given Trump’s past

⁵⁶ See <https://www.reuters.com/markets/rates-bonds/shrinking-fed-rate-cut-expectations-keep-us-treasury-yields-elevated-2024-06-11/> and <https://www.usbank.com/investing/financial-perspectives/market-news/interest-rates-affect-bonds.html>

history) that pressure on financial, technology, and other sector equities would be lessened, which would drive their returns up, and impose upward pressure on bond yields. However, the international forces that could come into play in response to political positioning that may be take could also significantly alter those calculations.

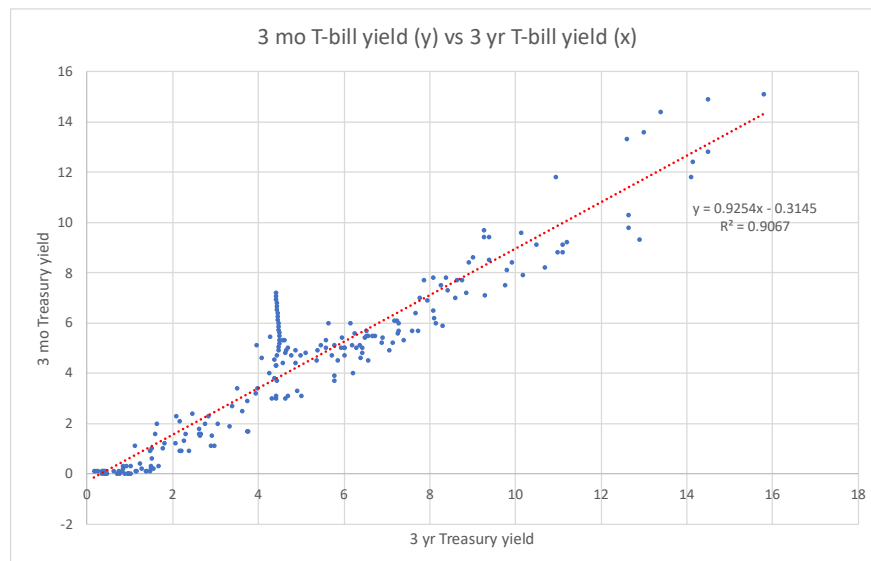
Figure 42 through Figure 50 illustrate the most significant correlations between Treasury yield rates.

Figure 42: 1-month Treasury yield rates, as a function of 1-year Treasury yield rates



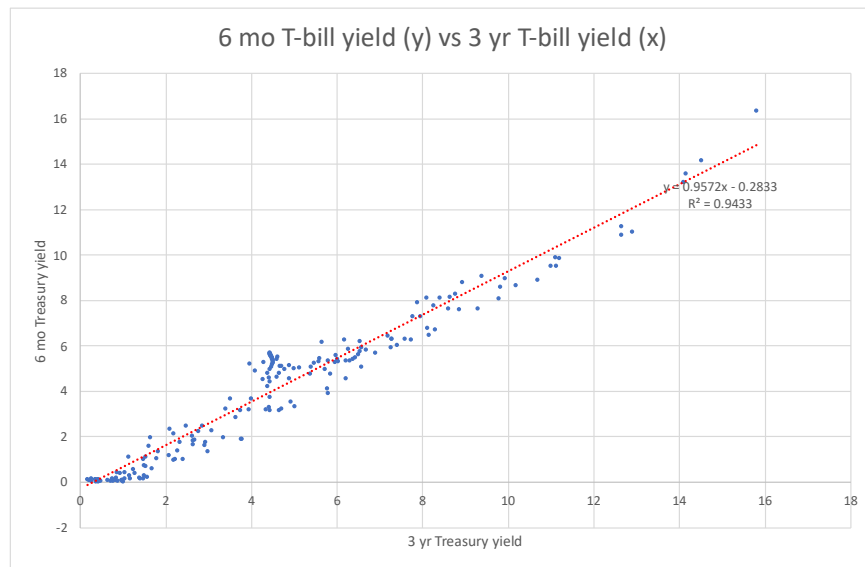
Source: Authors' calculation

Figure 43: 3-month Treasury yields, as a function of 3-year Treasury yields



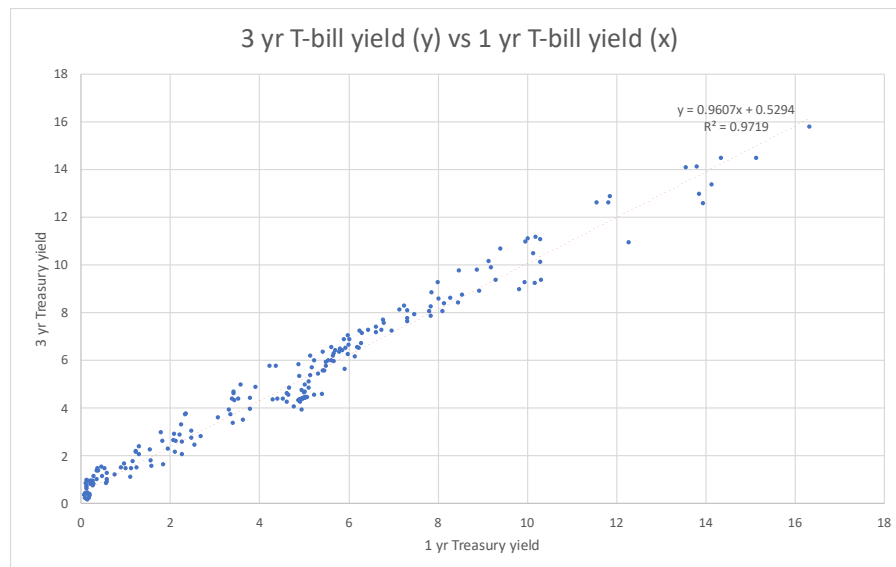
Source: Authors' calculation

Figure 44: 6-month Treasury yields, as a function of 3-year Treasury yields



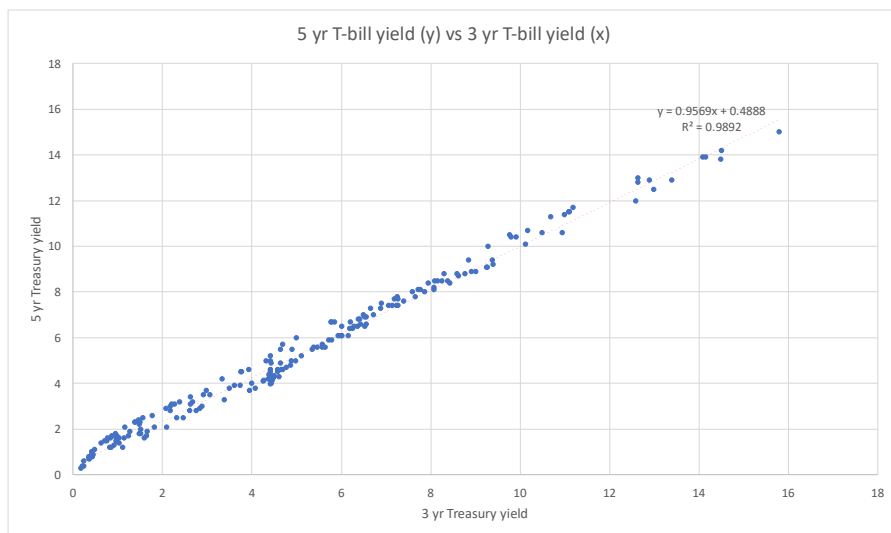
Source: Authors' calculation

Figure 45: 3-year Treasury yields, as a function of 1-year Treasury yields



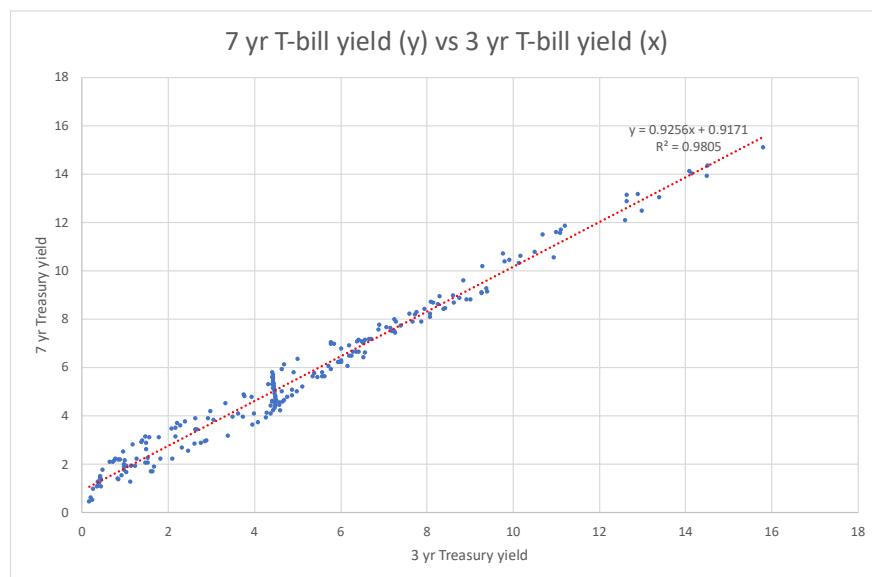
Source: Authors' calculation

Figure 46: 5-year Treasury yields, as a function of 1-year Treasury yields



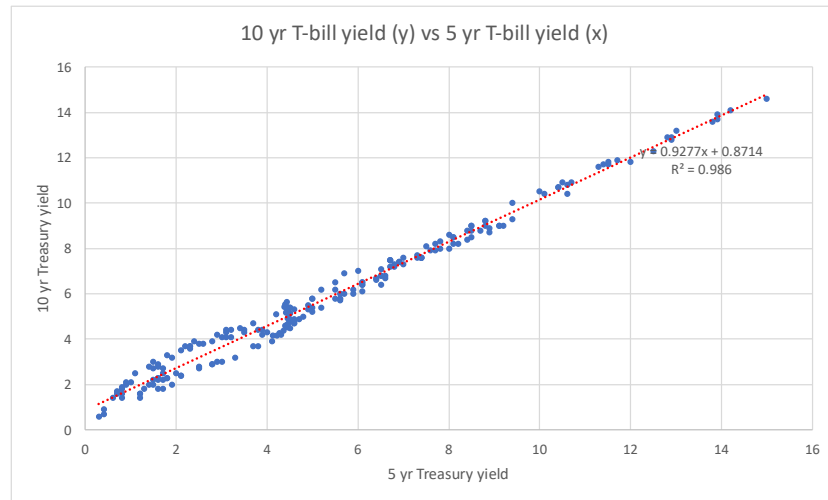
Source: Authors' calculation

Figure 47: 7-year Treasury yields, as a function of 3-year Treasury yields



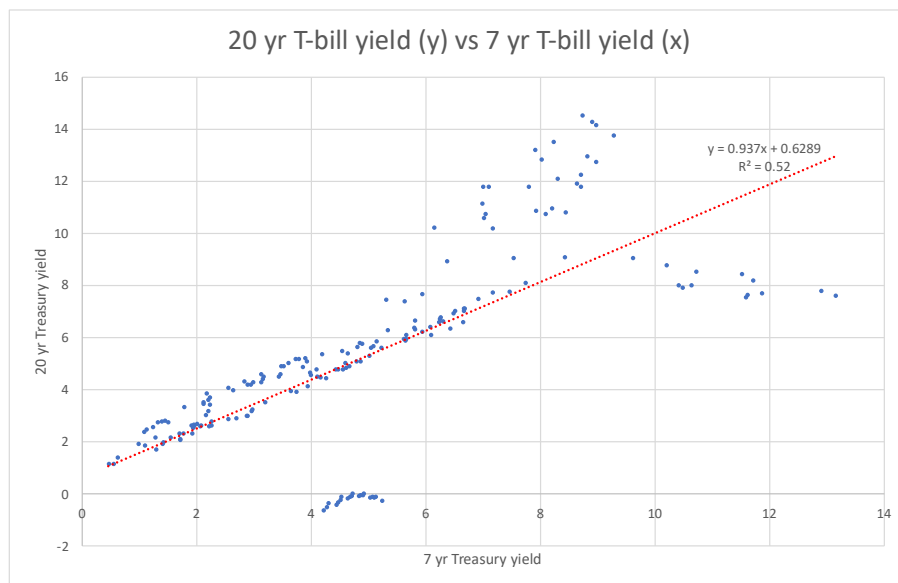
Source: Authors' calculation

Figure 48: 10-year Treasury yields, as a function of 5-year Treasury yields



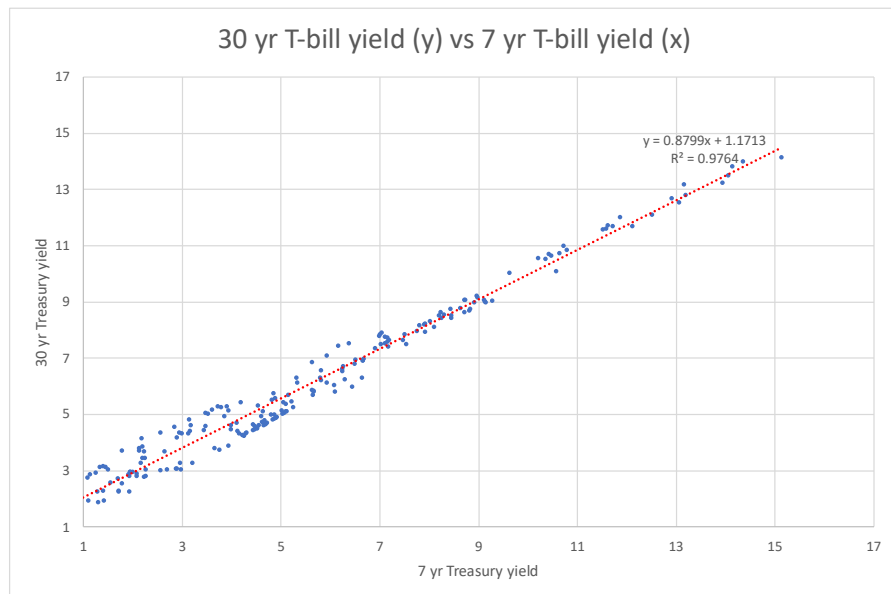
Source: Authors' calculation

Figure 49: 20-year Treasury yields, as a function of 7-year Treasury yields



Source: Authors' calculation

Figure 50: 30-year Treasury yields, as a function of 7-year Treasury yields



Source: Authors' calculation

Other Commentary

- “Once the Fed does start cutting interest rates, it will likely continue doing so into 2026, but will not return short-term rates to zero. Figure on the one- month Treasury bill’s yield falling to about 3.5% ...” (<https://www.kiplinger.com/economic-forecasts/interest-rates>; June 12, 2024)
- “The U.S. 10-year note yield, seen roughly steady at 4.35% at end-August, is then forecast to decline to 4.23% and 4.13% in six and 12 months respectively, according to median forecasts from 55 fixed-income strategists and analysts in a June 6-11 Reuters poll. ‘For yields, we think it’s more choppy sideways and then lower towards the end of the year. We’re still in the camp of inflation pressures easing and eventual Fed rate cuts - one or two - by year-end,’ said Kathy Jones, chief fixed income strategist for the Schwab Center for Financial Research.” (<https://www.reuters.com/markets/rates-bonds/shrinking-fed-rate-cut-expectations-keep-us-treasury-yields-elevated-2024-06-11/>; June 11, 2024)

30-year Mortgage Rate

Analysis

Mortgage rates have been traditionally tightly correlated with mid-duration Treasury yields given the typical sources of funding and duration of held mortgages. Day-to-day, offered mortgage rates are driven by traditional supply-and-demand forces between mortgage providers, and they are also influenced by the releases of various metrics (and the reactions of investors⁵⁷).

As of this writing, 30-year, fixed-rate mortgage rates are 6.87%, but have fluctuated from 6.60% to 7.22% since YE2023⁵⁸. Since these rates generally follow medium-duration bonds consistently, and they

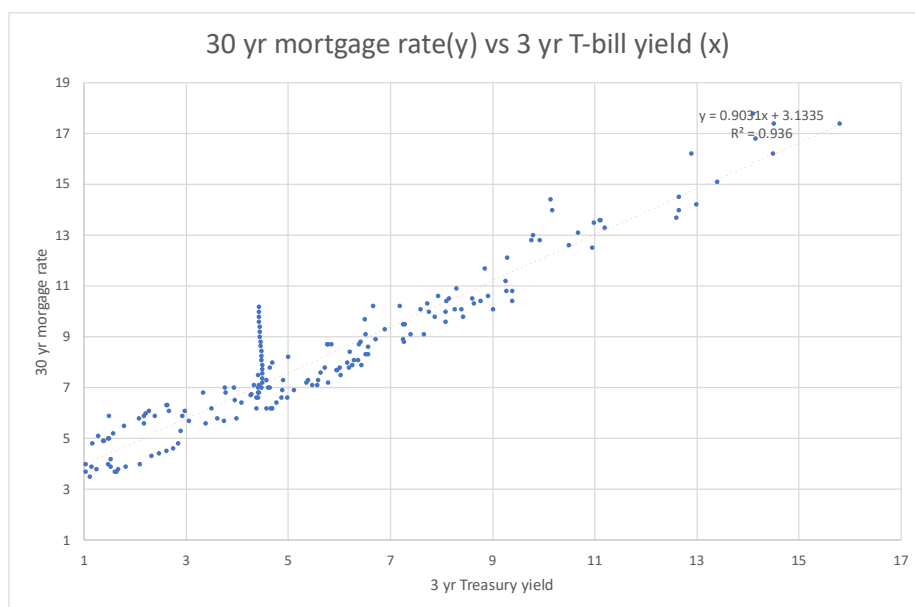
⁵⁷ See, e.g., <https://www.zillow.com/research/mortgage-rates-june-19-2024-34204/>

⁵⁸ <https://fred.stlouisfed.org/series/MORTGAGE30US>

follow the target Federal Funds rate, we expect them to generally continue to vary as they have been until later in the fall, after which point they will likely recede to around 6.5% by YE2024. **As mortgage rates start to drop (due to relief in rates offered by the FOMC), pent-up demand for new mortgages will continue to buoy rates, likely maintaining a +/- 7.0% level through YE2025.** Additionally, the positioning by U.S. Presidential candidates in the coming months will likely impact the thinking of investors and buyers, affecting their respective concepts of where inflation will go during 2025 and beyond; while investors may bid up the yields on 10-year bonds (which will affect mortgage rates) based on candidates' presentations in debates and polls, buyers may relent and execute sales despite the market forces.

Today we are seeing the 30-year mortgage rate becoming highly correlated with a shorter-term bond yield, with it being most connected to a 3-year yield. See Figure 51 for a graph of that correlation.

Figure 51: US 30-year (fixed rate) mortgage rate, as a function of a 3-year Treasury yield



Source: Authors' calculation

Other Commentary

- "Treasury yields futures experienced bearish pressure as prices fell from their May peak. Like precious metals, price action formed lower highs and failed to sustain even modest earlier gains. Meanwhile, ongoing economic adjustments and the Federal Reserve's cautious monetary stance continued to pressure the 10-year yield rate. ... Shorter-term yields also saw significant volatility, with the 2-year Treasury yield closing the month at nearly 4.67%. This performance remains closely tied to Fed policy changes and economic data releases."
(<https://oilprice.com/Finance/the-Markets/Whats-Ahead-for-Markets-in-the-Second-Half-of-2024.html>; June 28, 2024)
- "Fannie Mae and the Mortgage Bankers Association predict that the 30-year mortgage rate will be lower a year from now. Fannie Mae predicts it will average 6.9% in the first quarter of 2025 and the MBA predicts it will average 6.4%. It averaged 6.75% in the first quarter of 2024."

(<https://www.nerdwallet.com/article/mortgages/mortgage-interest-rates-forecast>; June 27, 2024)

- “A better tone of inflation data and evidence of slowing economic growth should bring mortgage rates below the 7 percent mark,’ says Greg McBride, CFA, chief financial analyst for Bankrate. ‘Whether they stay below 7 percent is contingent on further easing in inflation pressures.’” (<https://www.bankrate.com/mortgages/mortgage-interest-rates-forecast/>; June 1, 2024)

Moody’s AAA & BAA Rates; and the BofA BBB Corporate Yield

Analysis

AAA bond rates tend to track with mid-duration Treasury yields (our analysis indicates that they are most tightly correlated with 7-year yields), with rates for bonds with lower grades tending to be higher (in conjunction with their risk ratings). The average Moody’s Seasoned AAA Corporate Bond yield was up 23 bp to 4.97% in 1Q2024; average BAA yields were up by 9 bp over the quarter to 5.73%. (Quarter end yields were 5.01% and 5.75%, respectively.)

We have compared the AAA and BAA bond yields to 10/2 and 7/1 treasury yield spreads, but are finding that comparison less useful given the current inverted shape of the yield curve. Nonetheless, the yields and related spreads for these and similar U.S. Treasury bonds, are shown in Table 3⁵⁹.

Table 3: Comparison between Moody's Bond Yields, BofA BBB Yields, and U.S. Treasury Yields

Instrument	4Q2023	1Q2024	$\Delta(4Q \rightarrow 1Q)$	2Q2024	$\Delta(1Q \rightarrow 2Q)$
Moody’s AAA Bonds	4.74%	4.97%	+23bp	5.22%	+25bp
Moody’s BAA Bonds	5.64%	5.73%	+9bp	5.92%	+19bp
BAA-AAA Yield Spread	+90bp	+76bp	-14bp	+70bp	-6bp
BofA BBB Yields	6.11%	5.54%	-57bp	5.74%	+20bp
1-year Treasury Yield	4.79%	4.90%	+11bp	5.14%	+24bp
7-year Treasury Yield	3.88%	4.15%	+27bp	4.46%	+31bp
7 yr-1 yr Yield Spread	-91bp	-75bp	+16bp	-68bp	-7bp
2-year Treasury Yield	4.23%	4.48%	+25bp	4.83%	+35bp
10-year Treasury Yield	3.88%	4.16%	+28bp	4.45%	+29bp
10 yr-2 yr Yield Spread	-35bp	-32bp	+3bp	-38bp	-6bp

Over the long term, we have reported that the Moody’s AAA & BAA bonds, and the BofA BBB bonds, tend to track with medium term U.S. treasury yield rates. We have previously compared these instruments to the 7-year U.S. Treasury yield rates, and show the historical difference between the listed bond yields and the 7-year U.S. Treasury yield over the past five years in Figure 52 and Table 4⁶⁰.

Reflecting on the recent yield curve shown in Figure 39, we have seen the 7-year yield bounce between 3.65% and 4.46% since 4Q2022, and its yield bottomed out at 0.46% in 3Q2020. (For this discussion, it is worthwhile remembering that returns on U.S. Treasuries we anomalous, at best, for much of 2020 and

⁵⁹ See <https://fred.stlouisfed.org/series/DGS10>, <https://fred.stlouisfed.org/series/DGS7>, <https://fred.stlouisfed.org/series/DGS2>, <https://fred.stlouisfed.org/series/DGS1>, <https://fred.stlouisfed.org/series/aaa>, and <https://fred.stlouisfed.org/series/baa>

⁶⁰ <https://fred.stlouisfed.org>

2021; however, at the same time, it is that anomalous period, and the resulting phenomena that makes this discussion worthwhile.) As we are currently in the post-COVID economic period, considered to have started in 2H2022, it is worth noting that the premiums garnered by the all three of the corporate bonds discussed over the 7-year yield are gradually declining; BBB bonds are generating yields about 75 bp higher than 7-year yields.

Figure 52: Difference between Moody's AAA & BAA bond, and BofA BBB bond, yields and the U.S. Treasury 7-year yield

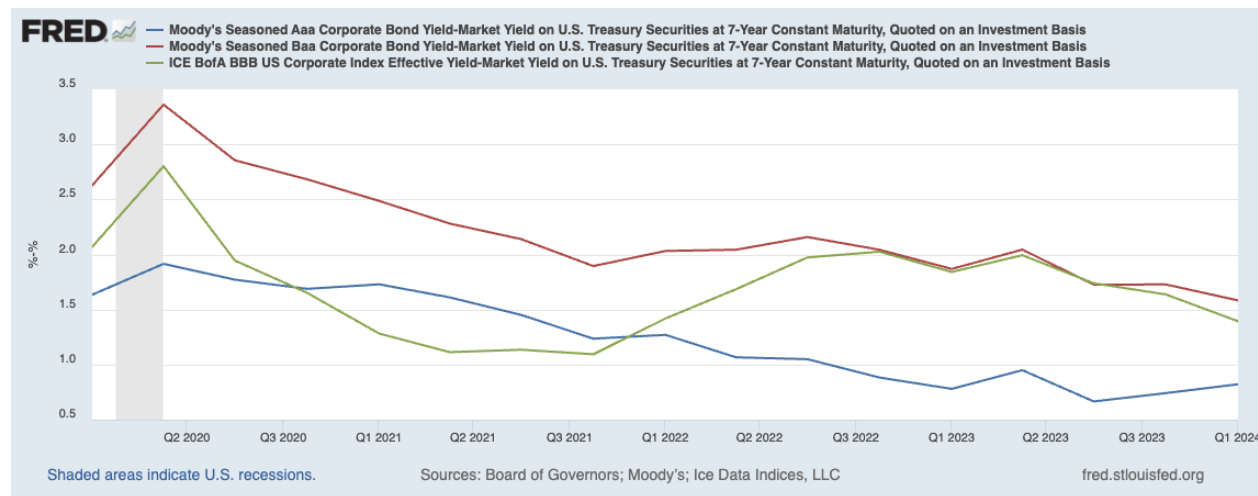
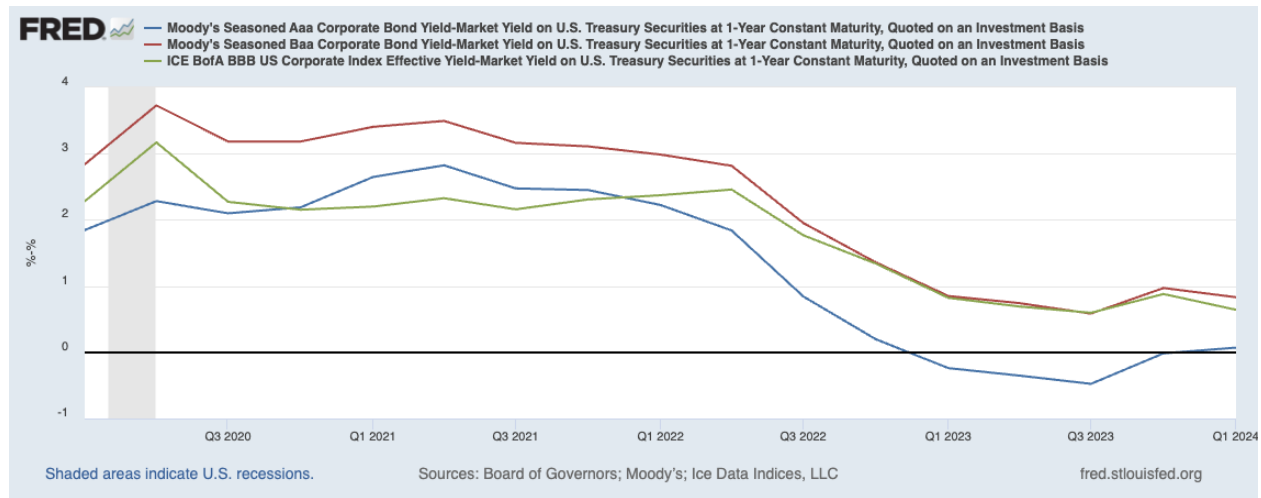


Table 4: Moody's AAA & BAA, and BofA BBB, Bond Yields Compared to 7-year US Treasury Yields

	3Q2022	1Q2024	Ann. Rate of Chg
7-year Treasury Yield	3.19%	4.15%	55 bp/yr
Moody's AAA Bonds	4.24%	4.97%	42 bp/yr
Moody's BAA Bonds	5.35%	5.73%	22 bp/yr
BofA BBB Yields	6.53%	6.29%	-14 bp/yr
$\Delta(\text{AAA} - 7\text{yr Treas yield})$	105 bp	82 bp	-13 bp/yr
$\Delta(\text{BAA} - 7\text{yr Treas yield})$	216 bp	158 bp	-33 bp/yr
$\Delta(\text{BBB} - 7\text{yr Treas yield})$	334 bp	214 bp	-69 bp/yr

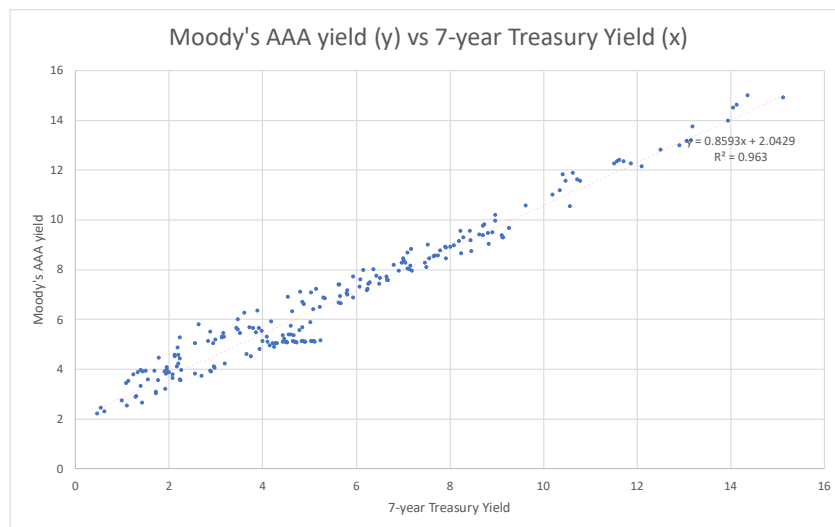
We have previously commented on the profitability of corporate bonds given the yields of short-term U.S. Treasury bonds. In Figure 53, we present the difference in the considered yields and 1-year U.S. Treasury yields. We see that BBB yields have not held up to 1-year returns since 1Q2023, and are only now slightly positive. Moody's bond yields are declining, now about 50 to 75 bp above 1-year returns. If the yield curve attempts to reverse its inversion as we previously discussed, then risk-free rates should decline and give some additional returns for corporate bonds.

Figure 53: Difference between Moody's AAA & BAA bond, and BofA BBB bond, yields and the U.S. Treasury 1-year yield



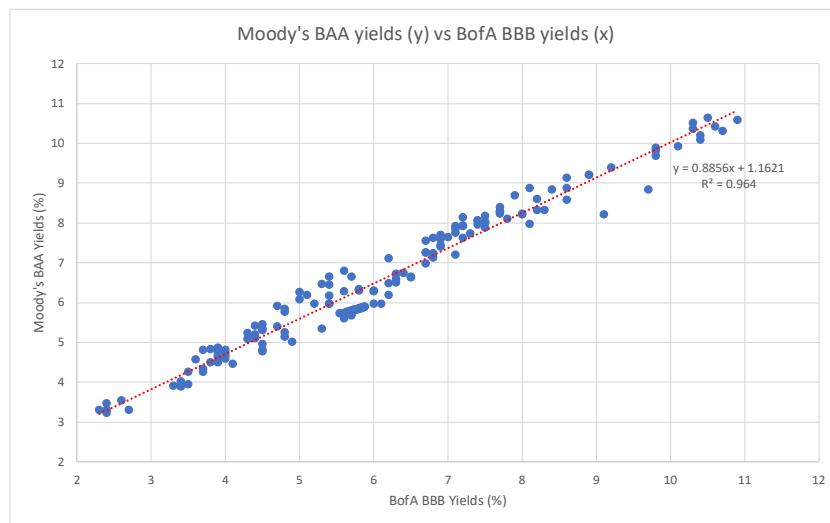
See Figure 54 for how Moody's AAA yields have historically tracked with the 7-year Treasury yield.

Figure 54: Moody's AAA-grade investment yields, as a function of 7-year Treasury yields



Source: Authors' calculation

Figure 55: Moody's BAA-grade investment yields, as a function of BofA BBB yields



Source: Authors' calculation

Other Commentary

- “Our overall outlook and guidance is mostly unchanged ... Investment-grade corporate bonds remain attractive given their average yields of 5% or more. We continue to suggest investors gradually extend duration with intermediate-term bonds, and investment-grade corporate bonds can make sense as investors can earn similar, or even higher, yields than with short-term alternatives. ... High-yield bonds and preferred securities can be considered by long-term investors who can ride out some volatility, but we wouldn't suggest large or overweight positions in either given the low yield advantage they offer relative to high-quality investments. Many preferred securities do offer tax advantages, however.”
(<https://www.schwab.com/learn/story/corporate-bond-outlook>; June 20, 2024)
- “Corporate bond rates are moving with changes in long-term Treasury rates. AAA-rated bonds are now yielding around 4.9%, BBB bonds 5.6%, and CCC-rated bond yields are around 13.8%.”
(<https://www.kiplinger.com/economic-forecasts/interest-rates>; June 12, 2024)

Prime Rate

Analysis

The Prime Rate is a benchmark rate that many banks use for setting consumer credit rates for creditworthy customers. It is generally based on the federal funds rate, and a spread (typically 3%) is dictated by banks as a matter of policy to specify lending rates for mortgages, small business loans, and personal loans⁶¹. The Prime Rate is currently (as of this writing) 8.50%⁶².

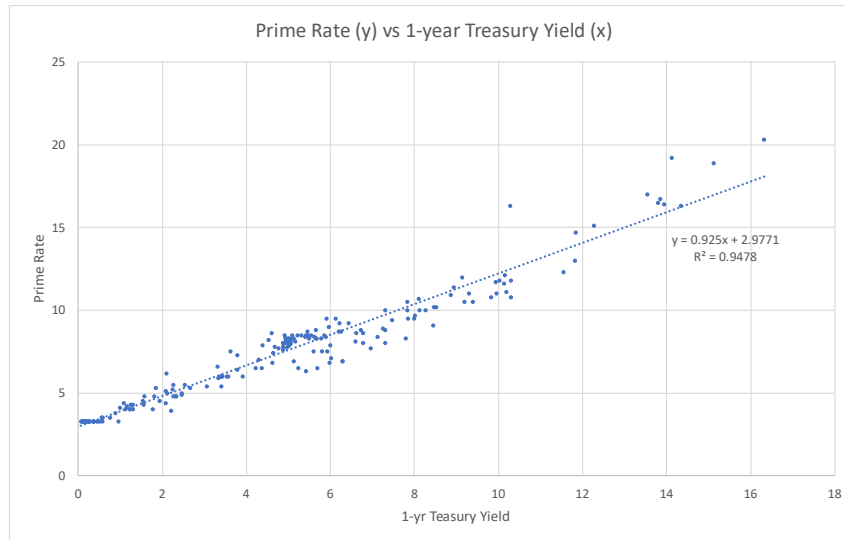
We do not expect the relationship between the federal funds rate and the Prime Rate to change in the near future. ***Inkeeping with our position that the FOMC will most likely reduce the federal funds rate***

⁶¹ <https://www.investopedia.com/terms/p/primerate.asp>

⁶² <https://fred.stlouisfed.org/series/DPRIME>

by 25 bp before YE2024, that change will cause the Prime Rate to drop in concert to between 8% and 8.25%.

Figure 56: Prime Rate as a function of 1-year Treasury yields



Source: Authors' calculation

Other Commentary

- “Once the Fed does start cutting interest rates, it will likely continue doing so into 2026, but will not return short-term rates to zero. Figure on ... the bank prime rate ending up around 6.5%, down from the current 8.5%, after the Fed is finished reducing its benchmark rate.” (<https://www.kiplinger.com/economic-forecasts/interest-rates>; June 12, 2024)

US Average Retail Gasoline Price

Analysis

As shown earlier, the U.S. average retail price for regular unleaded gasoline is approximately \$3.50/gallon⁶³ at the time of this writing, approximately the same price that it was one year ago. Further, retail gasoline is down by about 8c/gal in the past month, and 5c/gal over the past year⁶⁴.

Since 2020, we saw the average regular unleaded gasoline in U.S. cities bottom out as COVID took hold in 2Q2020 at approximately \$1.88/gallon, then run up to \$5.06/gallon in June 2022 as more in-office work requirements were imposed, and production was stifled by OPEC countries. Prices then dropped to \$3.36/gallon by YE2022 due to increasing refining capacity and decreased demand. Gasoline then recovered to almost \$4.00 at the end of 3Q2023 (due to restricted production, increased demand, and

⁶³ <https://gasprices.aaa.com/>

⁶⁴ Ibid.

Red Sea attacks by pirates) before retreating to \$3.22/gallon by YE2023. Since that time, prices have steadily returned to \$3.75/gallon in May 2024⁶⁵.

West Texas Intermediate (WTI) crude oil has been in a sawtooth pattern since YE2022, fluctuating substantially from \$70/barrel to \$90/barrel, with the price as of this writing being \$81.54/barrel⁶⁶. (See Figure 57 and Figure 58.) While demand is expected to be predictable through YE2023, production by OPEC countries (along with Russia, among other non-OPEC countries) must be considered more carefully: OPEC is expected to eliminate some production cuts in 4Q2023 – entailing approximately an additional 500,000 barrels flowing globally -- that will allow for government stockpiles that have been tested over the past five years to be replenished⁶⁷.

Regarding domestic production, as we reported in our last analysis, 2024 is expected to bring a significant hurricane season with 25 storms and 5 major storms⁶⁸ between June 1, 2024 and November 30, 2024. Beryl has been recognized as the first Atlantic hurricane in 2024, and, as of this writing, it is a very early “Category 5” storm that is westbound, south of Cuba and Haiti, and expected to make landfall in Mexico during the week of July 4, 2024⁶⁹. We note that it is extremely possible that domestic crude oil (originating in the Gulf of Mexico) could be easily and substantially affected by any of these storms.

Other Commentary

- “Oil prices will not change much in the second half of 2024 as concerns around demand from China and prospects of higher supply from key producers counter risks from geopolitical tensions, a Reuters poll indicated on [June 21, 2024]. ... A poll of 44 analysts and economists surveyed by Reuters in the last two weeks forecast the global benchmark, Brent crude, would average \$83.93 per barrel in 2024, just shy of the \$84.01 consensus in the previous month's poll. ... ‘Beyond the noise, oil prices seem stuck in a sideways trend,’ with supply and demand providing little direction and storage levels floating well within seasonal norms, said Julius Baer analyst Norbert Rücker.” (<https://www.reuters.com/markets/commodities/oil-prices-stay-steady-china-demand-woes-offset-mideast-risks-2024-06-28/>; June 28, 2024)
- “We expect the Brent crude oil price will average \$82 per barrel (b) in 2024 and \$79/b in 2025, close to the 2023 average of \$82/b. Our forecast for relatively little price change is based on expectations that global supply and demand of petroleum liquids will be relatively balanced. ... Although we forecast prices to average near \$80/b over the next two years, our price forecast remains uncertain. We generally expect the Brent crude oil price is more likely to decline than rise because we expect global oil production will more likely exceed our forecast than fall short of our forecast. The potential for prices to exceed our current forecast is largely related to unplanned production disruptions, a risk highlighted by the recently escalating tensions in the Red Sea.” (<https://www.eia.gov/outlooks/steo/report/BTL/2024/01-brentprice/article.php>; June 11, 2024)
- “The agency's Brent price forecast for 2024 represents a \$3.64 reduction from the prior month's estimate of \$87.79/b, the outlook said. Similarly, EIA lowered its WTI price forecast for 2024 by

⁶⁵ <https://fred.stlouisfed.org/series/APU000074714>

⁶⁶ <https://oilprice.com/futures/wti/>

⁶⁷ <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/oil/061124-us-eia-lowers-2024-oil-price-outlook-by-3b-after-steep-price-declines-in-may>.

⁶⁸ <https://www.bloomberg.com/news/articles/2024-03-27/super-charged-atlantic-hurricane-season-threatens-to-set-new-record> and <https://www.cnn.com/2024/04/05/weather/2024-atlantic-hurricane-season-fast-facts/index.html>

⁶⁹ <https://www.al.com/hurricane/2024/06/tropical-storm-beryl-2024-heres-the-official-forecast-track.html>

\$3.35, to \$79.70/b, the outlook said. ... The extension of OPEC+ cuts through the third quarter of 2024 led EIA to reduce its forecast for OPEC+ oil production for the rest of 2024, which will cause Brent prices to rise to an average of \$85/b during the second half of the year, the outlook said.” (<https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/oil/061124-us-eia-lowers-2024-oil-price-outlook-by-3b-after-steep-price-declines-in-may; June 11, 2024>)

Figure 57: Crude Oil vs Retail Gasoline Prices

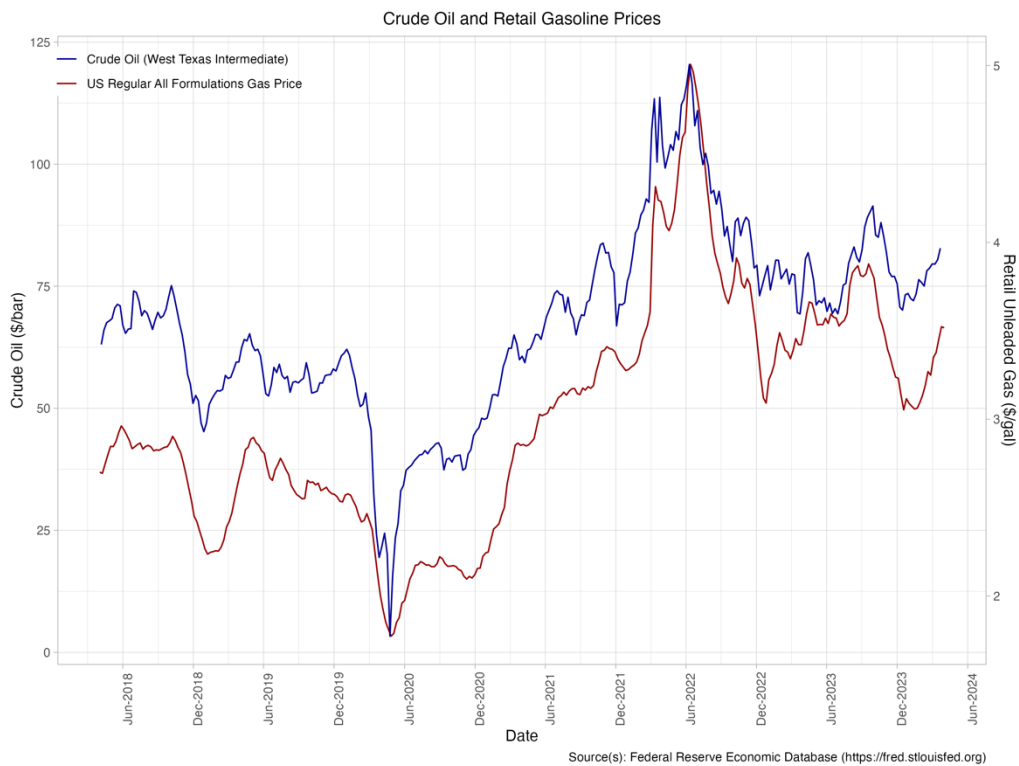
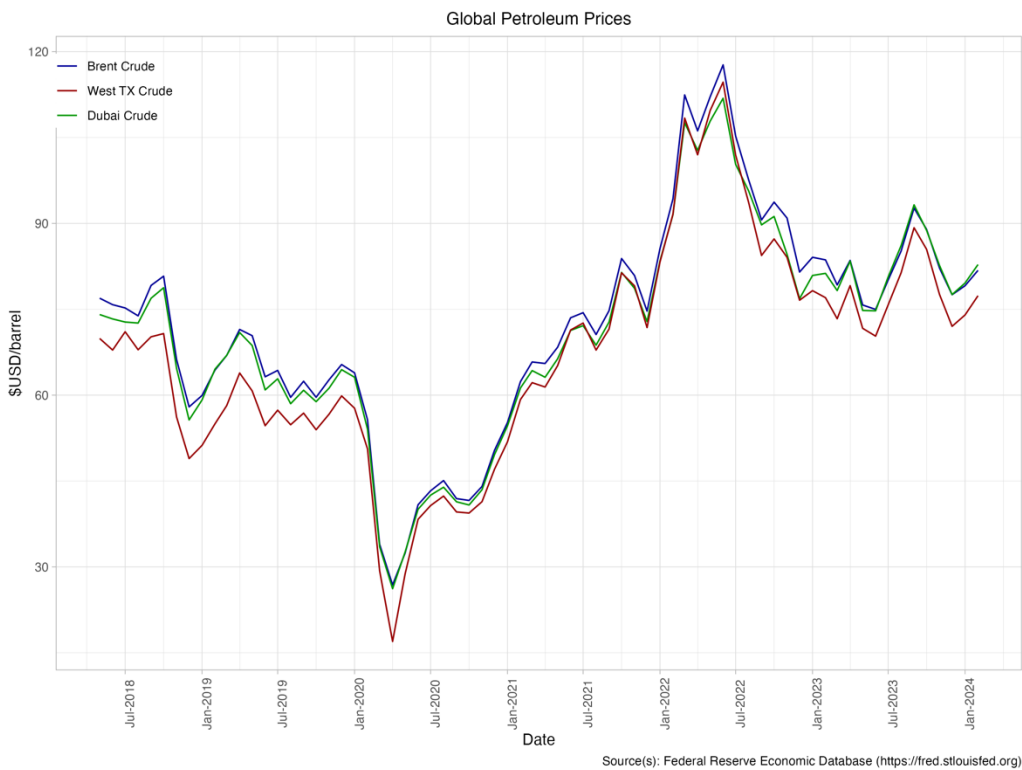


Figure 58: Global crude oil prices



House and Commercial Real Estate Price Indexes

Residential Home Price Analysis

There are approximately 146M households in the U.S. as of the end of 1Q2024⁷⁰, with 86M of those units being owner-occupied⁷¹. The median residential price of a home in the U.S. is almost \$421,000⁷². Figure 59 shows the national housing inventory as reported by Zillow.

According to Redfin, while the median residential home sale price has been up from roughly \$300,000 to almost \$440,000 between May 2019 and May 2024, the number of homes sold per month has generally trended down. While there were approximately 650,000 homes sold in May 2019, there were just under 500,000 homes sold in May 2024. Obviously, financing rates have changed dramatically over the past five years. Inventory of homes on the market has fluctuated from about 1.5 months (in Dec 2021) to almost four months (in Jan 2023). The number of months of inventory was approaching four months in Jan 2024, but is 2.66 months in May 2024. (See Figure 59.) That metric was 2.54 months of inventory in May 2023⁷³.

⁷⁰ <https://fred.stlouisfed.org/series/ETOTALUSQ176N>

⁷¹ <https://fred.stlouisfed.org/series/EOWNOCCUSQ176N>

⁷² <https://fred.stlouisfed.org/series/MSPUS>

⁷³ <https://www.redfin.com/us-housing-market>

Past trends show all of these metrics as being extremely volatile and based on several other factors: the number of homes for sale in a market; the market's desirability; mortgage rates; creditworthiness of borrowers; comparable leased property rental rates; and other factors.

Pricing in many desirable markets has increased substantially based on industries that are hiring. The S&P CoreLogic Case-Shiller U.S. national home price index is 315.12 as of the end of 1Q2024; it was 205.8 at YE2018 and 215 at YE2019 (i.e., a 50% increase over about 50 months)⁷⁴.

The FOMC's mantra of "higher for longer" telegraphs the sense that mortgage rates will remain in the neighborhood of 7% for the next year, meaning that buying power will remain eroded when compared with only a decade ago. As a result, competition between younger, first-home buyers and older "empty nesters" (who have access to better credit and more capital) will make it more difficult for renters to move to become homeowners⁷⁵.

Also, the fact that a significant percentage of mortgages are currently at rates well below market levels means that many buyers will be hesitant to sell their homes without adequate compensation for taking on a new mortgage at a higher rate. For instance, Freddie Mac reported that 60% of mortgages were held at rates less than 4%⁷⁶; transitioning from a mortgage from that rate to a mortgage with an interest rate 50% higher will be a difficult pill for many homeowners to stomach. The widening gap between rent rates and home prices is concerning, but indicates that it is likely that home values are likely set for a tumble in the near term⁷⁷.

Unless either (a) wages and savings are adjusted in order to provide the fuel for new mortgage transactions, and/or (b) businesses are willing to drive relocations (either directly or indirectly), and/or (c) mortgage rates fall closer to the rates of currently existing mortgages, it seems unlikely that this profile of real estate will change.

Commercial Real Estate Analysis

Commercial real estate is going through similar growing pains. Commercial real estate can be classified as (1) multi-tenant rented residential space (i.e., apartments, condominiums, etc.), (2) office space, (3) industrial use space, and (4) retail space, with subclasses defined within each class.

- (1) Regarding multi-tenant rentals, the Federal Reserve Board's Commercial Real Estate Price Index has increased by 50% over the past decade⁷⁸. Data from Nareit and Costar assessed that the multifamily CRE market was worth 18.36% (\$3.8T) of the total CRE market (\$20.7T) as of 2Q2021⁷⁹. The total CRE market is valued at \$22.5T as of YE2023⁸⁰, reflecting a 3.4% average annual growth rate. The CPI for the average owners' equivalent rent of residences has shown a 15.7% increase over the same period⁸¹, meaning that the multifamily CRE market should now be

⁷⁴ See <https://www.wsj.com/finance/investing/home-prices-overvalued-housing-market-4f8be55b>

⁷⁵ <https://www.redfin.com/news/housing-market-update-homes-selling-below-asking-price-june-2024/>

⁷⁶ <https://www.freddiemac.com/research/forecast/20240516-economic-growth-moderated-start-year>

⁷⁷ <https://www.wsj.com/finance/investing/home-prices-overvalued-housing-market-4f8be55b>

⁷⁸ See the FRB's Dodd-Frank Act Stress Test dataset at https://www.federalreserve.gov/supervisionreg/files/2024-Table_2A_Historic_Domestic.csv

⁷⁹ <https://www.reit.com/data-research/research/nareit-research/estimating-size-commercial-real-estate-market-us-2021>

⁸⁰ <https://www.stlouisfed.org/on-the-economy/2024/may/commercial-real-estate-in-focus>

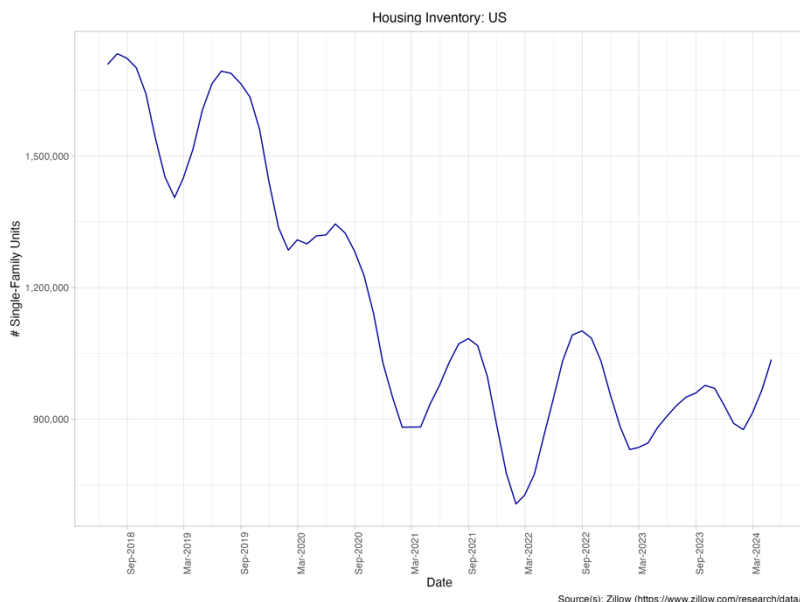
⁸¹ <https://fred.stlouisfed.org/series/CUSR0000SEHC>

worth close to \$4.4T as of YE2023 (not accounting for the increases in inventory that have been noted in several industry reports).

CRE debt is estimated to be about \$6.9T as of YE2023, with 50% of that debt held by banks and thrifts, and 30% of that debt (that which is held by banks and thrifts) is predicted as coming due before YE2026⁸².

Now let's look at a recap of recent history: the Centers for Disease Control and Prevention (CDC) ended its nationwide eviction moratorium in 2021, roughly a year after it took effect. Eviction protections for New York City residents ended in January 2022, and California's last eviction moratorium expired in March 2023. The widespread eviction moratoria during the COVID pandemic led to a new renter mindset: they wanted leniency in paying rents. Unfortunately, as the post-pandemic cost of living went up, real wages trailed behind, and many renters stopped paying rent. After residual protections at the state level were lifted, renters' lack of income left many landlords without enough funds to pay their mortgages, which has led to a growing number of mortgage delinquencies among landlords whose rental income has suffered from unpaid rents⁸³.

Figure 59: US Housing Inventory



According to the Mortgage Bankers' Association, there has been a noticeable uptick in delinquency rates during 1Q2024⁸⁴. From their press release⁸⁵, commercial multifamily mortgages held by banks and thrifts have seen a 9 bp increase in their delinquency rate since 4Q2023 to 1.03% during 1Q2024, almost a 10% Q/Q increase. The delinquency rate of those held by Fannie Mae actually declined by 2 bp to 0.44%, and the delinquency rate of those held

⁸² Ibid.

⁸³ <https://www.matthews.com/delinquencies-collection-issues-and-the-new-renter-mindset/>

⁸⁴ <https://www.mba.org/docs/default-source/research-and-forecasts/cmf-delinquency-rates/1q24cmfdelinquency.pdf>

⁸⁵ <https://www.mba.org/news-and-research/newsroom/news/2024/06/04/commercial-mortgage-delinquency-rates-increased-in-the-first-quarter-of-2024>

by Freddie Mac increased by 6 bp to 0.34% (a 21% Q/Q increase). Properties held by life insurance companies increased by 16 bp to 0.52% (a 44% Q/Q increase), and those backed by CMBS' increased by 5 bp to 4.35%.

Looking further at MBA's delinquency rates over time⁸⁶, we note that none of the five groups of multi-family units that they examine (which are a function of the type of owner/financier of the properties) are in jeopardy of exceeding records limited to only the past 25 years; these delinquency rates are still extremely small in comparison to rates witnessed at various points since the year 2000. But all of the rates are noteworthy nonetheless.

- (2) The U.S. had 4.1B+ square feet of office space in 2022⁸⁷, and now holds 5B+ square feet of office space inventory⁸⁸, with another 80M+ square feet under active construction⁸⁹. However, demand for office space has been declining for over two years -- in conjunction with the recovery from the COVID pandemic, and as employers have tried multiple tactics to entice workers to return to the office --, and vacancies in the U.S. are rapidly approaching 20% (hitting a record 1B square feet of vacant space)^{90,91}. Out of the 500 most valuable properties identified in one study, these properties have only 88% occupancy and an average rent of less than \$41/square foot⁹². Furthermore, one paper from the Federal Reserve Bank of St. Louis publicly comments, "It should be noted that published vacancy rates likely underestimate the overall level of vacant office space, as space that is leased but not fully used or that is subleased runs the risk of turning into vacancies once those leases come up for renewal."⁹³

The question is now one of the timing of any defaults and or shifts of properties into receivership. With the current "flight to quality"⁹⁴, contemporary construction is highly sought after by a diminishing set of clients, in a market in which the mean leased office building is 50 years old⁹⁵; leased space that does not meet that criteria will be at the mercy of the evaporating pool of interested tenants, landlords, and financiers⁹⁶.

- (3) Industrial real estate typically involves properties where goods are made, stored and/or shipped. There are close to 15B square feet of industrial space in the U.S.⁹⁷, and will lease for an average of \$8/square foot (up 7.5% Y/Y), with a vacancy rate of 5.6% nationally. While rental prices vary by region in the U.S., they are relatively stable over time, only increasing an average of 40bp in the year⁹⁸.

⁸⁶ <https://www.mba.org/docs/default-source/research-and-forecasts/cmf-delinquency-rates/1q24cmfdelinquency.pdf>

⁸⁷ <https://www.brookfield.com/news-insights/insights/misunderstood-us-office-market>

⁸⁸ <https://info.siteselectiongroup.com/blog/the-impact-of-return-to-office-1-billion-square-feet-of-office-space-is-available-in-the-us> and <https://www.bloomberg.com/news/articles/2024-04-02/office-vacancy-rate-nears-20-to-set-fresh-record-moody-s-says>

⁸⁹ <https://www.commercialedge.com/blog/national-office-report>

⁹⁰ <https://info.siteselectiongroup.com/blog/the-impact-of-return-to-office-1-billion-square-feet-of-office-space-is-available-in-the-us> and <https://www.bloomberg.com/news/articles/2024-04-02/office-vacancy-rate-nears-20-to-set-fresh-record-moody-s-says>

⁹¹ See <https://www.mckinsey.com/mgi/our-research/empty-spaces-and-hybrid-places-chapter-2> for comments regarding the same trend playing out globally.

⁹² <https://www.brookfield.com/news-insights/insights/misunderstood-us-office-market>

⁹³ <https://www.stlouisfed.org/on-the-economy/2024/may/commercial-real-estate-in-focus>

⁹⁴ <https://www.brookfield.com/news-insights/insights/misunderstood-us-office-market>

⁹⁵ <https://www.commbuildings.com/BuildingAgeData.pdf>

⁹⁶ <https://www.brookfield.com/news-insights/insights/misunderstood-us-office-market>

⁹⁷ <https://www.statista.com/statistics/873554/industrial-space-by-type-united-states/>

⁹⁸ <https://www.commercialedge.com/blog/national-industrial-report/>

- (4) Retail real estate comprises about 12.5% of the overall CRE space⁹⁹, and, as previously discussed, construction of new inventory has been substantially slowed over the past 12 months on the whole. Current trends appear to lean towards “boutiques” that cater to customer in a “high touch” environment, and not in a “mass appeal” channel, e.g., a regional shopping mall. As in the case of office CRE, contemporary projects had stronger results than older buildings for appealing to retailers and customers.¹⁰⁰

Other Commentary

- “In addition to higher interest rates (which make it more expensive for borrowers to refinance) and delayed Federal Reserve rate cuts creating headwinds, the commercial property market has been facing a sizable retreat in occupancy rates and tighter lending standards. That, in turn, has resulted in more commercial foreclosures and higher delinquencies on CRE loans. Office occupancies, in particular, have suffered from the post-pandemic work-from-home trend. ... ‘Cracks are forming beneath the surface, as consumers and businesses remain under pressure from the cumulative effects of higher interest rates and inflation,’ said Rebecca Rockey, deputy chief economist and global head of Forecasting of Cushman & Wakefield.” (<https://seekingalpha.com/news/4117694-commercial-property-mid-year-outlook-cracks-are-forming-beneath-the-surface>; June 22, 2024)
- “While the largest U.S. banks — those with more than \$50 billion in assets — will potentially face up to \$141 billion in losses tied to commercial-real-estate and office loans in the next nine quarters, it won’t cripple them, according to analysts at Janney. ... ‘We think banks are able to handle and manage the necessary loan losses as they occur using existing loan loss reserves as well as current earnings...to address unknown credit risks,’ analyst Chris Marinac wrote in an email to MarketWatch.” (<https://www.marketwatch.com/story/banks-face-141-billion-in-commercial-real-estate-losses-but-theyll-handle-it-analyst-5893490a>; June 21, 2024)
- “More U.S. regional bank failures could be on the way thanks to what Pacific Investment Management warns is a ‘very high’ concentration of troubled commercial real estate loans on their books. ‘The real wave of distress is just starting’ for lenders to everything from malls to offices, says Pimco’s John Murray. Recent turmoil has been particularly felt by regional lenders, which boosted commercial real estate exposure that (in many cases) is now worth only a fraction of their value at its peak. Smaller banks have continued to worry investors ever since last year’s mini-collapse.” (<https://www.bloomberg.com/news/newsletters/2024-06-11/bloomberg-evening-briefing-more-us-regional-bank-failures-may-be-coming>; June 11, 2024)
- “REITs have faced challenges since the start of the pandemic as working from home threatens the long-term value of offices while high borrowing costs have hurt many multifamily investments. Some investors responded by pulling money from trusts over the past two years, including those managed by Starwood Capital Group and Blackstone Inc., which limited redemptions to preserve liquidity.” (<https://www.bloomberg.com/news/articles/2024-05-30/us-banks-have-a-commercial-property-blind-spot-risk-study-warns>; May 29, 2024)
- “The U.S. retail market dynamics have been shaped by demand outpacing supply in Q1 2024. Net deliveries remained modest at 9.5 million in the first quarter and most of the retail space under construction is pre-leased, leaving a mere 25% available for lease. Leasing activity in the period decreased due to a lack of suitable location availability. However, the leasing rate of 35.1% over the last 12 months was higher than the previous year's rate, indicating robust

⁹⁹ <https://www.statista.com/topics/7588/retail-real-estate-market-in-the-us/#statisticChapter>

¹⁰⁰ <https://www.us.jll.com/en/trends-and-insights/research/retail-market-outlook>

demand. Sun Belt markets saw more growth due to population increases and buying-power growth, while locations with older properties and stagnant populations performed under par. ... A notable trend in the retail sector is the preference for small spaces of less than 2,500 square feet, accounting for over two-thirds of executed leases. In light of this, quick-service and fast-casual restaurants, usually fitting within this size range, reported almost 2,000 potential openings in 2024 ...” (<https://www.us.jll.com/en/trends-and-insights/research/retail-market-outlook>; May 8, 2024)

Dow Jones Total Stock Market Index (end-of-quarter); S&P 500 (quarterly average); and the Market Volatility Index (VIX)

Analysis

The Dow Jones U.S. Total Market Index (DWCF) is a market-capitalization-weighted index that represents the top 95% of the U.S. stock market based on market capitalization. Per Table 5, stocks rose dramatically during 1Q2024, but less so during 2Q2024, due to the remarkably resilient economy that is earning increasing concern. Until the FOMC blinks and makes changes to the target Federal Funds rate, **we expect that market will be increasingly wary of anything that may affect the precariousness of the economy.** This will likely continue through the end of 2024 as the Fed’ continues to consider rate changes, and given the upcoming U.S. Presidential election.

Table 5: Approximate Quarterly Milestones for the Dow-Jones Total Market Index

Period	Index Range ¹⁰¹	Trading Days	Avg points/day
2Q2023 (4/1/2023-6/30/2023)	41136.55 → 44411.47	61	+53.7
3Q2023 (7/1/2023-9/30/2023)	44411.47 → 42788.69	63	-25.8
4Q2023 (10/1/2023-12/31/2023)	42788.69 → 47787.47	61	+81.9
1Q2024 (1/1/2024-3/31/2024)	47787.47 → 52402.86	61	+75.7
2Q2024 (4/1/2024-6/30/2024)	52402.86 → 53905.94	63	+23.9

We note in Table 6 that the Standard & Poor’s 500 Index (“SP500”) is an index of 500 very large, publicly traded companies in the U.S. Again, the index’ performance in 4Q2023 & 1Q2024 was notably better than in 2Q2024. However, many are starting to realize and comment on the concentration of the S&P500 in terms of market capitalization and sector focus; the top 10 firms in this index currently account for 34% of the market¹⁰². **We feel that the overall performance of equities (as shown in these indexes) will continue to rise (albeit more slowly than previously) through 2024; growth in 2025 will likely be affected by the outcome of the U.S. Presidential election.**

Table 6: Approximate Quarterly Milestones for the Standard and Poor’s 500 (“SP500”) Index

Period	Index Range ¹⁰³	Trading Days	Avg points/day
2Q2023 (4/1/2023-6/30/2023)	4109.31 → 4450.38	61	+5.59
3Q2023 (7/1/2023-9/30/2023)	4450.38 → 4288.05	63	-2.58
4Q2023 (10/1/2023-12/31/2023)	4288.05 → 4769.83	61	+7.90
1Q2024 (1/1/2024-3/31/2024)	4769.83 → 5254.35	61	+7.94
2Q2024 (4/1/2024-6/30/2024)	5254.35 → 5459.65	63	+3.26

¹⁰¹ Index values found at <https://www.marketwatch.com/investing/index/dwcf>

¹⁰² <https://www.cnbc.com/2024/07/01/how-magnificent-7-affects-sp-500-stock-market-concentration.html>

¹⁰³ Index values found at <https://www.marketwatch.com/investing/index/spx>

However, again, the stability of the VIX is stunning: its quarterly average has gone from 12.5 at the end of 4Q2023, to 13.0 at the end of 1Q2024, to 12.44 at the end of 2Q2024¹⁰⁴. Again, these numbers are conveying a sense of future market stability, in spite of the lingering Russia-Ukraine conflict, Israel-Hamas conflict, volatile corporate debt levels, currently ongoing quantitative tightening efforts, and upcoming 2024 U.S. Presidential election.

Other Commentary

- “The U.S. stock market has become dominated by about a handful of companies in recent years. Some experts question whether that ‘concentrated’ market puts investors at risk, though others think such fears are likely overblown. ... The top 10 stocks in the S&P 500, the largest by market capitalization, accounted for 27% of the index at the end of 2023, nearly double the 14% share a decade earlier, according to a recent Morgan Stanley analysis.” (<https://www.cnbc.com/2024/07/01/how-magnificent-7-affects-sp-500-stock-market-concentration.html>; July 1, 2024)
- “We are also estimating that S&P 500 revenues per share will grow 1.3% this year, 3.9% next year and 4.1% in 2026. Our numbers are conservative relative to the analysts' consensus expectations, currently at 4.6%, 5.8% and 5.6% year over year. ... In any event, our S&P 500 margin projections are about the same as analysts' margin estimates: 13.2% from us vs. 12.6% from them for 2024, 13.7% from both of us in 2025, and 14.6% from us vs. 14.5% from them in 2026. If the estimates for 2025 and 2026 come to pass, they'd mark new record highs for the S&P 500 margin.” (<https://www.morningstar.com/news/marketwatch/20240629358/even-the-bulls-are-getting-trampled-by-the-tech-sector-heavy-us-market-a-melt-up-could-be-coming>; June 29, 2024)
- “In May, the S&P 500 gained 4.2% despite concerns over slowing economic growth, weakening U.S. consumer sentiment and the possibility of stagflation ahead. The S&P 500 is up 10% year-to-date as investors have shrugged off mixed economic data and now anticipate lower inflation, earnings growth acceleration and interest rate cuts in the second half of 2024.” (<https://www.forbes.com/advisor/investing/stock-market-outlook-and-forecast/>; June 3, 2024)

¹⁰⁴ See <https://fred.stlouisfed.org/series/VIXCLS>

Regression Analyses

The following section documents the linear regression coefficients found for each of the aforementioned variables, as a function of other variables (which are not significantly correlated with the control variable). With this report, we have also included the natural log and the square of all variables as experimental (dependent) variables; these variables are denoted by a “LN_” prefix and a “_2” suffix below (respectively).

To compare the effectiveness of these regressions, we calculate the percentage error between the forecasted value (based on the given regression, using the values from the immediately preceding quarter) and the actual value for the period between 2Q2015 and 1Q2024, inclusive.

Table 4: Regression Aggregate Errors for 2Q2015 through 1Q2024

Variable	Min Abs. Error	Average Error	Max Abs. Error
Real GDP Growth	9.44%	578.44%	***
Nominal GDP Growth	70.07%	728.53%	***
Real Disposable Income Growth	1000.00%	**	***
Nominal Disposable Income Growth	***	**	***
Inflation	0.00%	**	***
Unemployment Rate	281.19%	***	***
1-month Treasury Yield	141.14%	**	***
3-month Treasury Yield	0.00%	**	***
6-month Treasury Yield	211.12%	**	***
1-year Treasury Yield	950.44%	***	***
3-year Treasury Yield	1.24%	77.44%	***
5-year Treasury Yield	0.09%	13.42%	219.80%
7-year Treasury Yield	0.58%	15.81%	246.14%
10-year Treasury Yield	0.41%	7.35%	77.11%
20-year Treasury Yield	0.28%	12.76%	64.01%
30-year Treasury Yield	0.47%	-1.97%	76.69%
30-year Mortgage Rate	0.86%	-3.27%	26.46%
Moody's AAA Curve	0.12%	-1.92%	32.99%
Moody's BAA Curve	11.21%	-32.90%	71.14%
BBB Corporate Yield	0.13%	4.35%	37.96%
Prime Rate	7.25%	-572.83%	***
US Average Retail Gasoline Price	***	-4244.26%	***
Cost of Federal Funds	81.54%	-4320.46%	***
Dow Jones Total Stock Market Index	159.62%	799.95%	***
S&P 500 Stock Price Index	0.41%	-35.24%	249.53%
Commercial Real Estate Price Index	34.73%	46.05%	502.68%
Residential Home Price Index	75.57%	274.00%	486.91%
Market Volatility Index	***	**	***

** The indicated value has a percentage error less than -1000%.

*** The indicated value has a percentage error greater than 1000%.

Real & Nominal GDP Growth, Real & Nominal Disposable Income Growth, and CPI Inflation Rate

REGRESSION FOR REAL GDP GROWTH	
	<i>Dependent variable (+/- SE):</i>
	Real GDP growth
Constant	19.339 (+/- 5.410) p = 0.002***
Real disposable income growth	-3.091 (+/- 0.680) p = 0.0001***
Nominal disposable income growth	2.775 (+/- 0.672) p = 0.0003***
Home Price Index	-0.154 (+/- 0.041) p = 0.001***
20-year Treasury Yield	27.530 (+/- 8.149) p = 0.002***
LN_20-year Treasury Yield	-65.711 (+/- 19.476) p = 0.002***
Observations	40
R ²	0.500
Adjusted R ²	0.427
Residual Std. Error	5.632 (df = 34)
F Statistic	6.802*** (df = 5; 34)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR NOMINAL GDP GROWTH	
	<i>Dependent variable (+/- SE):</i>
	Nominal GDP growth
Constant	71.307 (+/- 17.310) p = 0.0003***
Real disposable income growth	-4.422 (+/- 0.737) p = 0.00000***
Nominal disposable income growth	4.060 (+/- 0.725) p = 0.00001***
Prime Rate	5.961 (+/- 1.762) p = 0.002***
Commercial Real Estate Price Index	-0.257 (+/- 0.066) p = 0.0005***
LN_30-year Treasury Yield	-27.708 (+/- 8.035) p = 0.002***
Observations	40
R ²	0.629
Adjusted R ²	0.574
Residual Std. Error	5.514 (df = 34)
F Statistic	11.509*** (df = 5; 34)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR REAL DISPOSABLE INCOME GROWTH	
	<i>Dependent variable (+/- SE):</i>
	Real disposable income growth
Constant	-364.610 (+/- 50.353) p = 0.0001***
SP500 Stock Price Index	-0.070 (+/- 0.006) p = 0.00001***
US Fed Reserve O-N Loan Rate	143.919 (+/- 12.784) p = 0.00001***
Moody's BAA Curve	-146.430 (+/- 12.153) p = 0.00001***
Real GDP growth	26.446 (+/- 2.468) p = 0.00001***
Nominal GDP growth	-22.392 (+/- 2.144) p = 0.00001***
Unemployment Rate	72.634 (+/- 4.832) p = 0.00000***
BBB corporate yield	60.330 (+/- 7.818) p = 0.0001***
Prime Rate	-449.640 (+/- 37.058) p = 0.00001***
Home Price Index	1.382 (+/- 0.267) p = 0.001***
Commercial Real Estate Price Index	3.553 (+/- 0.263) p = 0.00000***
Market Volatility Index	-0.552 (+/- 0.082) p = 0.0002***
30-year Treasury Yield	-570.090 (+/- 86.943) p = 0.0002***
LN_30-year Treasury Yield	3,119.682 (+/- 328.360) p = 0.00002***
10-year Treasury Yield	109.010 (+/- 22.904) p = 0.002***
LN_10-year Treasury Yield	-318.039 (+/- 51.089) p = 0.0003***
LN_1-month Treasury Yield	33.865 (+/- 3.188) p = 0.00001***
7-year Treasury Yield	-413.910 (+/- 48.489)

	p = 0.00003***
LN_7-year Treasury Yield	-406.390 (+/- 103.736)
	p = 0.005***
3-month Treasury Yield	131.662 (+/- 21.614)
	p = 0.0003***
5-year Treasury Yield	-178.080 (+/- 21.985)
	p = 0.00004***
LN_5-year Treasury Yield	283.752 (+/- 31.678)
	p = 0.00002***
LN_6-month Treasury Yield	-102.243 (+/- 13.805)
	p = 0.0001***
3-year Treasury Yield	700.853 (+/- 45.472)
	p = 0.00000***
LN_3-year Treasury Yield	-140.703 (+/- 25.346)
	p = 0.001***
1-year Treasury Yield	-150.867 (+/- 26.808)
	p = 0.0005***
LN_1-year Treasury Yield	105.306 (+/- 12.269)
	p = 0.00003***
1-year Treasury Yield_2	-66.106 (+/- 8.977)
	p = 0.0001***
3-year Treasury Yield_2	41.595 (+/- 7.686)
	p = 0.001***
6-month Treasury Yield_2	39.285 (+/- 7.008)
	p = 0.001***
3-month Treasury Yield_2	11.401 (+/- 2.305)
	p = 0.002***
7-year Treasury Yield_2	-24.308 (+/- 6.925)
	p = 0.008***
Observations	40
R ²	0.994
Adjusted R ²	0.972
Residual Std. Error	2.150 (df = 8)
F Statistic	44.480*** (df = 31; 8)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR NOMINAL DISPOSABLE INCOME GROWTH

	<i>Dependent variable (+/- SE):</i>
	Nominal disposable income growth
Constant	-723.178 (+/- 62.541) p = 0.0001***
SP500 Stock Price Index	-0.066 (+/- 0.004) p = 0.00003***
US Fed Reserve O-N Loan Rate	88.341 (+/- 7.769) p = 0.0001***
Moody's BAA Curve	-164.451 (+/- 10.418) p = 0.00002***
Real GDP growth	25.778 (+/- 2.420) p = 0.0002***
Nominal GDP growth	-21.697 (+/- 2.156) p = 0.0002***
Unemployment Rate	53.425 (+/- 2.797) p = 0.00001***
CPI Inflation Rate	-5.668 (+/- 0.539) p = 0.0002***
BBB corporate yield	81.080 (+/- 6.106) p = 0.00005***
30-year Mortgage Rate	34.170 (+/- 4.243) p = 0.0005***
Prime Rate	-448.391 (+/- 25.917) p = 0.00002***
Dow Total Stock Market Index	0.002 (+/- 0.0005) p = 0.006***
Home Price Index	2.722 (+/- 0.182) p = 0.00003***
Commercial Real Estate Price Index	2.622 (+/- 0.151) p = 0.00002***
Market Volatility Index	-0.767 (+/- 0.100) p = 0.001***
30-year Treasury Yield	-736.276 (+/- 64.477) p = 0.0001***
LN_30-year Treasury Yield	4,032.645 (+/- 288.989) p = 0.00004***
LN_20-year Treasury Yield	-446.884 (+/- 50.929)

	p = 0.0004***
10-year Treasury Yield	294.125 (+/- 21.426)
	p = 0.00004***
LN_10-year Treasury Yield	-784.840 (+/- 50.673)
	p = 0.00003***
LN_1-month Treasury Yield	32.699 (+/- 1.385)
	p = 0.00001***
7-year Treasury Yield	-258.660 (+/- 31.812)
	p = 0.0005***
LN_7-year Treasury Yield	-599.278 (+/- 83.490)
	p = 0.001***
3-month Treasury Yield	178.405 (+/- 11.170)
	p = 0.00002***
5-year Treasury Yield	-260.356 (+/- 25.896)
	p = 0.0002***
LN_5-year Treasury Yield	486.504 (+/- 32.383)
	p = 0.00003***
6-month Treasury Yield	150.400 (+/- 12.496)
	p = 0.0001***
LN_6-month Treasury Yield	-181.765 (+/- 9.622)
	p = 0.00001***
3-year Treasury Yield	663.125 (+/- 34.996)
	p = 0.00001***
LN_3-year Treasury Yield	-220.210 (+/- 12.257)
	p = 0.00001***
1-year Treasury Yield	-201.069 (+/- 25.895)
	p = 0.001***
LN_1-year Treasury Yield	194.528 (+/- 8.762)
	p = 0.00001***
1-year Treasury Yield_2	-27.501 (+/- 1.833)
	p = 0.00003***
6-month Treasury Yield_2	13.413 (+/- 1.841)
	p = 0.001***
5-year Treasury Yield_2	-11.326 (+/- 1.388)
	p = 0.0005***
Observations	40
R ²	0.999
Adjusted R ²	0.993
Residual Std. Error	1.034 (df = 5)

F Statistic	173.798 ^{***} (df = 34; 5)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR CPI INFLATION RATE

	<i>Dependent variable (+/- SE):</i>
	CPI Inflation Rate
Constant	-74.768 (+/- 7.922) p = 0.00001***
Moody's AAA Curve	-8.893 (+/- 0.886) p = 0.00000***
Real GDP growth	0.610 (+/- 0.102) p = 0.0001***
Nominal GDP growth	-0.509 (+/- 0.098) p = 0.0003***
Real disposable income growth	-0.658 (+/- 0.100) p = 0.00004***
Nominal disposable income growth	0.578 (+/- 0.099) p = 0.0002***
30-year Mortgage Rate	3.359 (+/- 0.537) p = 0.0001***
Prime Rate	-5.591 (+/- 0.789) p = 0.00003***
Home Price Index	0.137 (+/- 0.012) p = 0.00000***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	1.475 (+/- 0.185) p = 0.00001***
LN_30-year Treasury Yield	90.855 (+/- 8.330) p = 0.00000***
LN_20-year Treasury Yield	-54.143 (+/- 5.812) p = 0.00001***
10-year Treasury Yield	66.108 (+/- 8.955) p = 0.00002***
LN_10-year Treasury Yield	-80.811 (+/- 9.247) p = 0.00001***
1-month Treasury Yield	3.420 (+/- 0.416) p = 0.00001***
LN_1-month Treasury Yield	1.049 (+/- 0.155) p = 0.00004***
7-year Treasury Yield	10.076 (+/- 2.092) p = 0.001***
3-month Treasury Yield	2.719 (+/- 0.598)

	p = 0.001***
5-year Treasury Yield	-29.995 (+/- 4.533)
	p = 0.00004***
LN_5-year Treasury Yield	33.826 (+/- 4.079)
	p = 0.00001***
LN_6-month Treasury Yield	-8.740 (+/- 0.766)
	p = 0.00000***
3-year Treasury Yield	10.659 (+/- 1.631)
	p = 0.00005***
LN_3-year Treasury Yield	-17.891 (+/- 1.681)
	p = 0.00000***
1-year Treasury Yield	-4.241 (+/- 0.788)
	p = 0.0003***
LN_1-year Treasury Yield	12.232 (+/- 0.962)
	p = 0.00000***
5-year Treasury Yield_2	3.105 (+/- 0.615)
	p = 0.0004***
3-month Treasury Yield_2	-0.539 (+/- 0.075)
	p = 0.00002***
7-year Treasury Yield_2	-1.941 (+/- 0.208)
	p = 0.00001***
10-year Treasury Yield_2	-6.957 (+/- 1.102)
	p = 0.0001***
Observations	40
R ²	0.999
Adjusted R ²	0.998
Residual Std. Error	0.130 (df = 11)
F Statistic	647.107*** (df = 28; 11)
Note:	*p<0.1; **p<0.05; ***p<0.01

Unemployment Rate

REGRESSION FOR UNEMPLOYMENT RATE

	<i>Dependent variable (+/- SE):</i>
	Unemployment Rate
Constant	5.835 (+/- 0.210) p = 0.00001***
SP500 Stock Price Index	0.001 (+/- 0.00002) p = 0.00000***
Moody's AAA Curve	-1.621 (+/- 0.087) p = 0.00001***
Moody's BAA Curve	3.699 (+/- 0.065) p = 0.00000***
Real GDP growth	-0.342 (+/- 0.012) p = 0.00000***
Nominal GDP growth	0.270 (+/- 0.011) p = 0.00001***
Real disposable income growth	-0.221 (+/- 0.013) p = 0.00002***
Nominal disposable income growth	0.227 (+/- 0.013) p = 0.00002***
BBB corporate yield	-1.699 (+/- 0.034) p = 0.00000***
30-year Mortgage Rate	-0.705 (+/- 0.063) p = 0.0002***
Prime Rate	8.558 (+/- 0.148) p = 0.00000***
Dow Total Stock Market Index	-0.00004 (+/- 0.00000) p = 0.0002***
Home Price Index	-0.039 (+/- 0.001) p = 0.00000***
Commercial Real Estate Price Index	-0.047 (+/- 0.001) p = 0.000***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.144 (+/- 0.020) p = 0.001***
30-year Treasury Yield	15.293 (+/- 0.331) p = 0.00000***
LN_30-year Treasury Yield	-67.051 (+/- 1.147) p = 0.00000***

10-year Treasury Yield	-3.602 (+/- 0.200) p = 0.00001***
LN_10-year Treasury Yield	11.145 (+/- 0.516) p = 0.00001***
1-month Treasury Yield	-0.771 (+/- 0.061) p = 0.0001***
LN_1-month Treasury Yield	-0.631 (+/- 0.013) p = 0.00000***
7-year Treasury Yield	1.990 (+/- 0.257) p = 0.001***
LN_7-year Treasury Yield	14.637 (+/- 0.503) p = 0.00000***
3-month Treasury Yield	-3.552 (+/- 0.075) p = 0.00000***
5-year Treasury Yield	6.271 (+/- 0.243) p = 0.00001***
LN_5-year Treasury Yield	-9.379 (+/- 0.383) p = 0.00001***
6-month Treasury Yield	-1.588 (+/- 0.134) p = 0.0001***
LN_6-month Treasury Yield	2.694 (+/- 0.064) p = 0.00000***
3-year Treasury Yield	-7.829 (+/- 0.207) p = 0.00000***
LN_3-year Treasury Yield	2.027 (+/- 0.203) p = 0.0002***
LN_1-year Treasury Yield	-2.700 (+/- 0.092) p = 0.00000***
1-year Treasury Yield_2	0.924 (+/- 0.025) p = 0.00000***
3-year Treasury Yield_2	-0.209 (+/- 0.023) p = 0.0003***
6-month Treasury Yield_2	-0.625 (+/- 0.022) p = 0.00000***
Market Volatility Index_2	0.0002 (+/- 0.00001) p = 0.00001***
Observations	40
R ²	1.000
Adjusted R ²	1.000

Residual Std. Error	0.010 (df = 5)
F Statistic	35,713.390*** (df = 34; 5)
<hr/>	
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

Treasury Yields (1, 3, & 6-month; 1, 3, 5, 7, 10, 20, & 30-year series)

REGRESSION FOR 1-MONTH TREASURY YIELD	
	<i>Dependent variable (+/- SE):</i>
	1-month Treasury Yield
Constant	3.452 (+/- 0.777) p = 0.0002***
Moody's AAA Curve	-3.850 (+/- 0.801) p = 0.00005***
Moody's BAA Curve	1.274 (+/- 0.358) p = 0.002***
Real GDP growth	0.231 (+/- 0.032) p = 0.00000***
Nominal GDP growth	-0.216 (+/- 0.029) p = 0.00000***
Unemployment Rate	-0.242 (+/- 0.053) p = 0.0001***
BBB corporate yield	-1.131 (+/- 0.268) p = 0.0003***
30-year Mortgage Rate	1.512 (+/- 0.253) p = 0.00001***
LN_30-year Treasury Yield	5.413 (+/- 1.643) p = 0.003***
LN_10-year Treasury Yield	-1.320 (+/- 0.379) p = 0.002***
7-year Treasury Yield_2	0.277 (+/- 0.043) p = 0.00000***
Observations	40
R ²	0.978
Adjusted R ²	0.970
Residual Std. Error	0.299 (df = 29)
F Statistic	128.140*** (df = 10; 29)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 3-MONTH TREASURY YIELD	
	<i>Dependent variable (+/- SE):</i>
	3-month Treasury Yield
Constant	-24.413 (+/- 2.701) p = 0.000***
Real disposable income growth	0.195 (+/- 0.028) p = 0.00000***
Nominal disposable income growth	-0.179 (+/- 0.028) p = 0.00000***
Unemployment Rate	-0.467 (+/- 0.055) p = 0.000***
Dow Total Stock Market Index	0.0001 (+/- 0.00001) p = 0.00003***
Commercial Real Estate Price Index	0.014 (+/- 0.004) p = 0.002***
30-year Treasury Yield	-9.870 (+/- 2.421) p = 0.0004***
LN_30-year Treasury Yield	34.147 (+/- 5.958) p = 0.00001***
20-year Treasury Yield	31.371 (+/- 2.905) p = 0.000***
LN_20-year Treasury Yield	-55.906 (+/- 5.287) p = 0.000***
20-year Treasury Yield_2	-1.996 (+/- 0.249) p = 0.000***
Observations	40
R ²	0.987
Adjusted R ²	0.983
Residual Std. Error	0.239 (df = 29)
F Statistic	223.094*** (df = 10; 29)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 6-MONTH TREASURY YIELD	
	<i>Dependent variable (+/- SE):</i>
	6-month Treasury Yield
Constant	-20.189 (+/- 3.014) p = 0.00000***
Moody's AAA Curve	-1.348 (+/- 0.436) p = 0.005***
Real disposable income growth	0.267 (+/- 0.037) p = 0.00000***
Nominal disposable income growth	-0.247 (+/- 0.037) p = 0.00000***
Unemployment Rate	-0.536 (+/- 0.067) p = 0.000***
Commercial Real Estate Price Index	0.027 (+/- 0.004) p = 0.00000***
LN_30-year Treasury Yield	13.436 (+/- 3.000) p = 0.0002***
20-year Treasury Yield	20.995 (+/- 3.045) p = 0.00000***
LN_20-year Treasury Yield	-37.812 (+/- 5.023) p = 0.00000***
20-year Treasury Yield_2	-1.562 (+/- 0.273) p = 0.00001***
Observations	40
R ²	0.976
Adjusted R ²	0.968
Residual Std. Error	0.314 (df = 30)
F Statistic	133.098*** (df = 9; 30)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 1-YEAR TREASURY YIELD	
	<i>Dependent variable (+/- SE):</i>
	1-year Treasury Yield
Constant	-22.266 (+/- 3.710) p = 0.00001***
Real disposable income growth	0.249 (+/- 0.043) p = 0.00001***
Nominal disposable income growth	-0.229 (+/- 0.042) p = 0.00001***
Unemployment Rate	-0.514 (+/- 0.083) p = 0.00000***
Commercial Real Estate Price Index	0.021 (+/- 0.003) p = 0.00000***
30-year Treasury Yield	27.334 (+/- 5.266) p = 0.00002***
LN_30-year Treasury Yield	-38.733 (+/- 7.433) p = 0.00002***
30-year Treasury Yield_2	-2.083 (+/- 0.454) p = 0.0001***
Observations	40
R ²	0.958
Adjusted R ²	0.949
Residual Std. Error	0.381 (df = 32)
F Statistic	103.924*** (df = 7; 32)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 3-YEAR TREASURY YIELD	
	<i>Dependent variable (+/- SE):</i>
	3-year Treasury Yield
Constant	-1.454 (+/- 0.648) p = 0.032**
SP500 Stock Price Index	-0.001 (+/- 0.0003) p = 0.0002***
Real disposable income growth	0.268 (+/- 0.050) p = 0.00001***
Nominal disposable income growth	-0.254 (+/- 0.049) p = 0.00002***
Unemployment Rate	-0.425 (+/- 0.056) p = 0.000***
Home Price Index	0.042 (+/- 0.005) p = 0.000***
Observations	40
R ²	0.861
Adjusted R ²	0.840
Residual Std. Error	0.526 (df = 34)
F Statistic	42.038*** (df = 5; 34)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 5-YEAR TREASURY YIELD

	<i>Dependent variable (+/- SE):</i>
	5-year Treasury Yield
Constant	-1.027 (+/- 0.679) p = 0.140
Real GDP growth	0.235 (+/- 0.055) p = 0.0002***
Nominal GDP growth	-0.230 (+/- 0.049) p = 0.00005***
Unemployment Rate	-0.249 (+/- 0.052) p = 0.00004***
Home Price Index	0.012 (+/- 0.002) p = 0.00002***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.882 (+/- 0.201) p = 0.0002***
Market Volatility Index_2	-0.0002 (+/- 0.0001) p = 0.003***
Observations	40
R ²	0.846
Adjusted R ²	0.818
Residual Std. Error	0.505 (df = 33)
F Statistic	30.207*** (df = 6; 33)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 7-YEAR TREASURY YIELD

	<i>Dependent variable (+/- SE):</i>
	7-year Treasury Yield
Constant	2.052 (+/- 0.448) p = 0.0001***
Commercial Real Estate Price Index	-0.009 (+/- 0.002) p = 0.00001***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.759 (+/- 0.113) p = 0.00000***
1-month Treasury Yield	0.506 (+/- 0.039) p = 0.000***
Observations	40
R ²	0.888
Adjusted R ²	0.879
Residual Std. Error	0.351 (df = 36)
F Statistic	95.439*** (df = 3; 36)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 10-YEAR TREASURY YIELD

	<i>Dependent variable (+/- SE):</i>
	10-year Treasury Yield
Constant	0.332 (+/- 0.381) p = 0.390
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.639 (+/- 0.133) p = 0.00003***
1-month Treasury Yield	0.318 (+/- 0.048) p = 0.00000***
Market Volatility Index_2	-0.0002 (+/- 0.0001) p = 0.003***
Observations	40
R ²	0.791
Adjusted R ²	0.773
Residual Std. Error	0.469 (df = 36)
F Statistic	45.332*** (df = 3; 36)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 20-YEAR TREASURY YIELD

	<i>Dependent variable (+/- SE):</i>
	20-year Treasury Yield
Constant	4.948 (+/- 0.393) p = 0.000***
US Fed Reserve O-N Loan Rate	-0.939 (+/- 0.207) p = 0.0001***
Unemployment Rate	-0.095 (+/- 0.025) p = 0.001***
Commercial Real Estate Price Index	-0.009 (+/- 0.001) p = 0.000***
LN_Market Volatility Index	-0.251 (+/- 0.091) p = 0.010***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.443 (+/- 0.078) p = 0.00001***
6-month Treasury Yield	0.938 (+/- 0.160) p = 0.00001***
1-month Treasury Yield_2	0.071 (+/- 0.015) p = 0.00003***
Observations	40
R ²	0.959
Adjusted R ²	0.950
Residual Std. Error	0.192 (df = 32)
F Statistic	107.408*** (df = 7; 32)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 30-YEAR TREASURY YIELD

	<i>Dependent variable (+/- SE):</i>
	30-year Treasury Yield
Constant	2.659 (+/- 0.292) p = 0.000***
US Fed Reserve O-N Loan Rate	-0.748 (+/- 0.127) p = 0.00001***
Unemployment Rate	-0.111 (+/- 0.024) p = 0.0001***
Prime Rate	0.687 (+/- 0.095) p = 0.00000***
Home Price Index	-0.013 (+/- 0.001) p = 0.000***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.328 (+/- 0.081) p = 0.0003***
1-month Treasury Yield_2	0.101 (+/- 0.013) p = 0.000***
Observations	40
R ²	0.947
Adjusted R ²	0.937
Residual Std. Error	0.189 (df = 33)
F Statistic	97.815*** (df = 6; 33)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

30-year Mortgage Rate

REGRESSION FOR 30-YEAR MORTGATE RATE	
	<i>Dependent variable (+/- SE):</i>
	30-year Mortgage Rate
Constant	0.819 (+/- 0.467) p = 0.089*
Dow Total Stock Market Index	-0.0001 (+/- 0.00002) p = 0.0001***
Home Price Index	0.018 (+/- 0.005) p = 0.002***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.714 (+/- 0.160) p = 0.0001***
1-month Treasury Yield_2	0.086 (+/- 0.011) p = 0.000***
Observations	40
R ²	0.897
Adjusted R ²	0.886
Residual Std. Error	0.436 (df = 35)
F Statistic	76.589*** (df = 4; 35)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

Moody's AAA & BAA Rates

REGRESSION FOR MOODY'S AAA CURVE	
	<i>Dependent variable (+/- SE):</i>
	Moody's AAA Curve
Constant	3.417 (+/- 0.375) p = 0.000***
Real GDP growth	0.464 (+/- 0.057) p = 0.000***
Nominal GDP growth	-0.458 (+/- 0.057) p = 0.000***
Real disposable income growth	-0.278 (+/- 0.058) p = 0.00005***
Nominal disposable income growth	0.268 (+/- 0.056) p = 0.00005***
LN_Market Volatility Index	-0.385 (+/- 0.093) p = 0.0003***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.598 (+/- 0.095) p = 0.00000***
1-month Treasury Yield	0.921 (+/- 0.261) p = 0.002***
6-month Treasury Yield	-4.466 (+/- 0.733) p = 0.00001***
1-year Treasury Yield	3.536 (+/- 0.501) p = 0.00000***
3-month Treasury Yield_2	0.063 (+/- 0.014) p = 0.0002***
Observations	40
R ²	0.943
Adjusted R ²	0.923
Residual Std. Error	0.205 (df = 29)
F Statistic	47.552*** (df = 10; 29)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR MOODY'S BAA CURVE	
	<i>Dependent variable (+/- SE):</i>
	Moody's BAA Curve
Constant	5.571 (+/- 0.179) p = 0.000***
SP500 Stock Price Index	-0.001 (+/- 0.0001) p = 0.000***
6-month Treasury Yield	-1.617 (+/- 0.339) p = 0.00004***
1-year Treasury Yield	1.619 (+/- 0.325) p = 0.00002***
3-month Treasury Yield_2	0.108 (+/- 0.017) p = 0.00000***
Observations	40
R ²	0.890
Adjusted R ²	0.878
Residual Std. Error	0.277 (df = 35)
F Statistic	71.077*** (df = 4; 35)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

BBB Corporate Yield

REGRESSION FOR BBB CORPORATE YIELD

	<i>Dependent variable (+/- SE):</i>
	BBB corporate yield
Constant	5.456 (+/- 0.444) p = 0.000***
US Fed Reserve O-N Loan Rate	-3.668 (+/- 0.733) p = 0.00003***
Unemployment Rate	-0.147 (+/- 0.032) p = 0.0001***
Dow Total Stock Market Index	-0.00004 (+/- 0.00001) p = 0.00000***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.355 (+/- 0.095) p = 0.001***
1-month Treasury Yield	2.512 (+/- 0.642) p = 0.001***
LN_1-month Treasury Yield	-0.208 (+/- 0.074) p = 0.010***
3-month Treasury Yield	0.506 (+/- 0.131) p = 0.001***
LN_1-year Treasury Yield	0.670 (+/- 0.102) p = 0.00000***
1-year Treasury Yield_2	-0.248 (+/- 0.077) p = 0.004***
6-month Treasury Yield_2	0.362 (+/- 0.078) p = 0.0001***
Observations	40
R ²	0.976
Adjusted R ²	0.968
Residual Std. Error	0.192 (df = 29)
F Statistic	117.975*** (df = 10; 29)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

Prime Rate

REGRESSION FOR PRIME RATE	
	<i>Dependent variable (+/- SE):</i>
	Prime Rate
Constant	-21.080 (+/- 2.585) p = 0.000***
Real disposable income growth	0.211 (+/- 0.027) p = 0.00000***
Nominal disposable income growth	-0.195 (+/- 0.027) p = 0.00000***
Unemployment Rate	-0.436 (+/- 0.053) p = 0.000***
Dow Total Stock Market Index	0.0001 (+/- 0.00001) p = 0.00002***
Commercial Real Estate Price Index	0.016 (+/- 0.004) p = 0.0004***
30-year Treasury Yield	-8.057 (+/- 2.317) p = 0.002***
LN_30-year Treasury Yield	31.407 (+/- 5.700) p = 0.00001***
20-year Treasury Yield	28.485 (+/- 2.779) p = 0.000***
LN_20-year Treasury Yield	-52.158 (+/- 5.059) p = 0.000***
20-year Treasury Yield_2	-1.870 (+/- 0.239) p = 0.000***
Observations	40
R ²	0.987
Adjusted R ²	0.983
Residual Std. Error	0.229 (df = 29)
F Statistic	227.807*** (df = 10; 29)
Note:	*p<0.1; **p<0.05; ***p<0.01

US Average Retail Gasoline Price

REGRESSION FOR US AVG RETAIL GASOLINE PRICE (-GAL; ALL GRADES, ALL FORMULATIONS)	
	<i>Dependent variable (+/- SE):</i>
	US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)
Constant	-4.136 (+/- 0.255) p = 0.001***
SP500 Stock Price Index	-0.004 (+/- 0.0001) p = 0.00001***
US Fed Reserve O-N Loan Rate	9.411 (+/- 0.144) p = 0.00001***
Moody's AAA Curve	5.675 (+/- 0.102) p = 0.00002***
Moody's BAA Curve	-9.756 (+/- 0.111) p = 0.00001***
Real GDP growth	0.185 (+/- 0.002) p = 0.00001***
Real disposable income growth	1.599 (+/- 0.021) p = 0.00001***
Nominal disposable income growth	-1.594 (+/- 0.021) p = 0.00001***
Unemployment Rate	4.957 (+/- 0.071) p = 0.00001***
CPI Inflation Rate	0.850 (+/- 0.012) p = 0.00001***
BBB corporate yield	1.175 (+/- 0.024) p = 0.00002***
30-year Mortgage Rate	-1.479 (+/- 0.052) p = 0.0001***
Prime Rate	-25.370 (+/- 0.317) p = 0.00001***
Dow Total Stock Market Index	-0.0001 (+/- 0.00000) p = 0.00004***
Commercial Real Estate Price Index	0.241 (+/- 0.003) p = 0.00001***
Market Volatility Index	-0.133 (+/- 0.002) p = 0.00001***
LN_Market Volatility Index	4.363 (+/- 0.070) p = 0.00001***

30-year Treasury Yield	-20.094 (+/- 0.353) p = 0.00002***
LN_30-year Treasury Yield	115.861 (+/- 1.515) p = 0.00001***
LN_20-year Treasury Yield	19.718 (+/- 0.521) p = 0.00005***
LN_10-year Treasury Yield	-4.118 (+/- 0.066) p = 0.00001***
LN_1-month Treasury Yield	1.292 (+/- 0.019) p = 0.00001***
7-year Treasury Yield	-46.663 (+/- 0.645) p = 0.00001***
3-month Treasury Yield	-3.254 (+/- 0.139) p = 0.0002***
5-year Treasury Yield	-13.688 (+/- 0.204) p = 0.00001***
LN_5-year Treasury Yield	21.257 (+/- 0.285) p = 0.00001***
6-month Treasury Yield	8.170 (+/- 0.155) p = 0.00002***
LN_6-month Treasury Yield	2.709 (+/- 0.057) p = 0.00003***
3-year Treasury Yield	68.947 (+/- 0.898) p = 0.00001***
LN_3-year Treasury Yield	-16.991 (+/- 0.213) p = 0.00001***
1-year Treasury Yield	-24.018 (+/- 0.356) p = 0.00001***
1-year Treasury Yield_2	-1.456 (+/- 0.020) p = 0.00001***
5-year Treasury Yield_2	0.972 (+/- 0.017) p = 0.00002***
3-month Treasury Yield_2	2.796 (+/- 0.044) p = 0.00001***
7-year Treasury Yield_2	-1.050 (+/- 0.039) p = 0.0002***
1-month Treasury Yield_2	0.057 (+/- 0.004) p = 0.001***
20-year Treasury Yield_2	0.275 (+/- 0.031)

	p = 0.004***
Observations	40
R ²	1.000
Adjusted R ²	1.000
Residual Std. Error	0.007 (df = 3)
F Statistic	9,086.349*** (df = 36; 3)
Note:	*p<0.1; **p<0.05; ***p<0.01

US Federal Reserve Overnight Lending Rate

REGRESSION FOR US FED RESERVE O-N LOAN RATE	
	<i>Dependent variable (+/- SE):</i>
	US Fed Reserve O-N Loan Rate
Constant	-14.463 (+/- 3.523) p = 0.0003***
Moody's AAA Curve	-2.179 (+/- 0.509) p = 0.0002***
Real disposable income growth	0.300 (+/- 0.043) p = 0.00000***
Nominal disposable income growth	-0.281 (+/- 0.043) p = 0.00000***
Unemployment Rate	-0.525 (+/- 0.078) p = 0.00000***
Commercial Real Estate Price Index	0.024 (+/- 0.005) p = 0.00002***
LN_30-year Treasury Yield	16.286 (+/- 3.506) p = 0.0001***
20-year Treasury Yield	16.332 (+/- 3.559) p = 0.0001***
LN_20-year Treasury Yield	-33.830 (+/- 5.870) p = 0.00001***
20-year Treasury Yield_2	-1.071 (+/- 0.319) p = 0.003***
Observations	40
R ²	0.963
Adjusted R ²	0.951
Residual Std. Error	0.367 (df = 30)
F Statistic	86.011*** (df = 9; 30)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

Dow Jones Total Stock Market Index (end-of-quarter) and S&P 500 (quarterly average)

REGRESSION FOR DOW TOTAL STOCK MARKET INDEX	
	<i>Dependent variable (+/- SE):</i>
	Dow Total Stock Market Index
Constant	-13,158.020 (+/- 8,924.097) p = 0.163
Moody's BAA Curve	12,562.840 (+/- 1,168.523) p = 0.00000***
Real GDP growth	-2,369.609 (+/- 143.786) p = 0.000***
Nominal GDP growth	2,203.598 (+/- 135.940) p = 0.000***
BBB corporate yield	-6,443.623 (+/- 1,076.605) p = 0.00004***
30-year Mortgage Rate	-7,500.909 (+/- 1,236.618) p = 0.00003***
Prime Rate	32,485.140 (+/- 2,927.547) p = 0.00000***
LN_Market Volatility Index	3,467.124 (+/- 770.151) p = 0.0005***
30-year Treasury Yield	32,299.260 (+/- 6,553.556) p = 0.0003***
LN_30-year Treasury Yield	-186,168.800 (+/- 17,052.640) p = 0.00000***
10-year Treasury Yield	-35,746.920 (+/- 4,452.233) p = 0.00001***
LN_10-year Treasury Yield	94,034.270 (+/- 7,477.078) p = 0.000***
1-month Treasury Yield	19,732.390 (+/- 3,509.622) p = 0.0001***
7-year Treasury Yield	-51,508.990 (+/- 4,752.632) p = 0.00000***
LN_7-year Treasury Yield	102,594.100 (+/- 6,383.367) p = 0.000***
3-month Treasury Yield	-17,305.450 (+/- 2,281.024) p = 0.00001***
5-year Treasury Yield	45,273.390 (+/- 3,665.111) p = 0.000***

LN_5-year Treasury Yield	-63,484.690 (+/- 4,846.548) p = 0.000***
6-month Treasury Yield	-39,278.130 (+/- 5,089.510) p = 0.00001***
LN_6-month Treasury Yield	14,226.820 (+/- 1,313.698) p = 0.00000***
LN_1-year Treasury Yield	-15,306.750 (+/- 1,375.965) p = 0.00000***
1-year Treasury Yield_2	-5,634.098 (+/- 585.806) p = 0.00000***
6-month Treasury Yield_2	7,302.947 (+/- 653.032) p = 0.00000***
7-year Treasury Yield_2	5,546.609 (+/- 595.538) p = 0.00000***
1-month Treasury Yield_2	-2,063.253 (+/- 354.723) p = 0.00005***
Market Volatility Index_2	0.944 (+/- 0.233) p = 0.002***
Observations	40
R ²	0.999
Adjusted R ²	0.996
Residual Std. Error	576.444 (df = 14)
F Statistic	431.360*** (df = 25; 14)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR SP500 STOCK PRICE INDEX	
	<i>Dependent variable (+/- SE):</i>
	SP500 Stock Price Index
Constant	7,866.265 (+/- 906.109) p = 0.000***
CPI Inflation Rate	85.652 (+/- 17.212) p = 0.00004***
30-year Mortgage Rate	-1,402.281 (+/- 292.467) p = 0.0001***
Prime Rate	1,349.825 (+/- 246.365) p = 0.00002***
LN_20-year Treasury Yield	8,544.234 (+/- 1,690.580) p = 0.00004***
7-year Treasury Yield	-13,924.470 (+/- 1,487.822) p = 0.000***
LN_7-year Treasury Yield	4,432.166 (+/- 842.274) p = 0.00002***
5-year Treasury Yield	2,284.995 (+/- 450.770) p = 0.00004***
LN_5-year Treasury Yield	-2,334.500 (+/- 401.574) p = 0.00001***
3-year Treasury Yield	6,794.837 (+/- 1,104.114) p = 0.00001***
1-year Treasury Yield	-3,750.747 (+/- 573.735) p = 0.00000***
1-year Treasury Yield_2	386.946 (+/- 60.398) p = 0.00001***
3-year Treasury Yield_2	-990.148 (+/- 171.016) p = 0.00001***
7-year Treasury Yield_2	1,948.866 (+/- 252.957) p = 0.00000***
30-year Treasury Yield_2	-454.545 (+/- 101.215) p = 0.0002***
Observations	40
R ²	0.980
Adjusted R ²	0.968
Residual Std. Error	176.587 (df = 25)
F Statistic	85.836*** (df = 14; 25)

Note:

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

House and Commercial Real Estate Price Indexes

REGRESSION FOR HOME PRICE INDEX	
	<i>Dependent variable (+/- SE):</i>
	Home Price Index
Constant	187.196 (+/- 53.791) p = 0.003***
Moody's BAA Curve	23.352 (+/- 5.129) p = 0.0002***
Real GDP growth	-0.649 (+/- 0.154) p = 0.0004***
CPI Inflation Rate	6.219 (+/- 0.597) p = 0.000***
30-year Mortgage Rate	-22.447 (+/- 7.201) p = 0.006***
Prime Rate	101.388 (+/- 19.024) p = 0.00003***
LN_30-year Treasury Yield	-492.707 (+/- 44.370) p = 0.000***
10-year Treasury Yield	-80.723 (+/- 28.223) p = 0.010***
LN_10-year Treasury Yield	214.618 (+/- 42.695) p = 0.0001***
7-year Treasury Yield	-84.465 (+/- 17.437) p = 0.0001***
LN_7-year Treasury Yield	261.311 (+/- 27.532) p = 0.000***
3-month Treasury Yield	-74.629 (+/- 18.282) p = 0.001***
5-year Treasury Yield	85.840 (+/- 22.964) p = 0.002***
LN_5-year Treasury Yield	-137.696 (+/- 25.610) p = 0.00003***
6-month Treasury Yield	-42.853 (+/- 8.226) p = 0.00004***
LN_6-month Treasury Yield	44.214 (+/- 8.703) p = 0.00005***
LN_1-year Treasury Yield	-48.044 (+/- 10.030) p = 0.0001***

3-month Treasury Yield_2	5.231 (+/- 1.016) p = 0.00005***
20-year Treasury Yield_2	15.560 (+/- 2.180) p = 0.00000***
Observations	40
R ²	0.995
Adjusted R ²	0.991
Residual Std. Error	4.714 (df = 21)
F Statistic	239.197*** (df = 18; 21)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR COMMERCIAL REAL ESTATE PRICE INDEX	
	<i>Dependent variable (+/- SE):</i>
	Commercial Real Estate Price Index
Constant	-768.426 (+/- 253.255) p = 0.008***
US Fed Reserve O-N Loan Rate	-142.593 (+/- 44.379) p = 0.005***
Unemployment Rate	-29.330 (+/- 4.003) p = 0.00000***
Prime Rate	199.057 (+/- 26.966) p = 0.00000***
20-year Treasury Yield	2,276.570 (+/- 686.767) p = 0.004***
LN_20-year Treasury Yield	-2,479.158 (+/- 808.648) p = 0.007***
10-year Treasury Yield	-55.269 (+/- 15.840) p = 0.003***
1-month Treasury Yield	173.305 (+/- 39.280) p = 0.0004***
LN_1-month Treasury Yield	-17.268 (+/- 4.033) p = 0.0005***
7-year Treasury Yield	-1,846.103 (+/- 411.614) p = 0.0003***
LN_7-year Treasury Yield	1,076.162 (+/- 256.171) p = 0.001***
5-year Treasury Yield	277.924 (+/- 40.206) p = 0.00001***
LN_5-year Treasury Yield	-227.422 (+/- 33.758) p = 0.00001***
6-month Treasury Yield	-168.140 (+/- 48.300) p = 0.003***
3-year Treasury Yield	230.654 (+/- 71.586) p = 0.005***
1-year Treasury Yield_2	31.491 (+/- 5.946) p = 0.00005***
3-year Treasury Yield_2	-92.529 (+/- 22.770) p = 0.001***
5-year Treasury Yield_2	-21.009 (+/- 4.950)

	p = 0.0005***
3-month Treasury Yield_2	-11.204 (+/- 2.513)
	p = 0.0004***
7-year Treasury Yield_2	282.154 (+/- 66.353)
	p = 0.0005***
1-month Treasury Yield_2	-9.587 (+/- 3.079)
	p = 0.006***
20-year Treasury Yield_2	-232.318 (+/- 68.976)
	p = 0.004***
Observations	40
R ²	0.985
Adjusted R ²	0.967
Residual Std. Error	7.573 (df = 18)
F Statistic	56.047*** (df = 21; 18)
Note:	* p<0.1; ** p<0.05; *** p<0.01

Market Volatility Index

REGRESSION FOR MARKET VOLATILITY INDEX	
	<i>Dependent variable (+/- SE):</i>
	Market Volatility Index
Constant	137.001 (+/- 34.939) p = 0.002***
Moody's AAA Curve	-96.856 (+/- 9.102) p = 0.000***
Real GDP growth	21.678 (+/- 1.534) p = 0.000***
Nominal GDP growth	-20.423 (+/- 1.486) p = 0.000***
Real disposable income growth	-10.798 (+/- 1.356) p = 0.00000***
Nominal disposable income growth	10.158 (+/- 1.301) p = 0.00000***
Unemployment Rate	14.348 (+/- 1.612) p = 0.00000***
BBB corporate yield	19.184 (+/- 3.684) p = 0.0001***
Prime Rate	-105.358 (+/- 9.426) p = 0.000***
Dow Total Stock Market Index	0.003 (+/- 0.0003) p = 0.000***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	28.350 (+/- 3.069) p = 0.00000***
30-year Treasury Yield	-557.861 (+/- 45.412) p = 0.000***
LN_30-year Treasury Yield	1,538.006 (+/- 111.615) p = 0.000***
20-year Treasury Yield	229.798 (+/- 24.712) p = 0.00000***
LN_10-year Treasury Yield	-258.420 (+/- 23.302) p = 0.000***
LN_1-month Treasury Yield	11.212 (+/- 2.663) p = 0.001***
LN_7-year Treasury Yield	-422.796 (+/- 31.930) p = 0.000***

LN_5-year Treasury Yield	143.168 (+/- 15.900) p = 0.00000***
LN_6-month Treasury Yield	-47.819 (+/- 8.135) p = 0.00003***
3-year Treasury Yield	119.089 (+/- 9.594) p = 0.000***
LN_1-year Treasury Yield	82.119 (+/- 8.349) p = 0.00000***
5-year Treasury Yield_2	-29.564 (+/- 2.383) p = 0.000***
3-month Treasury Yield_2	6.430 (+/- 1.014) p = 0.00001***
10-year Treasury Yield_2	29.136 (+/- 2.645) p = 0.000***
Observations	40
R ²	0.982
Adjusted R ²	0.957
Residual Std. Error	2.686 (df = 16)
F Statistic	38.935*** (df = 23; 16)
Note:	*p<0.1; **p<0.05; ***p<0.01

Appendix A: Data Sources

The following table lists the attributes provided by Capitalytics as part of its macro-economic forecast service. The sources for data that are defined by the document “2024 Stress Test Scenarios” (found at <https://www.federalreserve.gov/publications/files/2024-stress-test-scenarios-20240215.pdf>) are listed. Please note that shaded attributes are not discussed within this report.

Table 16: Data Values and Referenced Sources

Attribute	Referenced Source ¹⁰⁵
Real GDP growth	Bureau of Economic Analysis (NIPA table 1.1.6, line 1)
Nominal GDP growth	Bureau of Economic Analysis (NIPA table 1.1.5, line 1)
Real disposable income growth	Bureau of Economic Analysis (NIPA table 2.1, line 27, and NIPA table 1.1.4, line 2)
Nominal disposable income growth	Bureau of Economic Analysis (NIPA table 2.1, line 27)
Unemployment rate	Bureau of Labor Statistics (series LNS14000000)
CPI inflation rate	Bureau of Labor Statistics (series CUSR0000SA0)
3-month Treasury yield	Quarterly average of 3-month Treasury bill secondary market rate on a discount basis, H.15 Release, Selected Interest Rates, Federal Reserve Board (series RIFSGFSM03_N.B)
5-year Treasury yield	Quarterly average of the yield on 5-year U.S. Treasury bonds, constructed for the FRB/U.S. model by Federal Reserve staff based on the Svensson smoothed term structure model; see Lars E. O. Svensson (1995), “Estimating Forward Interest Rates with the Extended Nelson-Siegel Method,” Quarterly Review, no. 3, Sveriges Riksbank, pp. 13–26
10-year Treasury yield	Quarterly average of the yield on 10-year U.S. Treasury bonds, constructed for the FRB/U.S. model by Federal Reserve staff based on the Svensson smoothed term structure model; see Lars E. O. Svensson (1995), “Estimating Forward Interest Rates with the Extended Nelson-Siegel Method,” Quarterly Review, no. 3, Sveriges Riksbank, pp. 13–26
BBB corporate yield	Ice Data Indices, LLC, ICE BofA BBB US Corporate Index Effective Yield [BAMLC0A4CBBBEY], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/BAMLC0A4CBBBEY ¹⁰⁶

¹⁰⁵ Per <https://www.federalreserve.gov/newsevents/pressreleases/files/bcreg20190213a1.pdf>

¹⁰⁶ Capitalytics does not have license to use the data referenced in <https://www.federalreserve.gov/newsevents/pressreleases/files/bcreg20210212a1.pdf>, specifically “Quarterly average of ICE BofAML U.S.

Mortgage rate	Quarterly average of weekly series for the interest rate of a conventional, conforming, 30-year fixed-rate mortgage, obtained from the Primary Mortgage Market Survey of the Federal Home Loan Mortgage Corporation.
Prime rate	Quarterly average of monthly series, H.15 Release, Selected Interest Rates, Federal Reserve Board (series RIFSPBLP_N.M).
Dow Jones Total Stock Market Index (end-of-qtr value)	Dow-Jones
House Price Index	Price Index for Owner-Occupied Real Estate, CoreLogic National, Z.1 Release (Financial Accounts of the United States), Federal Reserve Board (series FL075035243.Q divided by 1000) ¹⁰⁷ .
Commercial Real Estate Price Index	Commercial Real Estate Price Index, Z.1 Release (Financial Accounts of the United States), Federal Reserve Board (series FL075035503.Q divided by 1000) ¹⁰⁸ .
Market Volatility Index (VIX)	VIX converted to quarterly frequency using the maximum close-of-day value in any quarter, Chicago Board Options Exchange.
Euro Area Real GDP Growth	Percent change in real gross domestic product at an annualized rate, staff calculations based on Statistical Office of the European Communities via Haver, extended back using ECB Area Wide Model dataset (ECB Working Paper series no. 42).
Euro Area Inflation	Percent change in the quarterly average of the harmonized index of consumer prices 16 Federal Reserve Supervisory Scenarios at an annualized rate, staff calculations based on Statistical Office of the European Communities via Haver.
Euro Area Bilateral Dollar Exchange Rate (USD/Euro)	End-of-quarter rates from the H.10 Release, Foreign Exchange Rates, Federal Reserve Board.
Developing Asia Real GDP Growth	Percent change in real gross domestic product at an annualized rate, staff calculations based on Bank of Korea via Haver; Chinese National Bureau of Statistics via CEIC; Indian Central Statistical Organization via CEIC; Census and Statistics Department of Hong Kong via CEIC; and Taiwan Directorate-General of Budget, Accounting, and Statistics via CEIC.
Developing Asia Inflation	Percent change in the quarterly average of the consumer price index, or local equivalent, at an annualized rate, staff calculations based on Chinese National Bureau of Statistics via CEIC; Indian Ministry of Statistics and Programme

Corporate 7-10 Year Yield-to-Maturity Index, ICE Data Indices, LLC, used with permission. (C4A4 series.)", but we use the referenced series as a proxy.

¹⁰⁷ Capalitytics accesses this series from the data provided at https://www.quandl.com/data/FED/FL075035243_Q-Interest-rates-and-price-indexes-owner-occupied-real-estate-CoreLogic-national-SA-Quarterly-Levels-NSA

¹⁰⁸ Capalitytics accesses this series from the data provided by https://www.quandl.com/data/FED/FL075035503_Q-Interest-rates-and-price-indexes-commercial-real-estate-price-index-Quarterly-Levels-NSA

	Implementation via Haver; Labour Bureau of India via CEIC; National Statistical Office of Korea via CEIC; Census and Statistic Department of Hong Kong via CEIC; and Taiwan Directorate General of Budget, Accounting, and Statistics via CEIC.
Developing Asia bilateral dollar exchange rate (F/USD, index)	End-of-quarter rates from the H.10 Release, Foreign Exchange Rates, Federal Reserve Board.
Japan Real GDP Growth	Percent change in gross domestic product at an annualized rate, Cabinet Office via Haver.
Japan Inflation	Percent change in the quarterly average of the consumer price index at an annualized rate, staff calculations based on Ministry of Internal Affairs and Communications via Haver.
Japan Bilateral Dollar Exchange Rate (Yen/USD)	End-of-quarter rates from the H.10 Release, Foreign Exchange Rates, Federal Reserve Board.
UK Real GDP Growth	Percent change in gross domestic product at an annualized rate, Office for National Statistics via Haver.
UK Inflation	Percent change in the quarterly average of the consumer price index at an annualized rate, staff calculations based on Office for National Statistics via Haver.
UK Bilateral Dollar Exchange Rate (USD/Pound)	End-of-quarter rates from the H.10 Release, Foreign Exchange Rates, Federal Reserve Board.

The above dataset from the Federal Reserve can be downloaded manually or automatically. Manual downloads are available at https://www.federalreserve.gov/supervisionreg/files/2024-Table_2A_Historic_Domestic.csv and https://www.federalreserve.gov/supervisionreg/files/2024-Table_2B_Historic_International.csv (shown below, as of April 2024) by clicking the links marked “2024 Historical Domestic (CSV)” and “2024 Historical International (CSV)”¹⁰⁹.

Board of Governors of the Federal Reserve System
The Federal Reserve, the central bank of the United States, provides the nation with a safe, flexible, and stable monetary and financial system.

Home > Supervision & Regulation > Stress Tests

Stress Tests

Dodd-Frank Act Stress Tests 2024

Annual Large Bank Capital Requirements

Supervisory Stress Test Historical Exercises

CCAR Historical Exercises (2011-2021)

Dodd-Frank Act Stress Tests 2024

Scenarios

- 2024 Stress Test Scenarios (PDF)
- Federal Reserve Board releases the hypothetical scenarios for its annual stress test
- Scenario Data
 - 2024 Severely Adverse Market Shocks (Excel)
 - 2024 Historic Domestic (CSV)
 - 2024 Historic International (CSV)**
 - 2024 Supervisory Baseline Domestic (CSV)
 - 2024 Supervisory Baseline International (CSV)
 - 2024 Supervisory Severely Adverse Domestic (CSV)
 - 2024 Supervisory Severely Adverse International (CSV)
 - Domestic Data Definitions (PDF)
 - International Data Definitions (PDF)

Since the CCAR dataset is only released annually (through 2Q2024 as of this writing), and Capitytics provides quarterly updates to its forecasts, the CCAR dataset is supplemented by the data sources

¹⁰⁹ Again, due to the requirements of this client, international data elements are not being discussed in this document.

shown below on a quarterly basis. All datasets discussed herein are supplemented with data through (including) 2Q2024.

Table 17: Supplementary Data Sources for Data Attributes

Attribute	Supplementary Data Source
Real GDP growth	Bureau of Economic Analysis (NIPA table 1.1.6, line 1)
Nominal GDP growth	Bureau of Economic Analysis (NIPA table 1.1.5, line 1)
Real disposable income growth	Bureau of Economic Analysis (NIPA table 2.1, line 27, and NIPA table 1.1.4, line 2)
Nominal disposable income growth	Bureau of Economic Analysis (NIPA table 2.1, line 27)
Unemployment rate	Bureau of Labor Statistics (series LNS14000000)
CPI inflation rate	Bureau of Labor Statistics (series CUSR0000SA0)
3-month Treasury yield	Quarterly average of 3-month Treasury bill secondary market rate on a discount basis, H.15 Release
5-year Treasury yield	Federal Reserve Economic Research website (https://fred.stlouisfed.org/series/GS5), with “Quarterly” frequency and “Average” aggregation method
10-year Treasury yield	Federal Reserve Economic Research website (https://fred.stlouisfed.org/series/GS10), with “Quarterly” frequency and “Average” aggregation method
BBB corporate yield	Federal Reserve Economic Research website (https://fred.stlouisfed.org/series/BAMLC0A4CBBBEY), with “Quarterly” frequency and “Average” aggregation method
Mortgage rate	Federal Reserve Economic Research website (https://fred.stlouisfed.org/series/MORTGAGE30US), with “Quarterly” frequency and “Average” aggregation method
Prime rate	Federal Reserve Economic Research website (https://fred.stlouisfed.org/series/MPRIME), with “Quarterly” frequency and “Average” aggregation method
Dow Jones Total Stock Market Index (end-of-qtr value)	Dow-Jones as provided by the Wall Street Journal (https://quotes.wsj.com/index/DWCF/advanced-chart)
House Price Index	https://data.nasdaq.com/data/FED/FL075035243_Q-interest-rates-and-price-indexes-owneroccupied-real-estate-corelogic-national-sa-quarterly-levels-nsa
Commercial Real Estate Price Index	https://data.nasdaq.com/data/FED/FL075035503_Q-interest-rates-and-price-indexes-commercial-real-estate-price-index-quarterly-levels-nsa
Market Volatility Index (VIX)	Federal Reserve Economic Research website (https://fred.stlouisfed.org/series/VIXCLS), with “Quarterly” frequency and “Average” aggregation method

Euro Area Real GDP Growth	Quarterly series for “European Union GDP Annual Growth Rate” per tradingeconomics.com
Euro Area Inflation	Quarterly average of monthly series for “European Union Inflation Rate” per tradingeconomics.com
Euro Area Bilateral Dollar Exchange Rate (USD/Euro)	End-of-quarter rates from the H.10 Release, Foreign Exchange Rates, Federal Reserve Board.
Developing Asia Real GDP Growth	The nominal GDP-weighted aggregate of the Real GDP growth for China, India, South Korea, Hong Kong Special Administrative Region, and Taiwan per OECD
Developing Asia Inflation	The nominal GDP-weighted aggregate of the inflation rate for China, India, South Korea, Hong Kong Special Administrative Region, and Taiwan per OECD
Developing Asia bilateral dollar exchange rate (F/USD, index)	End-of-quarter rates from the H.10 Release, Foreign Exchange Rates, Federal Reserve Board.
Japan Real GDP Growth	Quarterly average of monthly series for “Japan GDP Growth Rate” per tradingeconomics.com
Japan Inflation	Quarterly average of monthly series for “Japan Inflation Rate” per tradingeconomics.com
Japan Bilateral Dollar Exchange Rate (Yen/USD)	End-of-quarter rates from the H.10 Release, Foreign Exchange Rates, Federal Reserve Board.
UK Real GDP Growth	Quarterly average of monthly series for “United Kingdom GDP Growth Rate” per tradingeconomics.com
UK Inflation	Quarterly average of monthly series for “United Kingdom Inflation Rate” per tradingeconomics.com
UK Bilateral Dollar Exchange Rate (USD/Pound)	End-of-quarter rates from the H.10 Release, Foreign Exchange Rates, Federal Reserve Board.

While all data that is required for the Annual Stress Tests is available from at https://www.federalreserve.gov/supervisionreg/files/2024-Table_2A_Historic_Domestic.csv and https://www.federalreserve.gov/supervisionreg/files/2024-Table_2B_Historic_International.csv, Capitalytics provides 13 additional metrics per the information in the following table. These values are available from the point at which they are collected (which varies from metric to metric) through (and including) 2Q2024.

Table 17: Supplementary Data Attributes and Sources

Attribute	Capitalytics’ Source
1-month Treasury yield	https://fred.stlouisfed.org/series/dgs1mo
6-month Treasury yield	https://fred.stlouisfed.org/series/dgs6mo
1-year Treasury yield	https://fred.stlouisfed.org/series/dgs1
3-year Treasury yield	https://fred.stlouisfed.org/series/dgs3
7-year Treasury yield	https://fred.stlouisfed.org/series/dgs7
20-year Treasury yield	https://fred.stlouisfed.org/series/dgs20

30-year Treasury yield	https://fred.stlouisfed.org/series/dgs30
US Average Retail Gasoline Price (\$/gal; all grades, all formulations)	https://fred.stlouisfed.org/series/gasallm
S&P 500 Stock Price Index	https://fred.stlouisfed.org/series/sp500
Primary Credit	https://fred.stlouisfed.org/series/FEDFUNDS
Moody's AAA Rate	https://fred.stlouisfed.org/series/aaa
Moody's BAA Rate	https://fred.stlouisfed.org/series/baa
Dow Jones Total Industrial Average	https://fred.stlouisfed.org/series/djia

Appendix B: Methodologies

Capitalytics uses non-structured macroeconomic forecasting techniques in order to prepare its clients for what trends and relationships drive certain metrics, and what values those metrics may take on in the coming months.

Section I: General Forecasting Methodology

Generally, the most effective overall forecasting techniques have been found to be a hybridization of multiple other techniques. Capitalytics uses several forecasting schemes, and aggregates the results, as part of its analysis methodology. This section describes the process that is executed for generating these results.

For each metric, four distinct forecasts are produced.

1. The first forecast uses the full quarterly history of the metric as an input to an additive exponential smoothing representation. The process that is executed is that provided by R's¹¹⁰ "forecast" package¹¹¹; specifically, the "ets" function (see p.39 of <https://cran.r-project.org/web/packages/forecast/forecast.pdf>)¹¹² is designed to automatically determine the best fitting representation out of the "Generic 'ETS' Methodology" (discussed later in this section), including optimal parameters thereto, given a sequence of values. In our work, we have restricted our study to only "additive" forms (i.e., we set "additive.only=TRUE" in our calls), and our optimization criteria is set to the mean of absolute residuals (i.e., "opt.crit=mae"). Therefore, calls to generate our estimates through this procedure look something like the following command, where "s" is an appropriately populated array, vector, time series, or similar object.

```
> m<-ets(s, model='ZZZ', opt.crit=c('mae'), additive.only=TRUE)
```

The results of this call are shown above each dataset, including the representation type returned (as described later this section), the initial values that are used by the software, the optimal smoothing parameters estimated, and the $n+1^{\text{st}}$ forecasted value given the first n values of the metric's sequence (the "fitted" values)¹¹³, and the determined parameters. While fitting forecasts to previous values,

- "forecast error" is defined as being actual values less forecasted values,
- "% error" is defined as forecast error divided by actual value, and

¹¹⁰ As of this writing, v.4.1.2 of the "R" language is available at <https://cran.r-project.org/>.

¹¹¹ As of this writing, v.8.16 of the forecast package is available at <https://CRAN.R-project.org/package=forecast>.

¹¹² It should be noted that Microsoft's Excel software includes a FORECAST.ETS function which is documented as potentially producing comparable results; however, we have not been able to re-create its output independently, and, given the documentation, flexibility, and source availability of the R packages, Capitalytics has decided that it is a preferable option at this time.

¹¹³ While this procedure does generate fitted values for intermediate samples within a sequence -- and allow for generating a forecasted set of samples to extend a sequence -- according to the identified parameter set, it does not directly provide for determining the optimal parameter set of a sub-sequence. Capitalytics is currently codifying the process herein so that we may prescribe a "most likely" long term representation for each forecast, and determine the likely effects of errors in the forecasts by estimating the "recent term" values of dy/dx_i (where y is the metric being estimated and x_i is each of the parameters within the representation) and then compensating for recent quantified errors. We can also consider how "finite" a window to account for in building a set of parameters; these representations are theoretically using all history in building a forecast, but the values for alpha, beta, etc. implicitly give an indication of how much history of a metric is truly impacting a specific value.

- “score” is defined as mean absolute forecast error over an appropriate range (generally the duration of the collected past values, less the first two to four years of collected values)¹¹⁴.
2. The second forecast uses the differences between successive quarterly values in order to forecast the future quarterly differences. It should be noted that these sequences are (obviously) one data-point shorter than those in the preceding procedure. These values are forecasted using the same procedure as described in the first section, with forecasted values for the actual metric being built using the last known value for the metric and forecasts of incremental changes to the metric provided.

An edited example for loading the SP500 end-of quarter values, and the differences between successive quarterly values, is shown below.

```
> sp<-c(130.659129, 1250.520109, 998.4076848, 812.047, 799.5264066, 927.5045326,
1041.372826, ... )
> sp_ts<-ts(sp,freq=4,end=c(2017,4))
> sp_ts
      Qtr1      Qtr2      Qtr3      Qtr4
2008    130.6591 1250.5201 998.4077
2009 812.0470 799.5264 927.5045 1041.3728
...

> m<-ets(sp_ts,model='ZZZ',opt.crit=c('mae'),additive.only=TRUE)
> dsp_ts<-diff(sp_ts)
> dsp_ts
      Qtr1      Qtr2      Qtr3      Qtr4
2008    1119.860980 -252.112424
2009 -186.360685 -12.520593 127.978126 113.868293
...

> m<-ets(dsp_ts,model='ZZZ',opt.crit=c('mae'),additive.only=TRUE)
```

3. The third forecast uses the sequence of numbers from the second forecast, but partitions the dataset based on the quarter in which they are incurred. Assuming that the differences between quarters are associated with the ending points of each quarter (i.e., the difference between third and fourth quarter values are associated with a date of December 31st), four sequences of numbers are now created, with annual forecasts now being produced for each sequence using the same procedures as previously outlined. The final sequence appropriately interleaves the forecasted data-points.
4. The fourth forecast builds three sequences of values based the history of the metric to an observed point:
 - the slope of the “best fitting” line (based on minimizing the total absolute error) using the immediately preceding 2 years of values¹¹⁵;
 - the same slope using the immediately preceding 4 years of values; and,
 - the same slope using the immediately preceding 8 years of values.

While two years of data would provide for a relatively responsive change in aggregate values to be reflected given a change in the economic conditions, eight years of data (a not unreasonable

¹¹⁴ It bears noting that a lower value for the “score” indicates better accuracy of an algorithm.

¹¹⁵ The value for this slope is calculated using Microsoft Excel’s SLOPE function, with the first argument being the appropriate number of preceding values for the metric, and the second argument being the same number of corresponding “end-of-quarter” dates.

estimate for an “economic cycle”) would allow for a much more slowly moving change in average window for a counterbalance.

Using these datasets independently, we are able to use our previous procedure to generate forecasts for each slope, and then average the results on a quarterly basis. Multiplying the average slope by the duration of the following quarter (in days) provides an estimate for the change in the metric’s value during that following quarter, just as in our second forecast.

Obviously, this technique requires at least eight years of data to pass before being able to produce any data. However, in order to err on the side of conservatism, we generally allow a sequence to “mature” for two to four years before believing that its initial transience has become less significant and its results are trustworthy. If a dataset does not have enough data to complete one of these analyses, the analysis is dropped. In other words, if the metric does not have +/-11 years of data available, the 8-year slopes cannot be reliably calculated, and the average slope is only based on the 2- & 4-year slopes¹¹⁶.

5. In some cases, we may find variables with extremely tight cross-connections that can be justified as part of their nature (treasury bill yield rates, for example, with a magnitude or correlation greater than ~0.95). In these cases, we are able to additionally enhance our forecast by building a forecast that expresses one variable (the “dependent” variable, $y(t)$) in terms of another (the “independent” variable, $x(t)$) with a coefficient of determination (R^2), such that

$$y(t) = m(t) * x(t) + b(t).$$

Notice that the “slope” and “intercept” terms in this expression are time varying expressions that are re-evaluated with each data-point, not simply constants.

By averaging the results of these distinct forecasts in order to provide an aggregate forecast, the error for which can be characterized and measured, Capitalytics aims to provide a robust dataset that can be used for future business decisions.

It was stated earlier that Capitalytics uses each metric’s complete history in order to generate a matching representation and forecast. It should be recognized that we also perform the same analyses for periods starting no more than 100, 80, 60, and 40 quarters prior to the forecasted period. However, we have found the results of all of these analyses are more reactionary and less coherent than that already presented within this report.

Section II: Exponentially Smoothed State Space Representations & Generic “ETS” Methodology

Exponential smoothing was proposed in the late 1950s (Brown 1959, Holt 1957 and Winters 1960 are key pioneering works) and has motivated some of the most successful forecasting methods. Forecasts produced using exponential smoothing methods are weighted averages of past observations, with the weights decaying exponentially as the observations get older. In other words, the more recent the observation the higher the associated weight. (See the following equation for one example of this type of equation which requires $0 \leq \alpha \leq 1$, and estimates future values of \hat{y} given a history of values denoted as y_t . The ε_{T+1} term denotes an error term, the *residual*, which determines the value of the forecasting function.) This framework generates reliable forecasts quickly and for a wide spectrum of time series.

$$\hat{y}_{T+1|T} = \alpha y_T + \alpha(1-\alpha)y_{T-1} + \alpha(1-\alpha)^2 y_{T-2} + \dots + \varepsilon_{T+1}$$

¹¹⁶ See the SP500 metric’s analysis.

In this study, the relevance of quarterly samples more than 3 years old is eliminated by setting the number of terms in this type of expression to no more than 13.

The challenge with these forecasting techniques is to estimate the value of α such that some criteria is optimized, e.g., minimizing the sum of squared errors (SSE), across all values of a set of historical values. There are other forms of exponential smoothing methods that may account for any combination of forecasting *levels* (as in the Theta method), *trends* (for which a metric may, for instance, be growing or lessening according to a linear or higher order function), and *seasonality* (for which a metric may have engrained “cycles” on, e.g., a monthly, quarterly, or annual basis).

By considering variations in the combination of the trend and seasonal components, fifteen exponential smoothing methods are possible. Each method is labelled by a pair of letters (T,S) defining the type of ‘Trend’ and ‘Seasonal’ components. For example, (A,M) is the method with an additive trend and multiplicative seasonality; (M,N) is the method with multiplicative trend and no seasonality; and so on. Per Section 7.6 of Hyndman & Athanasopoulos, some of these methods are well known per the following table.

Table 18: Mathematical Methods Associated with Trend & Seasonal Components

Trend & Seasonal Components	Method
(N,N)	simple exponential smoothing
(A,N)	Holts linear method
(M,N)	Exponential trend method
(A _d ,N)	additive damped trend method
(M _d ,N)	multiplicative damped trend method
(A,A)	additive Holt-Winters method
(A,M)	multiplicative Holt-Winters method
(A _d ,M)	Holt-Winters damped method

Additionally, the following table (again from Section 7.6 of Hyndman & Athanasopoulos) gives the recursive formulae for applying all possible fifteen exponential smoothing methods. Each cell includes the forecast equation for generating h -step-ahead forecasts and the smoothing equations for applying the method. By recursively applying the appropriate expressions to generate consecutive forecasts, this framework can be an extremely powerful tool.

Section III: Regression Construction

Capitalytics also generates a regression to estimate future values of the variables that we track in terms of current-day values. By using R’s “lm” function, we estimate the next quarter’s values for each variable in terms of the preceding set of variables’ values. These regressions are built using the immediately preceding 57 sets of variables’ values.

Each output variable is considered in turn as the response variable, with all other variables as possibilities for the control (independent) variables *excluding* any variables that have an 80% correlation with the response variable. Successive linear regressions are built; if any of the control variables’ p-values exceed 5%, or if the model’s p-value exceeds 5% and the number of considered control variables is greater than one, the most offensive control variable is dropped, and the regression is re-run.

Trend	N	Seasonal A	M
N	$\hat{y}_{t+h t} = \ell_t$ $\ell_t = \alpha y_t + (1 - \alpha)\ell_{t-1}$	$\hat{y}_{t+h t} = \ell_t + s_{t-m+h_m^+}$ $\ell_t = \alpha(y_t - s_{t-m}) + (1 - \alpha)\ell_{t-1}$ $s_t = \gamma(y_t - \ell_{t-1}) + (1 - \gamma)s_{t-m}$	$\hat{y}_{t+h t} = \ell_t s_{t-m+h_m^+}$ $\ell_t = \alpha(y_t/s_{t-m}) + (1 - \alpha)\ell_{t-1}$ $s_t = \gamma(y_t/\ell_{t-1}) + (1 - \gamma)s_{t-m}$
A	$\hat{y}_{t+h t} = \ell_t + hb_t$ $\ell_t = \alpha y_t + (1 - \alpha)(\ell_{t-1} + b_{t-1})$ $b_t = \beta^*(\ell_t - \ell_{t-1}) + (1 - \beta^*)b_{t-1}$	$\hat{y}_{t+h t} = \ell_t + hb_t + s_{t-m+h_m^+}$ $\ell_t = \alpha(y_t - s_{t-m}) + (1 - \alpha)(\ell_{t-1} + b_{t-1})$ $b_t = \beta^*(\ell_t - \ell_{t-1}) + (1 - \beta^*)b_{t-1}$ $s_t = \gamma(y_t - \ell_{t-1} - b_{t-1}) + (1 - \gamma)s_{t-m}$	$\hat{y}_{t+h t} = (\ell_t + hb_t)s_{t-m+h_m^+}$ $\ell_t = \alpha(y_t/s_{t-m}) + (1 - \alpha)(\ell_{t-1} + b_{t-1})$ $b_t = \beta^*(\ell_t - \ell_{t-1}) + (1 - \beta^*)b_{t-1}$ $s_t = \gamma(y_t/(\ell_{t-1} + b_{t-1})) + (1 - \gamma)s_{t-m}$
A_d	$\hat{y}_{t+h t} = \ell_t + \phi_h b_t$ $\ell_t = \alpha y_t + (1 - \alpha)(\ell_{t-1} + \phi b_{t-1})$ $b_t = \beta^*(\ell_t - \ell_{t-1}) + (1 - \beta^*)\phi b_{t-1}$	$\hat{y}_{t+h t} = \ell_t + \phi_h b_t + s_{t-m+h_m^+}$ $\ell_t = \alpha(y_t - s_{t-m}) + (1 - \alpha)(\ell_{t-1} + \phi b_{t-1})$ $b_t = \beta^*(\ell_t - \ell_{t-1}) + (1 - \beta^*)\phi b_{t-1}$ $s_t = \gamma(y_t - \ell_{t-1} - \phi b_{t-1}) + (1 - \gamma)s_{t-m}$	$\hat{y}_{t+h t} = (\ell_t + \phi_h b_t)s_{t-m+h_m^+}$ $\ell_t = \alpha(y_t/s_{t-m}) + (1 - \alpha)(\ell_{t-1} + \phi b_{t-1})$ $b_t = \beta^*(\ell_t - \ell_{t-1}) + (1 - \beta^*)\phi b_{t-1}$ $s_t = \gamma(y_t/(\ell_{t-1} + \phi b_{t-1})) + (1 - \gamma)s_{t-m}$
M	$\hat{y}_{t+h t} = \ell_t b_t^h$ $\ell_t = \alpha y_t + (1 - \alpha)\ell_{t-1}b_{t-1}$ $b_t = \beta^*(\ell_t/\ell_{t-1}) + (1 - \beta^*)b_{t-1}$	$\hat{y}_{t+h t} = \ell_t b_t^h + s_{t-m+h_m^+}$ $\ell_t = \alpha(y_t - s_{t-m}) + (1 - \alpha)\ell_{t-1}b_{t-1}$ $b_t = \beta^*(\ell_t/\ell_{t-1}) + (1 - \beta^*)b_{t-1}$ $s_t = \gamma(y_t - \ell_{t-1}b_{t-1}) + (1 - \gamma)s_{t-m}$	$\hat{y}_{t+h t} = \ell_t b_t^h s_{t-m+h_m^+}$ $\ell_t = \alpha(y_t/s_{t-m}) + (1 - \alpha)\ell_{t-1}b_{t-1}$ $b_t = \beta^*(\ell_t/\ell_{t-1}) + (1 - \beta^*)b_{t-1}$ $s_t = \gamma(y_t/(\ell_{t-1}b_{t-1})) + (1 - \gamma)s_{t-m}$
M_d	$\hat{y}_{t+h t} = \ell_t b_t^{\phi_h}$ $\ell_t = \alpha y_t + (1 - \alpha)\ell_{t-1}b_{t-1}^{\phi}$ $b_t = \beta^*(\ell_t/\ell_{t-1}) + (1 - \beta^*)b_{t-1}^{\phi}$	$\hat{y}_{t+h t} = \ell_t b_t^{\phi_h} + s_{t-m+h_m^+}$ $\ell_t = \alpha(y_t - s_{t-m}) + (1 - \alpha)\ell_{t-1}b_{t-1}^{\phi}$ $b_t = \beta^*(\ell_t/\ell_{t-1}) + (1 - \beta^*)b_{t-1}^{\phi}$ $s_t = \gamma(y_t - \ell_{t-1}b_{t-1}^{\phi}) + (1 - \gamma)s_{t-m}$	$\hat{y}_{t+h t} = \ell_t b_t^{\phi_h} s_{t-m+h_m^+}$ $\ell_t = \alpha(y_t/s_{t-m}) + (1 - \alpha)\ell_{t-1}b_{t-1}^{\phi}$ $b_t = \beta^*(\ell_t/\ell_{t-1}) + (1 - \beta^*)b_{t-1}^{\phi}$ $s_t = \gamma(y_t/(\ell_{t-1}b_{t-1}^{\phi})) + (1 - \gamma)s_{t-m}$

Appendix C: Variable Correlations

The following table shows the correlation factors between all of the listed variables for which the absolute value of the correlation is greater than 0.6, indicating a noteworthy degree of correlation. As is discussed in Appendix B of this report, (absolute) correlations greater than 0.95 warrant further investigation as the relationship between variables may be useful for our research.

Table 7: Correlation Factors found as of 2Q2024

Variable 1	Variable 2	Correlation
S&P500 Stock Price Index	Annualized US Inflation Rate (all items, all urban areas)	0.644473
S&P500 Stock Price Index	Dow-Jones Total Stock Market Index	0.965802
S&P500 Stock Price Index	US Nat'l Residential Home Price Index	0.947577
S&P500 Stock Price Index	US Nat'l Commercial Real Estate Index	0.942308
Cost of Federal Funds	Moody's AAA Yield	0.775244
Cost of Federal Funds	Moody's BAA Yield	0.72023
Cost of Federal Funds	BofA BBB Corporate Yield	0.749103
Cost of Federal Funds	30-year Fixed Mortgage Rate	0.871324
Cost of Federal Funds	US Prime Rate	0.996415
Cost of Federal Funds	30-year Treasury Yield	0.76487
Cost of Federal Funds	20-year Treasury Yield	0.770514
Cost of Federal Funds	10-year Treasury Yield	0.836284
Cost of Federal Funds	1-month Treasury Yield	0.993368
Cost of Federal Funds	7-year Treasury Yield	0.880438
Cost of Federal Funds	3-month Treasury Yield	0.995559
Cost of Federal Funds	5-year Treasury Yield	0.910503
Cost of Federal Funds	6-month Treasury Yield	0.99257
Cost of Federal Funds	3-year Treasury Yield	0.949364
Cost of Federal Funds	1-year Treasury Yield	0.985656
Moody's AAA Yield	Moody's BAA Yield	0.97935
Moody's AAA Yield	BofA BBB Corporate Yield	0.947956
Moody's AAA Yield	30-year Fixed Mortgage Rate	0.965746
Moody's AAA Yield	US Prime Rate	0.753029
Moody's AAA Yield	Dow-Jones Total Stock Market Index	-0.749064
Moody's AAA Yield	US Nat'l Residential Home Price Index	-0.77277
Moody's AAA Yield	US Nat'l Commercial Real Estate Index	-0.828321
Moody's AAA Yield	Average Retail Gasoline Price (all grades)	-0.708772
Moody's AAA Yield	30-year Treasury Yield	0.985177
Moody's AAA Yield	20-year Treasury Yield	0.982851
Moody's AAA Yield	10-year Treasury Yield	0.98365
Moody's AAA Yield	7-year Treasury Yield	0.962184
Moody's AAA Yield	3-month Treasury Yield	0.770259
Moody's AAA Yield	5-year Treasury Yield	0.938819
Moody's AAA Yield	6-month Treasury Yield	0.776467
Moody's AAA Yield	3-year Treasury Yield	0.888083
Moody's AAA Yield	1-year Treasury Yield	0.799123
Moody's BAA Yield	BofA BBB Corporate Yield	0.98374
Moody's BAA Yield	30-year Fixed Mortgage Rate	0.940102
Moody's BAA Yield	US Prime Rate	0.697489
Moody's BAA Yield	Dow-Jones Total Stock Market Index	-0.764292
Moody's BAA Yield	US Nat'l Residential Home Price Index	-0.758875
Moody's BAA Yield	US Nat'l Commercial Real Estate Index	-0.804096
Moody's BAA Yield	Average Retail Gasoline Price (all grades)	-0.671011
Moody's BAA Yield	30-year Treasury Yield	0.94901
Moody's BAA Yield	20-year Treasury Yield	0.932452
Moody's BAA Yield	10-year Treasury Yield	0.947416
Moody's BAA Yield	7-year Treasury Yield	0.915012
Moody's BAA Yield	3-month Treasury Yield	0.71327
Moody's BAA Yield	5-year Treasury Yield	0.888969

MACROECONOMIC FORECASTS, 4Q2023 – FINAL VERSION

Moody's BAA Yield	6-month Treasury Yield	0.720867
Moody's BAA Yield	3-year Treasury Yield	0.833509
Moody's BAA Yield	1-year Treasury Yield	0.74342
Real GDP Growth Rate	Nominal GDP Growth Rate	0.958629
Real Disposable Income Growth Rate	Nominal Disposable Income Growth Rate	0.972356
BofA BBB Corporate Yield	30-year Fixed Mortgage Rate	0.936681
BofA BBB Corporate Yield	US Prime Rate	0.728585
BofA BBB Corporate Yield	Dow-Jones Total Stock Market Index	-0.68448
BofA BBB Corporate Yield	US Nat'l Residential Home Price Index	-0.672056
BofA BBB Corporate Yield	US Nat'l Commercial Real Estate Index	-0.707755
BofA BBB Corporate Yield	30-year Treasury Yield	0.906009
BofA BBB Corporate Yield	20-year Treasury Yield	0.885939
BofA BBB Corporate Yield	10-year Treasury Yield	0.925676
BofA BBB Corporate Yield	7-year Treasury Yield	0.901936
BofA BBB Corporate Yield	3-month Treasury Yield	0.743895
BofA BBB Corporate Yield	5-year Treasury Yield	0.885615
BofA BBB Corporate Yield	6-month Treasury Yield	0.752991
BofA BBB Corporate Yield	3-year Treasury Yield	0.843695
BofA BBB Corporate Yield	1-year Treasury Yield	0.772086
30-year Fixed Mortgage Rate	US Prime Rate	0.853847
30-year Fixed Mortgage Rate	US Nat'l Residential Home Price Index	-0.609398
30-year Fixed Mortgage Rate	US Nat'l Commercial Real Estate Index	-0.684339
30-year Fixed Mortgage Rate	Average Retail Gasoline Price (all grades)	-0.618464
30-year Fixed Mortgage Rate	30-year Treasury Yield	0.9586
30-year Fixed Mortgage Rate	20-year Treasury Yield	0.96345
30-year Fixed Mortgage Rate	10-year Treasury Yield	0.984336
30-year Fixed Mortgage Rate	1-month Treasury Yield	0.735014
30-year Fixed Mortgage Rate	7-year Treasury Yield	0.98419
30-year Fixed Mortgage Rate	3-month Treasury Yield	0.875711
30-year Fixed Mortgage Rate	5-year Treasury Yield	0.978812
30-year Fixed Mortgage Rate	6-month Treasury Yield	0.882769
30-year Fixed Mortgage Rate	3-year Treasury Yield	0.954454
30-year Fixed Mortgage Rate	1-year Treasury Yield	0.899911
US Prime Rate	30-year Treasury Yield	0.739138
US Prime Rate	20-year Treasury Yield	0.759595
US Prime Rate	10-year Treasury Yield	0.815429
US Prime Rate	1-month Treasury Yield	0.992957
US Prime Rate	7-year Treasury Yield	0.861773
US Prime Rate	3-month Treasury Yield	0.992395
US Prime Rate	5-year Treasury Yield	0.89415
US Prime Rate	6-month Treasury Yield	0.989419
US Prime Rate	3-year Treasury Yield	0.937744
US Prime Rate	1-year Treasury Yield	0.981249
Dow-Jones Total Stock Market Index	US Nat'l Residential Home Price Index	0.925688
Dow-Jones Total Stock Market Index	US Nat'l Commercial Real Estate Index	0.922644
Dow-Jones Total Stock Market Index	Average Retail Gasoline Price (all grades)	0.600663
Dow-Jones Total Stock Market Index	30-year Treasury Yield	-0.739355
Dow-Jones Total Stock Market Index	20-year Treasury Yield	-0.659942
Dow-Jones Total Stock Market Index	10-year Treasury Yield	-0.675306
Dow-Jones Total Stock Market Index	7-year Treasury Yield	-0.612416
US Nat'l Residential Home Price Index	US Nat'l Commercial Real Estate Index	0.96975
US Nat'l Residential Home Price Index	Average Retail Gasoline Price (all grades)	0.710054
US Nat'l Residential Home Price Index	30-year Treasury Yield	-0.758096
US Nat'l Residential Home Price Index	20-year Treasury Yield	-0.666752
US Nat'l Residential Home Price Index	10-year Treasury Yield	-0.696708
US Nat'l Residential Home Price Index	7-year Treasury Yield	-0.644783
US Nat'l Commercial Real Estate Index	Average Retail Gasoline Price (all grades)	0.73899
US Nat'l Commercial Real Estate Index	30-year Treasury Yield	-0.827176
US Nat'l Commercial Real Estate Index	20-year Treasury Yield	-0.774362
US Nat'l Commercial Real Estate Index	10-year Treasury Yield	-0.76491
US Nat'l Commercial Real Estate Index	7-year Treasury Yield	-0.713766
US Nat'l Commercial Real Estate Index	5-year Treasury Yield	-0.664365
Average Retail Gasoline Price (all grades)	30-year Treasury Yield	-0.690486

MACROECONOMIC FORECASTS, 4Q2023 – FINAL VERSION

Average Retail Gasoline Price (all grades)	20-year Treasury Yield	-0.677253
Average Retail Gasoline Price (all grades)	10-year Treasury Yield	-0.68843
Average Retail Gasoline Price (all grades)	7-year Treasury Yield	-0.678952
Average Retail Gasoline Price (all grades)	5-year Treasury Yield	-0.662722
Average Retail Gasoline Price (all grades)	3-year Treasury Yield	-0.615758
30-year Treasury Yield	20-year Treasury Yield	0.995372
30-year Treasury Yield	10-year Treasury Yield	0.986364
30-year Treasury Yield	7-year Treasury Yield	0.965681
30-year Treasury Yield	3-month Treasury Yield	0.764846
30-year Treasury Yield	5-year Treasury Yield	0.939504
30-year Treasury Yield	6-month Treasury Yield	0.770547
30-year Treasury Yield	3-year Treasury Yield	0.886718
30-year Treasury Yield	1-year Treasury Yield	0.7946
20-year Treasury Yield	10-year Treasury Yield	0.992561
20-year Treasury Yield	7-year Treasury Yield	0.970526
20-year Treasury Yield	3-month Treasury Yield	0.767911
20-year Treasury Yield	5-year Treasury Yield	0.942216
20-year Treasury Yield	6-month Treasury Yield	0.778411
20-year Treasury Yield	3-year Treasury Yield	0.890878
20-year Treasury Yield	1-year Treasury Yield	0.805963
10-year Treasury Yield	1-month Treasury Yield	0.636238
10-year Treasury Yield	7-year Treasury Yield	0.993023
10-year Treasury Yield	3-month Treasury Yield	0.838156
10-year Treasury Yield	5-year Treasury Yield	0.979223
10-year Treasury Yield	6-month Treasury Yield	0.845491
10-year Treasury Yield	3-year Treasury Yield	0.942913
10-year Treasury Yield	1-year Treasury Yield	0.867485
1-month Treasury Yield	7-year Treasury Yield	0.757662
1-month Treasury Yield	3-month Treasury Yield	0.998018
1-month Treasury Yield	5-year Treasury Yield	0.83567
1-month Treasury Yield	6-month Treasury Yield	0.992242
1-month Treasury Yield	3-year Treasury Yield	0.91971
1-month Treasury Yield	1-year Treasury Yield	0.982595
7-year Treasury Yield	3-month Treasury Yield	0.885199
7-year Treasury Yield	5-year Treasury Yield	0.995694
7-year Treasury Yield	6-month Treasury Yield	0.892702
7-year Treasury Yield	3-year Treasury Yield	0.973626
7-year Treasury Yield	1-year Treasury Yield	0.912676
3-month Treasury Yield	5-year Treasury Yield	0.916783
3-month Treasury Yield	6-month Treasury Yield	0.998449
3-month Treasury Yield	3-year Treasury Yield	0.957694
3-month Treasury Yield	1-year Treasury Yield	0.993349
5-year Treasury Yield	6-month Treasury Yield	0.924535
5-year Treasury Yield	3-year Treasury Yield	0.989727
5-year Treasury Yield	1-year Treasury Yield	0.94241
6-month Treasury Yield	3-year Treasury Yield	0.965258
6-month Treasury Yield	1-year Treasury Yield	0.997586
3-year Treasury Yield	1-year Treasury Yield	0.978566
6-month Treasury Yield	1-year Treasury Yield	0.997737
3-year Treasury Yield	1-year Treasury Yield	0.979289

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